Conference:

CRITICAL PRACTICE in an AGE of COMPLEXITY

An Interdisciplinary Critique of the Built Environment
AMPS CONFERENCE 12

CRITICAL PRACTICE IN AN AGE OF COMPLEXITY – An Interdisciplinary Critique of the Built Environment
AMPS, Architecture_MPS; University of Arizona
22—23 February, 2018

CRITICAL PRACTICE IN AN AGE OF COMPLEXITY – An Interdisciplinary Critique of the Built Environment

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INTRODUCTION

Every generation of architects, urban designers, planners and artists engaged with the built environment face a set of seemingly intractable and isolated problems particular to their time. Mid 19th Century city planners addressed questions of public health while architects engaged in a ‘battle of the styles’. Early 20th century architects argued for a ‘contemporary style’ while architects / urban designers created visions of cities in the sky. By the 1970s ecological forerunners argued for a future of sustainable living while post-modernists looked to the past for aesthetics. Today, Donald Trump promises investment in infrastructure while simultaneously relaxing environmental regulations and targets. China continues to urbanize and pollute while industrial cities in the West continue to decline and ‘go green’. Internationally, global cities of commerce can be surrounded by slums and in many cities housing is unaffordable as a place of living while it functions as a major form of capital investment. This all happens against a backdrop of the arts and cultural industries seen as economic motors, conflicting media representations of urbanization, and the emergence of new medias altering the experience and forms of reporting on life in cities. To design and understand the built environment in the middle of this complexity and contradiction requires reflection and vision. It also requires critique and multiple practices.

The publication, and the conference which it documents, were organized to create a space for critical engagement with this scenario and facilitate the cross disciplinary approach it obliges. It was organised by the research organisation AMPS, its academic journal Architecture_MPS, and the University of Arizona.
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INDEX

1. DEVELOPMENT PROJECTS AS HEGEMONIC PROJECTS: ANALYSIS OF THE FUNCTIONS OF IMAGINEERING POLICIES IN SAGHEZ 8
   Hossein Banifatemeh, Farhad Bayani

2. LEARNING THROUGH PROTOTYPING 24
   Mahsan Mohsenin

3. ARCHITECTURE AS URBANISM: A MAJOR COURSE CORRECTION FOR ARCHITECTURE AND THE CITY? 30
   Norman Crowe

4. SINGULAR USE LANDSCAPES: A CRITIQUE OF METROPOLITAN SOLAR FARMS 38
   Kirk Dimond, Aaron Johnson

5. SENSE OF PLACE, HABITS OF CITIZENRY 49
   Kelum Palipane

6. DUAL ECOLOGIES: A CRITICAL PRACTICE 62
   Genevieve Baudoin

7. PHYSICAL AND SOCIAL DECAY: EXAMINING THE EFFECT OF ENVIRONMENTAL FACTORS ON HEROIN USE IN RURAL AND URBAN AREAS 68
   Paul DC Bones
8. ARCHITECTURE IN THE LAND OF DEVELOPMENTAL STATE: INSTRUMENTALIZING THE MUNICIPAL SERVICES BUILDING IN HONG KONG 77
Cheng-Chun Patrick Hwang

9. USING GENERATIVE DESIGN IN THE REHABILITATION OF FAVELAS IN WATERFRONT AREAS 86
Ana Luisa Rolim

10. MEDIATIC SURFACES: SHAPING URBAN ENVIRONMENTS. 96
Benjamin A. Bross

11. ROLES, AGENCY AND RELATIONS OF GIGA-MAPS IN SYSTEMIC APPROACH TO ARCHITECTURAL PERFORMANCE 104
Marie Davidová

12. SPIRALLING SLOPE AS A REAL LIFE CO-DESIGN LABORATORY 120
Marie Davidová, Parel Pánek, Michaela Pánková

13. SYSLOOP: AN ALLOPOIETIC ENVIRONMENT AGENCY 132
Karel Pánek, Marie Davidová

14. CRITICAL SPATIAL PRACTICES OF MONUMENTALITY IN THE SMART CITY 142
Dave Colangelo

15. LOST URBAN CONDITIONS OF HONG KONG: THE INFRASTRUCTURAL SPACES OF THE MEIFOO HOUSING ESTATE 151
Jing Luo, Peter W. Ferretto

16. THE PROJECT IS PRESENT: MINIMAL ART AND ITS CONTRIBUTION TOWARDS THE DEFINITION OF A NONREPRESENTATIVE ARCHITECTURAL MEDIUM 159
Andrea Zammataro
<table>
<thead>
<tr>
<th></th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.</td>
<td>SPATIAL UNCERTAINTIES OF EDUCATION REFORM: THE CASE OF HENDERSON-HOPKINS SCHOOL IN EAST BALTIMORE</td>
<td>165</td>
</tr>
<tr>
<td></td>
<td>Erikin Özay</td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>LEGISLATIVE NARRATIVES: TEXT AND GROUND COMPARISON</td>
<td>174</td>
</tr>
<tr>
<td></td>
<td>Masha Hupalo</td>
<td></td>
</tr>
<tr>
<td>19.</td>
<td>CRITICAL PRACTICE IN A LOST ARCHITECTURAL CULTURE</td>
<td>182</td>
</tr>
<tr>
<td></td>
<td>Gerald Gast</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>RE-VISITING UTOPIA: DIGITALITY TO AUGMENT MOMENTS OF THE IDEAL</td>
<td>191</td>
</tr>
<tr>
<td></td>
<td>Johan Voordouw</td>
<td></td>
</tr>
<tr>
<td>21.</td>
<td>DRAWING POLITICAL SPACE: REASSEMBLING CIVIC APPARATUSES IN MONTRÉAL, 1992 TO 2017</td>
<td>199</td>
</tr>
<tr>
<td></td>
<td>Thomas-Bernard Kenniff</td>
<td></td>
</tr>
<tr>
<td>22.</td>
<td>THE SPATIAL IMPACT OF IMMIGRATION</td>
<td>213</td>
</tr>
<tr>
<td></td>
<td>Cristina Cassandra Murphy</td>
<td></td>
</tr>
<tr>
<td>23.</td>
<td>THE ARCHITECTURE EXHIBITION AS AN ENVIRONMENT FOR A RADICAL REDESIGN OF THE BUILT ENVIRONMENT</td>
<td>223</td>
</tr>
<tr>
<td></td>
<td>Charlott Greub</td>
<td></td>
</tr>
<tr>
<td>24.</td>
<td>TIMELY MONUMENTS AND PERSISTENT CAMPS: A CALL FOR EXCEPTION</td>
<td>231</td>
</tr>
<tr>
<td></td>
<td>Lindsey Harkema</td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td>REVITALIZATION OF THE URBAN THROUGH THE SOCIAL FABRIC: TOOLS FOR THE ANALYSIS OF A MEXICAN DOWNTOWN NEIGHBORHOOD</td>
<td>238</td>
</tr>
<tr>
<td></td>
<td>Martha Martina Robles-Baldenegro, Luisa Maria Gutierrez-Sanchez, Rosa Maria Mendoza-Robles</td>
<td></td>
</tr>
</tbody>
</table>
26. ARCHITECTURE FOR YOU, ME, & THE BEES
Jan Smitheram

27. THE SLIDING PUZZLE MODEL FOR SCALING-UP CITIES: HOW CONTINUOUS CYCLES OF DEVELOPMENT AND GROWTH CAN BE ENABLED BY INTRODUCING STATE-ENFORCED QUOTAS OF EMPTY URBAN SPACES
João Silva Jordão

28. COPRODUCING HYBRID INFRASTRUCTURES
Marantha Dawkins

29. DYNAMIC LANDSCAPES | EMERGING TERRITORIES
Rana Abudayyeh

James Brazil, Esber Andiroglu, Shruti Khandelwal

31. LEARNING FROM LIMINAL PHENOMENA: THE CASE OF ABANDONED LARGE URBAN STRUCTURES (ALUS)
Tiphaine Abenia

32. SENSE OF PLACE IN THE ERA OF ANTHROPOCENE
Carla Brisotto

33. ASSESSING SURVEILLANCE: INFRASTRUCTURES OF SECURITY IN THE TOHONO O'ODHAM NATION
Caitlin Blanchfield, Nina Kolowratnik

34. POLITICS OF MASS HOUSING IN BAGHDAD: FROM SOCIALISM TO NEOLIBERALISM
Samah Abraham
DEVELOPMENT PROJECTS AS HEGEMONIC PROJECTS: ANALYSIS OF THE FUNCTIONS OF IMAGINEERING POLICIES IN SAGHEZ

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INTRODUCTION

Development projects and city expansion programs have had important and multi-dimensional achievements in contemporary cities. Not only construction and development projects have apparent and useful achievements, but also there are hidden and harmful sequences which are more effective in forming values and behavioral patterns and citizens’ identities today. Development projects in addition to their physical aspects have effective social and cultural dimensions; in most cases, they secure the purposes and demands of the rich and hegemonic men. It can be argued that their social and cultural sequences are more important than their physical services. Most of the time, urban managers, urban planners, and municipalities may coordinate their actions with Imagineering policies, unconsciously and on imitation and copying the appearance of developed cities. However, consciously or unconsciously, the harmful sequences of these social-physical constructions influence the identity, behavioral patterns, and cultural structure of society.

Most information required for the study was based upon knowledgeable people’s information or author observations. Also the information in various official resources was used.

Imagineering includes strategies and practices of urban planners and managers who create living imagination for citizens, applying these strategies in developing cities. They persuade citizens to ignore urban deficiencies and shortcomings through Imagineering, (Paul, 2004). The cities towing the label of world city have popular image and try to induce the imagination of moving toward socioeconomic development among citizens through spreading meta-local identities for cities and citizens, causing urban planners and managers use scenery and interesting urban surprises to induce that these cities are developing, close to modern, and developed, while they have no connection with modern and world cities (Applebome, 2001). Urban administrations do not follow real and infrastructural development of cities but try to represent these cities as developed ones. Imagineering leaders believe that the label “world class” is permanent feature of heterogeneous cities such as Mumbai, Shenzhen, Birmingham, Houston, Charlotte, and North Carolina (Shivadasani, 2001; Cartier, 2000; James n.d, Brown, 2000; Charlotte Mayors International Cabinet, 1994).

How a city, having no coordination with world city, has been lead in this direction? What is the relationship between Saghez, as a city which does not have any proportionality to world city, and Imagineering? Although there is no economic and social relation between Saghez and European and North American cities, analyzing the practices and activities of Saghez urban planners and managers clarifies that Imagineering policies applied in Saghez are similar to other cities in the world. Urban administrations in Saghez create the imagination of living in a developed city for Saghez citizens through high costs and useless expansions on shopping malls, and therefore hide the deficiencies and
shortcomings. Saghez’s urban administrators try to hide their managerial inefficiency through decorating the appearance of the city. Cities having global labeling do not have global characteristics and have hardly withstood, and with heavy and illogic costs have tried to keep alive the image of development in their citizens’ minds and make them negligent regarding city problems (Friedmann, 1968). The majority of people face routinizing with consumerism and critical thinking reduction. Mayor, city council, governor, and other planners in Saghez follow Imagineering policies unconsciously. Since Saghez’s urban planners are not aware of hegemonic development projects and Imagineering, mimic, unconsciously, the patterns of expansion and development in developed cities. Kim and Short use the term wannabe world cities (Kim & Short, 1999). Does construction of beautiful and attractive indexes for trading buildings or water-dancing waterwheels create development or image of development?

The urban environment is like canvas that runs on its hegemonic projects and Imagineering policies (Pagano & Bowman, 1995). Place, investment, and Imagineering are fundamental elements of a city’s physical appearance and global quality. They also have important role in motivating to hold festivals, sport events, buildings, parks, squares, and roads, and even neighborhood has symbolic meaning. These constructions and economic projects are hegemonic policies in which economic and political groups, classes, and coalitions reproduce their authority and hide their ineffective management in urban areas (Archer, 1997). Imagineering creates parks, entertainment centers, and shopping malls. These places are where the citizens become mere consumers more than ever. Citizens’ minds become so affected by bombardment of signs, seduction of shopping mall phantasmagoria so that they cannot recognize the hegemony around; therefore, they reproduce the abnormal situation repeatedly, continuously, and unconsciously. According to Wallace (1985:53), parks are places for classic grandstanding throughout … a place favored to boasting and indication of distinction through excessive consumption”. Urban facilities, in addition to the physical aspect, include spread of social and hegemonic messages and meanings. The symbols and meanings have important role in forming identity, thinking, behavior, and value patterns. Archer believes that urban facilities and physical construction are also social phenomena and live realities (quoted in Paul, 2004). Also a study on the role of branding in local and national strategies of economic development indicated that local branding system not only shapes the place within a customer’s mental framework, but also has an important function in shaping individuals’ identity (Van Ham, 2002: 254).

The current study tried to investigate how urban planners and managers, consciously or unconsciously, induce Imagineering policies to citizens and how they hide their mismanagement and poor decisions through these policies? And what are the consequences of Imagineering policies for citizens in Saghez? And what are the functions of Imagineering policies in Saghez?

The Definition of the key concepts

1. Imagineering

The term of “Imagineering” was invented by Walt Disney Studios to describe the composition of imagination with engineering in order to create dream and fantasy reality (Imagineers, 1996). Although some Imagineering aspects are studied in management of identity, many political aspects are neglected (Van Ham, 2002: 255). Although urban buildings follow economic purposes to some extent, they are not only limited to the production of capital and wealth. They follow certain definition and clear interpretation for cities. This process is hidden behind such projects and can apply its political power to citizens’ behaviors and minds through its dominant view and values such as cosmopolitanism, global relations, and creation of wealth in transnational capitalism (Paul, 2004).
reality, Imagineering is a collection of strategies that tries to guide minds of social actors and form their values, norms, and identities, and through making imagination of development, make the citizens inattentive to main urban problems and challenges. Imagineering via spread of consumerism reduces critical thinking among social actors, thus, via making them mass society, hinders their analysis of the condition and problems of city.

2. Hegemony

The main assumption of Gramsci’s thought is human is not controlled just by government but beliefs have an important role in this (Bate 1967, 351). Marx, like to Gramsci, believed ‘the ideas and beliefs of each generation are the beliefs of the ruling class of the same generation’ (Feuer 1959, 26). Unlike Marx, He didn’t believe that all governments are a dictator but he knew the gullibility of Marxist thinkers about events around has led to serious mistakes on the part of the Italian Left Party and to the rise of fascism (Bates 1975, 351). Hegemony means consensus-based domination or ideological domination. A kind of domination which this is based on satisfaction and cultural leadership. Also, this means cultural and ideological leadership of societies (Pourahmadi-e-Meibodi and Saidi 2011, 148). Perry Anderson about hegemony believes hegemony has spread to large extent in Russian Marxism and although hegemony was referred to workers peasantry in Russian Marxism but, Gramsci in his book, prison notebooks (1999) used hegemony in a different way and now it is referred to analysis of power the structure of bourgeois power in West (Anderson 1967 quoted in Riley 2011).

According to these content, Gramsci uses hegemony to explain the mechanism of exercise power and domination of dominant class on dominated classes. Also, he wants to describe the process of power exert from Western countries against others. He believes in addition to political, economic, and militant power dominant countries and classes need to ideological power on dominated countries or classes and this kind of domination is stronger than other types. Because of a legitimate aspect of hegemonic domination, it can be more durable and more influential. In other words, Gramsci believes that preserving the domination of a class or country on other classes or countries inevitably leads to the ideology and domination of belief and value.

Theoretical Framework

Though there are various and diverse texts and resources about the ‘World City’, but researches that directly address the functions of the Imagineering are not high. Of course, it is clear that the policies of the fantasy industry are one of the elements of the global cities, and these two actually follow a single conceptual approach. In one of these studies, conducted by Hannerz (1993), entitled "The cultural role of global cities" he concludes that the cultural role of these cities, which is influenced by the Imagineering, actually serves as a global market, which includes transnational commercial relations, which on one side are business elites, and on the other hand other workers who have low skill, income, and education. Instead of providing cultural functions that can strengthen certain cultural elements such as social tolerance and cultural differences in these cities, this situation has become more of a big global market with great benefit to capital owners (Hannerz 1993).

Also, a study on ‘branding’ in a local and national economic development strategy has taken into account that local marking system not only depicts the spatial domain within the consumer mentality frame but also has an important function in shaping identity (Van Ham 2002). Paul (2004) also explores the functions of Imagineering in the city of Montreal, Canada, and, by examining several documents from 1960 to 2001, has come to the conclusion that the policymakers of Montreal City, by allocating city funds for various art and sports festivals, organizing the Montreal Olympics and the
construction of huge structures, such as the Olympic Tower, seem to make this city as a world-class city and become a world-class city. But according to Paul, Montreal faces major problems such as urban wastewater, unemployment and some basic needs and services. But in more than 40 years, and on the operation of the two political factions in order to control the city, instead of using the city administration and eliminating the basic deficiencies of the city, they have, on the one hand, spent heavily on the appearance of the city and on the other hand they have tried to arrange special political and class relations with influential and capitalist groups and use them to survive their political party and, on the contrary, they provide their demand. In other words, the provision of the interests of influential groups is a priority, while the city administration faces serious problems (Paul 2004).

Teo (2003) in a research entitled ‘The Limits of Imagineering; a Case Study of Penang’, it explicitly points out that the Imagineering acts like an ideology and reverses the facts. In other words, according to him, the international image of Penang is very different from what actually happens in this city. While the policies of Imagineering have attracted tourism for more and more purchases, the people of Penang do not have such a passion for purchasing, as if they were showing a showcase of a prosperous developed city, but the reality of the city is another nothing. In addition to the economic and welfare dimension, the Imagineering has also tampered with the cultural image of Penang city; while the value and normative patterns of the people in this traditional and local city are still plentiful, religious sites, such as mosques and temples, still have a lot of prosperity, but the city's outward appearance is a transnational and global phenomenon, and this conflict is so far that Teo believes there is a deep divide between Penang's cultural reality and what is being shown (Teo 2003).

Yeoh (2005), also related to the cultural role of global cities and the role of the Imagineering in implementing this cultural role in some metropolitan areas of Southeast Asia in a study entitled ‘The global cultural city? Spatial Imagineering and politics in the (multi) cultural marketplaces of Southeast Asia' explored the same subject; he believed that although these metropolises were supposed to be a social space for the development of multiculturalism and that they would move towards increasing cultural adaptation and cultural interactions, now their economic functioning and market position have become more intense and stronger. So that the achievement of cultural achievements, which has been the main demand of the propagandists of such cities, has now been marginalized, and these cities have become multinational markets and multinational corporations that have provided an increasing benefit to capitalists (Yeoh, 2005).

In order to explain the Imagineering, sociological theories of consumption are used. Attention to the consumer and consumption community is at the heart of the attention of postmodernist approaches which among them, Jean-Baudrillard's view is more important. From his point of view, the consumer society forms the basic structure of the modern capitalist society, and what Marx considers to be the ‘infrastructure’ of the capitalist society is in the second place of importance (Riyazi 2013, 144). Baudrillard uses the concept of ‘abundance’ and ‘accumulation’ in explaining consumer societies. According to which one of the most characteristic features of such societies is the plurality and abundance of tools and consumer goods that these tools and products are obliged to incite and stimulate the appetite of individuals and result in nothing but the prosperity of luxuries and growing consumption (Baudrillard 2010, 15). Though in the writings of Thorstein Veblen and George Simmel there are valuable texts about consumption and consumer society, perhaps more serious traces of this issue could be observed in neo-Marxist views. Meanwhile, the Frankfurt school thinkers have a more central role (Edgar and Sejwick, 2009: 462). From the point of view of this group of socialist theory, following the change in the style of production of the twentieth century, as compared with the nineteenth century, the implications and consequences of consumption also evolved. However, from
point of view traditional Marxism, what was not worthwhile was not consumer use, but in the twentieth century, this freedom was limited and it seemed like this liberalization had taken place through consumer culture (Riyazi 2013, 141).

One of the mechanisms that lately used by capitalists to boost consumerism is resorting to the media and the role that they can play in that direction, from which it is referred to as the ‘culture industry’. ‘Influence of the culture industry on consumers is created through entertainment’ (Adorno and Horkheimer, 2005: 35). As a result of the consumption of cultural goods of the capitalist society created within the framework of the culture industry, the consumer becomes an absurd, obscure and standard man. The consumer in this interpretation is influenced by the very destructive power of the mass culture of the capitalist society to become the soldier of the capitalist system (Strinati 2001, 86 quoted by Riyazi 1392, 143).

Methodology
From the paradigm point of view, the research is based on the critical paradigm which seeks to identify effective mechanisms and layers for social phenomena. Critical Realism, contrary to empiricism, does not adequately conceive of phenomena but believes that we must reach the deeper parts of the world. Even, Critical realism believes these appearances of social events are obstacles in cognizing the nature of social reality. This view follows this view that in order to understand better and deeper the ontology of social reality, it must always be ‘ready for reform by more cognitive activity, such as observation, experimental evidence, interpretations, theoretical reasoning and dialogue and so on’ (Craib and Benton 2015, 226).

Roy Bhaskar, as the founder of critical realism, believes social reality has three layers; real, actual and empirical. The real layer refers to mechanisms and structures that may not even be apparent, but are effective in the emergence of new layers and phenomena. This layer also includes event and experimental layers. The actual layer, which includes the experimental layer, also includes events and phenomena that have occurred but may be beyond the knowledge or experience of human beings. The experimental layer also relates to discovered and experienced affairs (Bhaskar, 2010: 2). Accordingly, Compositionalism approach has been used to understand the Imagineering and the functions that in society, in particular, the hidden functions (see Blaiki 2010). Although the documentary research method has been used it has not neglected to investigate the data of the informed individuals, as well as the observations of the researchers themselves. Society studied is Saghez and we used three types of data involve documents on the developmental measures, which they used as Imagineering policies, conversation to keen key people who provided data to us, and, finally, our observations as life experience. Theoretical sampling was used for data gathering which based on we focused on data that included the most content to explain the subject. It is necessary to note that we haven’t enough accessibility to governmental documents about development projects so, we couldn’t use all essential documents to explain Imagineering.

The Functions of Imagineering
Imagineering policies like any social phenomena have positive, negative, apparent, and hidden functions. Considering the fact that sociology is naturally a critical science and it believes that critique is a unique instrument for indication of defects, the current study tried to assess and indicate negative and hidden functions of Imagineering and its role in spread of consumerism, making mass society, reduction of thinking, reproduction of hegemonic domination, and hiding the inefficiency of urban planners.
Imagineering as a cover on urban defects

World city projects are not only economic frameworks, but also they are becoming increasingly a special ethical approach and thus part of globalization. More important element of spread of cosmopolitanism ideals is what Calhoun calls consumerist cosmopolitanism that is shown via strange cultures in the form of food, tourism, music, literature, and cloth (Calhoun, 2001: 4). Christopher Lasch uses multiculturalism to express this topic. He believes that global market, which could be understood as various food patterns, different clothes, exotic music, and various tribal customs as congruent, is an index of tourist approach to the world (Lasch, 1995: 6). Thanks to globalization, no one have to travel to various areas for consuming. World city is a city which comes toward you and is available for you in street, for example an international festival (Paul, 2004). Lasch and Calhoun have understood class aspects of cosmopolitanism. Consumption is a cultural index of urban new middle class, and the new class follows consumerism and postmodern cultural goods such as museum, concert, and festival and all symbolic goods and patterns available every moment through commercial shops (Featherstone, 1991). The real purpose of hegemonic urban projects is that these projects become a setting for providing consumerism needs of cosmopolitan people in global neoliberalism system (Paul, 2004).

Saghez is the second largest city in Kurdistan province after Sanandaj as the center of province. A large number of youth (more than 10000 students) study at various universities of Saghez. Most of them are unemployed. Almost, every family has at least one educated unemployed youth. Unemployed youth waste the major part of their time in streets and shopping centers, so they are faced with bombardment of signs sent via presenting goods such as clothes, make-ups, food, and entertainment products. Unemployment of youth and teenagers, due to lack of income and purchasing power, leads to frustration and depression. Studying these problems is not the goal of the study, but we only tried to present a whole configuration from the city.

In addition to employment challenge, we are also faced with increased marriage age which causes serious challenges. However, any traveler who enters the town faces different images in contrast to the real image stated about the city. A large number of shops, various and lux shopping malls, chain stores, and fascinating showcases are the dominant image of Saghez for newcomers. An informant commented: there are more than 4000 shopping centers in Saghez, many of which are surplus to the needs of citizens, assuming the city population and purchasing power of citizens. The last major building which was built via the contribution of the municipal and an investor is a shopping mall called West Diamond having more than 280 stores in five stories, cost more than 20 billion Tomans; in the so-called building, only the ground floor and the first floor stores are sold and the others are empty. The average price of each shop is more than 350 million Tomans, and higher costs are reported in the public sale for it. Alan & Dilan Shopping Center called has also the same fate. It has three stories and about half of the shops are empty. Adami Shopping Center has a more deplorable situation, and less than half of the stores are in use. These are only a few of dozens failed constructions in the city that have imposed heavy costs on citizens. The main question is why city funds were not used appropriately and applied for equipping and prosperity of city factories? Why many decorated shopping malls and city centers were constructed, having no economic justification but having negative consequences for economic and cultural aspects?

In the coastal line of a river passing the city center, the municipality has designed attractive banners of the trading buildings and entertainment center and has invited people to take part in the costs and the design. The project is so dreamy and incentive that attracts everyone, but with a little realism and a
view of the historical memory of the city, implementing this project takes at least more than two centuries; Now, the question is that whether the project is a priority for the city? A large number of Saghez’s youth, who are mostly addicts and homeless, live under the city’s main bridge, and the number of young addicts increases rapidly. Street fights, high rate of divorces and couples’ dissatisfaction due to increased expectations are part of city problems. In such a situation, municipality, city council, and other authorities put efforts on decoration of the city appearance rather than solving problems, in order to cover shortcomings and their mismanagements and to create an image of development in citizens’ minds.

In one of the most bizarre acts of municipality, in the Coastal Park, an intelligent musical landscape water project called dancing water fountain was celebrated that according to the report of municipal, its cost was more than 250 million Tomans. In addition, it works with three-phase electricity power which is high power consumption. Based on Imagineering policies, actual costs are more than what is announced. Based on aware individuals, three-phase power is proportionate to acts like welding multi-floor buildings. It is active only at night, and because of its high power consumption, it must be shut down about every 15-minute. During an official notification, the municipality invited citizens to participate in the opening ceremony of this project: “the opening ceremony of the intelligent musical landscape water project will be held in the Coastal Park at 21.4.2014, Monday, 20:30. Saghez citizens are invited to participate in the ceremony” (Saghez City Council site, 2014). Is the project justified for the city which suffers various problems? Are empty shops economically feasible?

The Management of West Diamond Shopping Center advertised that the shops of second, third, fourth, and fifth floors are free for rent for six months. This decision was taken because these shops are empty and economically useless. Another aspect of Imagineering is holding artistic and sport festivals. According to a member in the City Council, holding a dramatic festival and invitation of four famous actors in 2012 cost more than 100 million tomans which is a heavy cost for Saghez budget. For highlighting the presence of these actors, large banners were installed in the city, without considering its heavy costs. According to the current City Council, the mayor was obliged 30 billion tomans debt (Mehr News Agency, December 9, 2013). It becomes more interesting that according to the press, the mayor and City Council of Saghez went to Kish Island to take part in the Festival of Ideal City and spent a part of Saghez budget at first year of their official activity, while these costs are to be used to solve city problems (Information Press; Special Saghez, April 2014). These actions make us think that Saghez’s urban planners try to create the image of development instead of dealing with the problems and challenges, through holding sport, artistic, and entertainment festivals to represent Saghez as a developed city to its citizens and external observers. They try to cover the shortcomings of the city, and the current situation creates the best condition for reproducing hegemonic domination of urban planners and their mismanagements in economic, social, and cultural aspects.

2. Consumerism

Consumerism is the sever tendency to have goods and services—a person may not able to gain them—and such tendency grows in a culture in which having goods and certain life style creates excellence and social prestige (Alikhah, 2008: 234-235).

Consumption in the contemporary world has defined itself as the religion of the world, and the family is the incarnate temple of that religion. Nowadays, consumption is not limited to essential needs and goods, but it is effective in forming identities. Contemporary man makes his identity through his selections among signs and symbols of different productions such as clothing, cosmetic goods, entertainment places, restaurants, so on (Alikhah, 2008). Marx and Angles wrote, as prophetically 150
years ago in manifest of communism party, about the increasing spread of consumption in capitalism society:

Bourgeoisie exploits world marketing through allocation of cosmopolitanism feature of production and consumption in all countries … previously needs were provided inside the country, but now our needs are provided in farfetched places. In the past, there was local and national independency, but now we are dependent in any aspect. Productions are very rational in material aspects. Rational production is characteristic of nations. Mental and national independency becomes increasingly impossible (Tucker, 1978: 476-477).

According to Marx and Angles, it can be argued that after securing needs of human, capitalism tries to create new needs for people through diversity in type, color, quality, and specialization (such as special goods for different seasons) and accordingly puts people in vortex of needs that does not end. In the other words, contemporary man becomes more and more consumerist and dependent on market. One of the clear features of Imagineering is attention to creation and spread of external grace of marketing centers as consumption tools. Urban managers and planners increasingly try to create entertainment and consumption centers to secure the goal. These goods’ consumer distribution centers are consumption tools. Nowadays, there are numerous and different consumption tools such as shopping malls, large markets, cheap wholesale, entertainment centers, restaurants, etc. The conception of consumption tool is originated from Marx, but he, like many other modern theorists, focused deeply on production … Nowadays, production can be separated from consumption. In fact, every day, it is added to the importance of consumption. Many people work in service jobs related to consumption, and also many of them allocate much of their spare time to consumption. Marx defines production tool as goods related to consumption, and he also defines consumption tool as goods related to individual consumption of the capitalist and worker class (Marx, 1884; as quoted in Ritzer and Douglas, 2011). In the other words, consumption tools provide services to people and cause people to be in control and exploit them as consumerists (Ritzer and Douglas, 2011: 464). It can be argued that Imagineering policies spread consumerism among people through expanding consumption and consumption tools. Consumerism that is expanding through Imagineering runs through another phenomenon is analyzed in the following.

The mechanism of consumerism in Saghez
The spread of consumerism is done via two main processes: A. bombardment of signs, B. seduction.

A. Bombardment of signs
Baudrillard believes that goods are a system of signs which organize social world via giving identity to the human and things. Baudrillard considers natural needs and human work as factors of movement in history. He emphasizes on structuralism of society based on symbolic and linguistic meanings (Seidman 2011: 229). He emphasizes on signs and symbols as a system of domination in addition to their identity role. “Now, the main problem is not exploitation and benefit, but the domination of signs and their productive systems … Signs were used to refer to the real things, but now signs imply only themselves and other signs, and in fact they are self-referential (Ritzer and Douglas, 2011: 726).

Various malls and markets, through presentation of various products, attractive showcases, attractive packaging, and glamorous lighting of exhibits, expose the consumers to signs and symbols, and as a result, bombardment of signs takes place. In bombardment of signs, minds and perception of
consumers are continually shot with signs and iconic products. This bombardment is done through shopping malls, markets, perfect lighting, and attractive packaging along with great advertisements. This increases consumerism among citizens, especially among youth and teenagers. Bombardment of signs is done via two ways: consumption tool and media, especially satellite programs.

1. Consumption tool

Consumption tool which has already been presented refers to markets, malls, and consumers’ temples that provide proportional position for consumption for the consumer of modern and postmodern society. It is a substrate for showing consumer products in the modern society and also a concourse for these products and contemporary consumers. Symbols and signs of goods try to force consumers to consume and follow these signs and symbolic products. When people are drowned in the symbolic system, it will be base for selections, values, social norms, and their identity. Consumption tools perform bombardment of signs through two processes; internal explosion and phantasmagoria.

1.1. Internal explosion

One of the methods via which new consumption tool creates attraction is internal explosion. Baudrillard believes internal explosion means the disappearance of borders and that various things fall on each other, and products which have different consumption time fall on each other in one place (Ritzer, 2010: 425). Internal explosion is a type of manifestation which attracts consumers and forces them to consume. In this world, one could only visit places and activities that are already separated while intermeshed. Previously people had to go to multiple locations to gain different products, but now they can gain their needs from a single mall or shopping center (Ritzer and Douglas, 2011: 733).

2.1. Phantasmagoria

Phantasmagoria is phantasy of immaterial impact applied through malls and other new consumption tools. In the other words, it implies the use of some things such as decoration in order to attract people to consumption. Phantasmagoria causes goods to seem attractive and romantic. The main goal is stimulation of emotions of consumers (Ritzer, 2010: 428). Research in old consumption tool can be found in Walter Benyamin work in which physical structure of it and its immaterial emotions were studied in order to simulate consumers. The most famous consumption tool is the design of malls and markets …. Benyamin believes that mall is the main temple to use capitalism goods. Mall is pioneer of other temples for consumption (Ibid: 427).

As it became clear, internal explosion and phantasmagoria have deep and prodigious effects on the mind and perception of consumers, and through induction of symbols and signs, guide citizens’ selections and force them to consume more and more. The famous malls of Saghez such as Adami, Alan and Dilan, West Diamond, Mahmoudi, etc. possess unbelievably these modern phenomena in a semi-modern and semi-traditional city, and these processes are effective on selections of tempted people. In some interviews which the author had with Saghez citizens and students, the interviewees said that before entering malls they had no intentions to do any purchase, but after exiting, they had done some purchases affected by internal explosion, bombardment of signs, and phantasmagoria while they had no special reason to these purchases. This process becomes more effective when other consumers purchase as well. When a person does not need to buy, under the influence of other consumers’ consumptions, he/she is unconsciously encouraged to purchase; this cycle is called investment-consumption which is reproduced multiple times.
2. Media

While consumerism is a feature of industrial developed countries, but nowadays, through mass media, it has become a global phenomenon. Nowadays, mass media has an important role in forming values, norms, attitudes, and tendencies of people. Messages of media can create new values and cultural places (Inglehart, 1990, Pan & et al., 1994, Wei & Pan, 1999 as quoted in Movahhed; and et al. 2010: 9). Most media efforts are focused on convincing the audience. It can be political, religious, and economic persuasion. On the other hand, large volumes of media messages are economic so that in each program, there are advertising and commercial messages and these messages try to prompt people to consume and select certain life styles. Creating new and false needs is one of the main functions of mass media grows consumerism (Ibid: 17).

Saghez citizens use satellite programs more than any other media. Many families use one or two satellite routes and have about 1000 channels in their houses. Large volumes of these channels include programs which spread materialist values as consumerism, attention to body, and other materials and consumerist values. The viewers of programs are exposed to bombardment of signs continuously, thus, consumerist life style is induced for them. Fun programs try to mimic the values and advertise lifestyles that are in these programs. People search malls and markets to find goods and productions which are the same as those advertisements and try to look like artists and heroes in the so-called programs. This process is called simulation. This process reproduces the cycle of consumerism. Baudrillard talks about the importance of simulation; “we entered to simulacra era. Simulacra are signs as patterns of things or actual events … today simulation does not imply any reality; they create the idea of reality that claim its representation. Simulacra do not imply any relevant reality. Contemporary world is organized around simulation. Some examples of simulation are model houses, urban planning patterns, sexuality goods, manhood, mod, and personal identity. Social structures are organized through mysteries and patterns that create reality, claiming its representation (Seidman, 2011: 231). People, especially the youth and teenagers, try to apply simulacrum of ideal woman, ideal man, ideal romantic relationships, and ideal body in their life while they do not know simulacra are not actual, but they are just a copy of the copy. People are attracted by markets and mall in order to get closer to the simulacra, so consumerism cycle is reproduced again.

B. Seduction

Consumers almost know that some of their shopping and patterns of purchase are not necessary, but they have recreational aspects. Certainly, some people know that some part of their consumptions is based on habituation and imitation. The question is that why a person, who is aware of his consumer behavior, continues this and does not try to change his consumption style? To answer the question, we can refer to Zygmunt Bauman and the concept of seduction which is presented in his thought. He believes that social control is applied in different ways in the modern and postmodern era. In the modern era, intellectuals create an ideology which satisfies politics and goals of dominant groups. In the postmodern era, dominant groups do not need intellectuals legitimize their domination because social control is based on seduction, not repressive proceedings or common cultural values …. In the contemporary era, market guarantees social solidarity and institutional loyalty of citizens. Needs, tendencies, identities, and social life styles are linked to consumption. Goods are designed in such a way that they create illusions and hopes which seduce social actors, and through this way social actors accept conformity to society (Seidman, 2011: 255). Bauman uses seduction for social control, but we
believe seduction is a type of mania and dizziness. Actually, it is a swamp that citizens get imprisoned in it through bombardment of signs, power of consumption tool, external explosion, and phantasmagoria of consumption temples. Seduction creates this image among consumers who cannot tolerate even without one day presence in temples of consumption or bombardment of signs (like satellite programs). These people are like an addict that spending a day without drug is as death for her.

Seductive space of shopping centers, attractive programs of satellite, and divers’ brands makes a swamp of seduction and mania that the youth and teenagers cannot get rid of it. The consumer society even organizes the imagination of citizens. Social status is determined by mental imagination rather than being determined by actual job of people, having some features such as the ability to change and manipulate symbols and consumer behaviors which are definable in relation to a type of city location and social status. Social status is placed in the framework of political-ethical cosmopolitan theory (Brooks, 2000; Schor 1999; Thompson and Tambyah, 1999: 219).

To cut the story short, consumerism is affected by mass production of consumer products. Production of goods cannot merely lead to consumption, but the supply of these products and advertisements have important roles in consumption of mass products of factories (Merton as quoted in Alikhah, 2008). The basic tool of introduction of products is bombardment of signs done through consumption tools and media. Consumption tool performs bombardment of signs via internal explosion and creation of phantasmagoria. Media also can do the task of advertise and make the consumer products attractive through different programs.

**The consequences of consumerism in connection with Imagineering; Imagineering reproduces its hegemonic domination through consumerism**

In this section, we will study a complex process in which Imagineering policies lead to reproduction of hegemonic domination of Imagineering and goals of urban planners and managers via spread of consumerism. Consumerism may reproduce Imagineering policies by three phenomena: mass society, decrease of critical thinking, and reproduction of hegemonic domination.

**1. Mass society**

Some believe that all societies - regardless of the type of political regime- are mass society. In mass society, the similarity between the ideas of the masses is more than differences between them. **Homogenization** is the main feature of mass society. Traditional societies cannot be considered mass societies because although there is domination of traditions, they have various interest groups and network communication. Also solidarity in them was based on close and meaningful communications … according to Durkheim sociology, mass society is an index of anomie. Homogenization increases through destruction of ethnical, local, religious, corporate and class identities, and appearance of economic mass and social organizations and communications (Bashiriyeh, 2012: 333). In mass society, class solidarity is dissolved in mass awareness and solidarity and causes convergence among ideologies of different classes and spreads common symbols of extra-class in entire society (Ibid). In the consumerist society which is affected by strategies of Imagineering, common symbols are recognized in form of symbols, signs, and brands. Mass society is a society in which people behave badly similar, follow the same values and normative patterns, and their selections show that their creativity is gone, and they are similar to robots following certain instructions and programs. The strategies of Imagineering which are based on promotion and modernization views and urban charming buildings are crucial in creation of mass society. Value patterns and social actions of
consumerist citizens are limited to a few repetitive procedures such as: following consumerism and selections to reproduce seductive space of consumerism. All people trapped in malls and markets as consumption temples follow buying patterns, leisure, academic interests, and even similar outlooks and worldview. Many of these people spend hours walking aimlessly every day in corridors and floors of consumption temple, sometimes renew their pacts with famous brands and meet their colleagues and reproduce each other. People of mass society are so seduced by consumerism that they do not see the shortcomings, anomies, and false policies of urban planners and managers.

2. Decrease of critical thinking
When a society becomes mass and many people follow the same values and normative patterns, creativity and critical thinking face serious challenges. People who live in a society consistent in repetitive behavior patterns, their mind and perception gradually get used to a series of stereotype and repetitive patterns and lose creativity and thinking ability. Saghez has become a mass society because of the Imagineering policies. People follow same values and normative patterns mostly related to consumer behavior and consumerism. A person who is surrounded by false charm of malls and brands loses thinking habit. In this situation, people are prisoners of their consumption habits, instead of being critical thinkers of causes of anomies. When there is lack of critical thinking, social actors cannot criticize decisions and practices of urban governors since there is not social consciousness to monitor decisions and practices of urban managers; therefore, there is a danger of moving towards authoritarianism which means not being responsible for one’s actions. Criticism can decrease authoritarianism. In Saghez, there is no critical thinking, thus there is reproduction of Imagineering and spread of consumerism and mass society.

3. Reproduction of hegemonic domination
As a logical chain, a collection of processes arises under the influence of applying Imagineering which reproduces hegemonic domination of managers and urban planners and their plans. When society becomes mass, critical thinking decreases. So, public opinion cannot recognize social anomalies. People in mass society do not investigate urban problems, failure, financial corruption, etc. or development process problems under the influence of Imagineering policies. When citizens in Saghez cannot recognize social problems of the city, the present status is maintained. In fact, lack of critical thinking among the citizens preserves false practices and decisions of urban managers and development of entertainment projects related to reproduction of Imagineering policies and accordingly reproduction of the hegemonic domination in the society. If critical thinking is turned out to be a dialogue in society, it becomes a power that can evaluate and control urban plans and practices. Today, critical thinking is declining among people because of the domination of consumerism. People neglect mismanagement, failure of urban managers, incalculable costs and social illnesses, thus providing a desired context for reproduction of hegemonic domination.
Theoretical model the consequences of Imagineering policies

![Diagram of theoretical model](image)

**Figure 1: Theoretical model the consequences of Imagineering policies**

**Conclusion**

In this paper, we analyzed some of the facts related to Imagineering and its aftermath with an emphasis on Saghez city. Imagineering, like other social phenomena, has positive and negative functions; however, we focused on its negative functions among social actors. Certainly, there is interaction between processes and phenomena considered in the theoretical framework, but due to excessive expansion of contents, detailed review has been neglected. The so-called interactions will be
studied in future studies. Imagineering has negative functions such as: hiding urban challenges and problems; covering shortcomings, mismanagements, and social, economic, and cultural challenges through building and performing buildings, marketing, and entertainment centers. Most shopping centers do not have economic justification, but they have hidden social and cultural and negative functions. Like spread of consumerism, Imagineering policies expand consumerism among citizens in Saghez through some processes. Consumerism is created by processes like bombardment of signs, consumption tools and media, simulation, internal explosion, phantasmagoria, and seduction. This situation has some consequences like creating mass society in which people follow consumer values and norms similarly. Decrease of critical thinking: mass society decreases thinking especially critical thinking. Reproduction of hegemonic domination: the lack of critical thinking causes people not to think about social illnesses but even understand these social illnesses as normal and natural processes. After analysis of the city condition and functions of Imagineering policies, now it is the time to answer this question “what should be done?” We presented the necessary solutions at two levels.

1. **At the elites’ level**
   Although based on observations and experiences of the researchers, many elites are involved in seductive atmosphere of consumerism and Imagineering policies and partially loss of critical thinking, but still we hope some individuals can perform the intellectual task. The elites’ task is *enlightenment*. That is, urban elites must survive Imagineering policies swamp and then try to enlighten the public opinion through different media tools and show the reality of Imagineering policies to people. They must reveal inefficiencies and failures of urban plans; also they must criticize and evaluate urban policies and programs.

2. **At the citizens’ level**
   According to Baudrillard, the reaction of citizens against bombardment of signs and simulations is a type of *isolationism*. He believes that citizens who are exposed to bombardment of signs and consumption temples must stand against Imagineering strategies and consumerism differently: “this revolution [revolution of mass against bombardment of signs] does not need Marx insurgent masses, but it requires masses to be more passive” (Ritzer and Douglas, 2011:: 728). Baudrillard believes that masses are *black holes* which swallow all meanings, information, communications, messages, etc, thus making them meaningless (Kellner, 1989 as quoted in Ritzer and Douglas, 2011::728). In the modern society, people who are exposed to advertisements and phantasmagoria should disregard these markets and malls and reform their consumption patterns and save themselves from reproduction cycle of hegemonic domination. Today, our resistance must be deliberately passive. Baudrillard believes that “our deliberate passiveness against continual eruption of signs and meanings causes the system death under its own erosion” (Seidman, 2011:: 232). Citizens should change their leisure and decrease circulation in shopping malls not to fall in the games of branding. If people neglect branding and decorative goods, then the strategies of Imagineering policies become weak.

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1. Saghez is a city in west of Iran.
2. Equivalent to 6700000 US dollar
3. Equivalent to 117000 US dollar
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LEARNING THROUGH PROTOTYPING

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INTRODUCTION
Findeli defines a design education model that articulates based on the roles of science, technology and art. The Bauhaus (1919-1928) epistemology emphasized on the role of art and technology, whereas the articulation of the model has been changed to art and science in New Bauhaus in Chicago (1937-1955). Science and Technology became the new theoretical model in Ulm (1958-1968). The question is how much do our schools today are trying to balance their curriculum based on the articulation of art, science, and technology. Stanford’s d school categorizes design thinking as Empathise, Define, Ideate, Prototype, and Test. This paper is looking at design thinking categories in the context of the education models to shape critical practice.

To provide a more cohesive study on design education and critical practice, there is a need to explain the role of critique during the ideation, prototyping and testing steps. Critical practice is the methodology used by a critic to understand a field of knowledge. Design critiques are one of the most important methods of communication and learning segments in design. Oh et al. provided a thorough review on the role of critiques in architecture design and developed a conceptual framework for instructors to systematically evaluate their critique method. Critiques are challenging for the beginning design classes, while it plays a significant role in preparing students as future critical thinkers.

Finding the balance between art, science and technology is challenging and was the derivative for initiating new graduate programs in architecture education. These programs focus on individual dimensions of the model, such as Master’s of Science in Building Technology and Master’s of Science in Computational Design. There is no doubt on the preparations these programs provide for PhD studies, while the necessity of the MS programs as a critical practice are not well defined within schools of architecture. A balanced program seems to combine all aspects of design thinking through the five-year undergraduate and/or M.Arch program of a student’s journey in architecture. The present study emphasizes on the design thinking and critical practice that starts with empathizing, ideation and shapes through prototyping in a graduate level course. The role of art, science and technology could be traced in all steps of the procedure through critical thinking and practice.

EMPATHIZE, DEFINE AND IDEATE
This study provides a series of assignments and samples used in a studio and digital fabrication course, using the critical practice method. The concepts and process in design remained similar through time, regardless of the changing media of presentation. During studio critiques, when students comment on each other’s work (ideate, prototype and test), they learn how to find design solutions based on changing needs. One of the techniques used to make students adaptable is teaching students to do research and learn
the “process” when facing a new challenge. The process in the case of teaching a software, for instance, is the workflow and logic of a software which remains the same using other computer programs. Learning Autodesk Revit is a common example for students, which makes them familiar with the logic of Building Information Modeling and vector drawings, similar to other drawing software. As a result, when students learn the logic, learning the future updates would be smooth for them. This part could be translated as empathise and define in design thinking. Student work samples presented highlight the role of learning through a logical process, which notifies students about their failure based on testing solutions. Da Vinci’s drawings are excellent examples illustrating a thought process based on the needs of the time. When students learn that their design lasts for decades and ask themselves about possible demands, they are on the right track to find solutions. Empathise is the first step in understanding any project, where research plays an important role in developing the precedents. During the beginning design studios, it is valuable to review Christopher Alexander’s ideas about the timeless way of building to make our technology-savvy students able to find the balance between different dimensions of design. Defining is the stage to reframe the problem and ideation starts by brainstorming different ideas. Ideation is where most of the students do not know where to start or feel lost in the process. In this paper, we are introducing Tracing as a note taking technique during the study process.

- Tracing as a note taking technique
Tracing in a visual-major is similar to tracing alphabets for children when learning how to write. The idea is to provide students with a note taking method to study and analyze projects, in order to expand student’s visual vocabulary. Tracing the precedents work and using the same technique to develop and ideate is what tested in a classroom and provided successful results. After the first ideation phase, critiques are where students get lessons of how to improve their approach and further develop their project. Critiques and ideation become back and forth steps at this point to finalize the design.

- Participating in critiques
The next suggested method in this study is to have students participate in critiques. For the beginning years, students do not know how to critique each other’s work, but they can still be part of the communication on their own design, rather than presenting their work and only receiving feedback. Following the method, students can see different projects and approached and better evaluate themselves. For upper level studios, there is a need to ask students to actively participate in the critique phase, by assigning and rotating students in different groups. As a result, student participation in critiques could play an important role in developing student’s critical thinking skills and preparing them for their future career.

PROTOTYPING AND TESTING
Prototyping and testing are the next parts of critical design thinking, which are less addressed in studios. Prototyping is a key element in critical thinking to explore “how things work” and a trial and error method to solve construction problems. In schools of architecture students learn about detail drawing, but they do not learn how to design a detail until they make one through prototyping. Michael Stacey in his book “Prototyping Architecture” provides examples from concrete prototyping to GFRP (Glass Fiber Reinforced Polymer) shells and wooden panels⁴. The projects are inspiring as tests and prototypes in the field of architecture. This section presents lessons learned from students’ work in the digital fabrication
course, designing a modular roof with regard to structure. This project brings up the question of the level of finesse in design, where lighting, structure, and fabrication are all intertwined and makes an effort to have this project tested in a classroom curriculum. In the current fabrication course, design-build is addressed as a side topic, instead of a significant component in design studio or a separate design-build course because of funding and liability issues. In the Modeling and Digital Fabrication class, students were asked to design a simple module and select a construction techniques such as Nip & Tuck, Weaving, and Folding to fabricate a deployable structure to cover a 8 by 3 ft. span. Students in this project were asked to experiment with joinery techniques such as Japanese joints. This project aimed at the following objectives:

- Full-scale prototyping,
- Detail design, and fabrication

As a result, this assignment is designed to explore both avenues of design in prototyping and fabrication. This project innovates by integrating modular design with prototyping. Each module could be a closed design, while the way modules connect to one another is the key in defining the construction technique. The rubric calls for a deployable structure, which requires students to assemble and deconstruct their projects. Some of the challenges that students faced could be summarized in the lack of time management skills to make different iterations and prototypes. In architecture studios, students learn to conceptualize and develop their designs through study models and make a final model; this mindset is very different from testing and prototyping. In the fabrication project, students learned that prototyping a joint detail could change their whole idea based on the method of construction or installation.

**METHODOLOGY**

Prototyping and testing are used in this study as a pedagogical model to have graduate students experiment with different construction methods based on materials and gain a design-build experience. Active learning is "anything that involves students in doing things and thinking about the things they are doing 5". Studio classes are often practiced based on active-learning, while this study used full-scale design-build to test active learning in a graduate classroom. Integration of the concept of structural stability is also combined with the digital modeling and fabrication process. The purpose is to identify digital fabrication as a tool and method of fabrication to design and build projects.

Ancient structures combined methods of construction with light penetration in domes, while after modernization building components became separated. In contemporary research, there is the call to apply and teach integrated design, where material decisions, lighting, structure and fabrication are more intertwined. In this project, students used plywood and experienced different methods of wood construction in a graduate course curriculum.

The methods used in this project are a combination of computer simulation and full-scale prototyping tested in students work. The students learned the process through prototyping (6-weeks), and prepared their 3D and assembly drawings (3 weeks), using Rhino. The first weeks of the course covered the concept of computational design to give the students a better understanding of the background. Next, the students were asked to sketch and ideate a modular skin and draw the geometry in Rhino, based on Rhino workshops. The course then focused on joint design such as Japanese joinery, and then prototyping the installation. The results presented in Figure 1 include the fabricated projects, which are designed to be
assembled and deconstructed. This course included research/sketch, digital modeling, prototyping, hinge design (joint detail), plywood fabrication, and final installation.

PEDAGOGICAL LESSONS LEARNED
Pedagogical lessons learned in the fabrication course are (1) the significant role of prototyping in developing an idea as a critical practice to troubleshoot the design implementation (ex. during the fabrication project, students found solutions based on testing how to use cables, which resulted in changing their initial design); (2) The next lesson focused on full-scale prototyping and its intermediary role between architecture studios and a design-build course; (3) Students explored the thought behind modular designs that could be applied to design of shading devices, interior partitions, ceilings and pavilions. The most important parts of this research are the techniques to fabricate a project and the importance of prototyping as an educational method. The combination of stability, installation, and fabrication is presented as the outcome.

To complete the discussion about pedagogical lessons, we are going to investigate a course at MIT called “Precedents in Critical Practice.” The subjects covered in this course include 1) City: Global Economy, 2) Urban Plan: Map of Operation, 3) Program: Performance, 4) Drawing, 5) Image: Surface, and 6) Utopia. The purpose of analyzing this course offering is to familiarize students with the framework being used to explore critical practice at one of the countries top schools. The content provides valuable critical practice examples through precedents in an urban scale. Having studied the course at MIT, the class would then move on to reviewing works of contemporary architects. As a critical practice, this can be challenging, since there is currently no dominant style. Thankfully, this ambiguity allows the research and exploration of various styles, from high-tech to evidence-based designs. Included in these discussions would be theories proposed by contemporary architects and urban planners. Topics mentioned above are often covered through discussions in design studios; however, this example showed the importance of providing schools of architecture with a more concrete subject and theory to cover different aspects of critical practice.

CONCLUDING REMARKS
The current study reviewed literature in models of design education and provided a case study in digital fabrication which is a graduate-level course. Prototyping is used as an active-learning model to encourage students to find solutions, using the design-build experience. Most of the studio courses during undergraduate studies deal with design ideation, but the testing part is missing in studio courses. On the other hand, architecture schools that offer special graduate programs, such as computational design, are focused on the computational approach and algorithmic design. As a result, there are few possibilities for students even during their graduate studies (M.Arch) to gain a design-build experience. This case study was an attempt to couple prototyping with the concept of digital fabrication. Student success and challenges indicated the importance of including design-build experiences in architecture curriculum. Full-scale prototyping is of significant value in design learning, since it challenges students with joinery problems and detail characteristics regarding the construction material. This study showed that similar to detail drawings, students enhance in critical thinking and ideaing about detail design when they are asked to build in full-scale. This teaching experience represented successful results in design process from ideation, tracing, student-led critique through a full-scale prototyping. This paper reviewed assignments in
a fabrication course for graduate students, emphasizing the fact that technological media can change over time, while critical thinking is the timeless quality to take from their assignments. Considering the speed that new technologies and computer programs are released, faculty at schools of architecture need to enhance critical thinking and leadership skills to prepare students to adjust to future challenges. Academia is meant to provide insights ahead of the practice of the time, and prototyping with regard to new technologies is one of these aspects. Educating students about the existing materials and construction methods, in addition to insights about new materials, advanced building skins, and fabricated prototypes is an example of critical practice explored in this study.

Figure 1. Student projects representing prototyping as pedagogy at Florida A&M University School of Architecture
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ARCHITECTURE AS URBANISM: A MAJOR COURSE CORRECTION FOR ARCHITECTURE AND THE CITY?

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INTRODUCTION
The late twentieth and early twenty-first centuries have seen a remarkable emphasis on architecture characteristically designed as distinct from its setting. Sometimes referred to as ‘the object building syndrome,’ published examples—especially works by the acknowledged avant-garde—celebrate distinctive individualism as prime paradigm for the new, thereby encouraging those architects whose practices reside outside the limelight to follow suite to whatever extent their clients and budgets permit. The ultimate effect has been to render large areas of cities a kind of architectural zoo, with disparate species side by side in a collection of examples from far and wide, all in the name of diversity.

Figure 1. Contemporary London skyline with disparate species of architecture sprouting up side by side.

So the question ultimately becomes, might there occur a sweepingly reactionary change in direction to this currently pervasive paradigm, and if so, what might it be?

Background and Setting
First, a quick look at how this has come about. The avant-garde at the onset of the Modern Movement in architecture proposed what they believed would make the world a better place. Their architectural and
urban proposals were based for the most part on idealism. Recall for instance Le Corbusier’s brave new world of mega-structures housing a society bent on health and wellbeing; or Alvar Aalto’s modernist translations of Finish regionalism based on poetic visions of nature; or, going further back in time, the Chicago School’s efforts to accommodate an emerging industrialized and commercial world without losing the subtle beauty of architectural ornament, historical references, or long held canons of proportions; or the civic pride expressed by the City Beautiful Movement that strove to make cities humane and beautiful in the face of advancing industrialization; or reflections on nature and natural sensibilities by architects of the Romantic and Picturesque movements; or before all those movements, classical expressions of civic and humanist visions by architects of the Renaissance and their later intellectual progeny for whom achieving a kind of harmony in sync with the cosmos and natural human sensibilities was an overarching objective. The list goes on, but you get the idea.

Of course the more radical among post-World War I modernist proposals were for the most part failures—which may be largely responsible for the abandonment of modernist idealism today. But while idealism has been abandoned, the charge to continually create architecture anew remains. In fact, the more recent avant-garde have resorted to creating buildings that for the first time in history are not based on architecture at all, opting for non-architecture models for architecture because it opens up a whole new range of possibilities, making the charge to be unique, distinctive, and unprecedented now easier than ever. You’ll see what I mean by simply google-ing “avant-garde architecture.” It is perhaps the best way to gage what is popularly regarded today as indeed avant-garde.

![Figure 2. A typical range of examples of “avant-garde architecture” from Google](image-url)

Each example, for the most part, is characterized by a quest for uniqueness and surprise, even shock and awe—sometimes justified as succinct metaphorical statements about underlying conditions—but usually simply offered as the excitement of the new and radically different. An analogy drawn from literature would be as though exemplary literature had gone from refinement, complexity, and richness of communication to the production of clever one-liners, the cleverer and more shocking each one-liner the higher its status among the literary arts. Compared to the past, much of the latest so-called avant-garde architecture presents itself in effect as clever one-liners, albeit the technological prowess that makes it possible to build them, and sometimes the underlying geometric basis that accounts for their form, may be indeed advanced and sophisticated. But the ultimate intent is all to often one of simple emotional impact conveyed by the unprecedented, the novel, the unique.
American Architectural critic Witold Rybczynski noted recently that avant-garde-ism in architecture no longer heralds the future as the term “avant-garde” originally meant. What is usually regarded as avant-garde among works of architecture today are instead, those one-liners, each an event in itself, essentially a unique phenomenon expressive of the particular designer’s genius for unprecedented form, and not infrequently accompanied by a compromised regard for the intended functional purpose. Other critics have begun to question this trend. Chicago Tribune’s Blair Kamin attacked what he called a “mountainous blob” proposed for Chicago’s waterfront by George Lucas with MAD Architects. Kamin characterized it as representing “all that’s wrong with architecture today: a celebration of object-making at the expense of public space, plus a shameless coddling of the powerful, provided they serve one’s aesthetic agenda.” Zachary Edelson writing for Architectural Record noted that criticism of Antoine Predock’s Museum for Human Rights in Winnipeg Canada has emphasized “vagueness and incoherence”, and that it is “too frenetic” given its purpose. Certainly it provides an exciting experience with all its ramps, overlapping curving glass wrappers substituting for a façade, and those reflecting mirror finishes everywhere. But on the other hand it fails to convey the sense of dignity we would expect of a museum dedicated to the history of human rights. And in a particularly sweeping attack on current avant-gardism in general, British writer Peter Buchanan in The Architectural Review leveled specific allegations against a long series of buildings by currently famous architects, criticizing their disregard for existing urban fabric and a refined subtlety of purpose, offering that, “Architecture must move on from pandering to preposterous concepts in an adolescent search for momentary excitement.”

All this is to say that the current trend away from idealism and toward personal commercial identity hasn’t gone unnoticed. And it manifests itself in the preverbal object building, expressive of itself and its creator, and purposely distinct from anything around it. As British architectural historian Roger Scruton put it, “No greater aesthetic catastrophe has struck our cities—European just as much as American—than the modernist idea that a building should stand out from its surroundings.” With today’s frequent emphasis on commercialization over professionalism, the latest avant-garde clearly follows suite. So the question becomes: Is it even possible for exemplary architecture to re-establish an innate sensitivity to urban setting? Or is it possible for avant-gardism in our time to engage such profound and subtle philosophical ideals as the notion of a harmonious social order? Or is that even appropriate any more? And if it is deemed appropriate, how may it come about and what might it look like?

The usual chain of events when something has progressed to the level of absurdity is for reactionary forces to emphasize the opposite of what they are reacting against. That being the case, if tomorrow’s reactionary forces are leveled against the dissolution of visually coherent, harmonious urban form, then we might expect the new direction for design in architecture to manifest an attempt to restore the fabric of cities as composed of ensembles of buildings designed as components of the larger whole. That is what the title here refers to as “architecture as urbanism.” And consistently, while global economic, commercial, and cultural forces reinforce what is happening today, there are nonetheless growing forces marshaling to the contrary.

**EMERGING THEORIES AND PRACTICES**

Of course most new buildings are not such in-your-face extravagant exercises as those depicted by Google’s ‘avant-garde architecture’ screens or on the pages of the architectural journals. But the trend’s trickledown effect strongly influences ordinary practice nonetheless. Compared to the pre-modernist era, designing from the inside-out with little regard for urban setting except perhaps to be competitively assertive with what ever is nearby, and striving toward uniqueness of form in the name of originality, increasingly characterizes much new architecture.

As an aside: historically, legislation aimed at ensuring a harmonious urban environment is not new. The usual schoolbook example is Verona. That city’s governing council as far back as the 13th century ruled that the palaces of the noble merchant class surrounding the city’s main public square, The Piazza del Campo, adjust their window openings to align with one another in order to present a unified sweep of facades around the piazza. Or there are countless examples of architects of the Italian Renaissance being required, either by statute or custom, to adjust their buildings to ‘fit’ with one another, especially when
arranged along streets so that they reinforce the sense of the street as a public corridor—as opposed to the street being seen as simply a transportation arterial and a convenient place along which to locate buildings.6

Integration of Architecture into Urbanism
As one may expect, there are rising forces today that seek to build a more humane urban environment. Examples include: attempts to return to an emphasis on the pedestrian domain in contradistinction to automobile dominance; the establishment of effective passive energy design, water management, and a healthier and more humane urbanism through comprehensive landscape planting programs; the introduction of efficient public transportation infrastructure along with efforts to tame seemingly limitless sprawl; and even a growing practice to require by code that new buildings conform to desirable characteristics of their overall setting, not unlike Siena’s example of nearly 700 years ago. The advent of organizations, theories, and movements that are responsible for promoting these ideas include The Congress for the New Urbanism (CNU), Smart Growth, Landscape Urbanism, and practices such as the establishment of form-based codes as well as an expansion of the practice of both expanding existing and establishing new historic districts in order to stabilize quality urban environments already in existence. Among recently emergent approaches to urban planning that may be seen as particularly effective in promoting the design of architecture as urbanism are form-based codes and the urban transect. Both are part of New Urbanist and Smart Growth theories. The practice of each may be seen as based on the notion that invention is most effective when it is grounded in the evolution of traditional urban experience and form, what is sometimes referred to as “innovation on the edge of tradition.”7 In addition, each accepts the inherent efficacy of a typological approach to architecture and urbanism.

The Urban Transect
The urban transect, for instance, aims at encouraging a more harmonious transition in urban density, character, and structure across the city—from its dense core through a series of “zones” across the urban fabric to the city’s suburban extremities and its rural and natural setting beyond. The urban transect is inspired in the first place by an analytical technique developed in biology for the study of healthy natural ecologies. The biological transect might begin by striking a continuous vertical section along a line across the continental shelf, then onto a beach at the continent’s edge, then to dunes beyond the beach and so on to forested land farther inland. The vertical section along that line documents what takes place every few centimeters or so, revealing the interaction of adjacent and overlapping ecological circumstances. Likewise, the urban transect, as a geographical cross-section, records a comparable set of conditions such as “building, lot, land use, street, and all . . . other physical elements of the human habitat” which in turn provides a basis for decision-making involving the organization of these typical components of the built world.8 For the city, the idea of the urban transect serves largely as a conceptual tool while it is still open to particular code-based legislative measures. For our purposes it is important to note that while the urban transect is derived from the biological transect which reveals natural processes, the urban transect is not to be confused with nature. It is man-made and involves exclusively man-made form. However, analogically the urban transect may be seen as “natural” because it is based on the evolution of effective urban form—that is to say, updated traditional urbanism. Therefore it is in effect an instance of biomimicry.
Figure 3. Idealized diagrams of urbanism (left, above & below) across the city as inspired by the biological transect (right) for the study of healthy continuous habitats in nature. (Courtesy DPZ and Co. Miami, FL).

Figure 4. Example of a portion of an urban transect (Courtesy Opticos Design, Inc., Berkeley, CA)

Form-based Codes
Form-based codes—or form-based zoning—on the other hand operates in a dialectical relationship with the urban transect. The intent of form-based codes is to replace mono-functional zoning as well as statistical zoning that stipulates such general conditions as setbacks, floor area ratios, functional designations, (residential, industrial, commercial, etc.) and the like. Form-based zoning instead defines building types seen as appropriate to their place in the urban transect. For instance form-based zoning may effect the coexistence of multiple building types in a particular neighborhood or district in order to avoid physical and social monocultures, thereby allowing for the natural evolution of uses. That is to say, form-based codes employ characteristics of traditional evolved urbanism whereby building types are both appropriately situated next to one another in terms of scale and visual characteristics, and like traditional architecture are “remodel-able” over time in order to accommodate related but different uses in response to changing demographics and economic conditions, thereby imparting a kind of traditional dynamic stability to the city. This is to say that existing building stock is maintained to a greater extent as opposed to frequent tear-down and re-build to accommodate economic and social growth and change.
CONCLUDING REMARKS
While these practices may be familiar to everyone in the field, the intent here has been to see them from the perspective of their intent to counter the dissolution of coherent, humane urbanism by enforcing a traditional typological approach to building design. Good cities are more than a scattered collection of good buildings. There are of course other practices afoot today that aim to accomplish similar results. They include, I believe, the introduction of extensive landscape schemes, the introduction of advanced public transportation systems, a re-introduction of regionalism in design, and the like. The existence of all of them is a testament to the truism that urban development, especially since the 1940s, has been largely destructive to cities throughout the world and there are strong movements to rectify existing circumstances. The most effective counter measures are based in traditional urbanism, which perhaps is more accurately termed “evolved urbanism.” That is, most reform measures are based on existing conditions from a time when invention was incremental—that is, it progressed as needs arose and was based on what went on before. Rapid industrialization and the rise of our commercially inspired consumer culture inspired re-invention of urban order, both through intentional radical planning and unconscious default. We now see all that to have perpetrated a scourge on the city. Awareness of the problem, as is often said, is the first step toward its solution.
Figure 7. Examples of streetscapes where the architecture is of less importance than the ambience/experience for pedestrians.

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6 A particularly salient example is the church of Sant’ Agnese in Agone in Piazza Nuvona, Rome, Italy. When citizens of Rome rioted against the projection of the church into the public space, the Pope directed architect Boromini to draw the façade back from the surface of the piazza’s enclosing wall, allowing it to be both an object and part of the wall of the public space at the same time.
7 The use of this expression is attributed to Robert Campbell, Architectural Critic of The Boston Globe.

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INTRODUCTION
Solar photovoltaic (PV) systems are a promising renewable energy technology to offset the negative impacts of conventional energy. However, inherently they are not a perfect solution. While advancements have been made in efficiency, they remain as a low-density energy source that requires a larger consumption of land compared with the high density conventional sources we have used for decades. Ambitious projections toward 2050 decarbonization targets estimate between around fifty-nine thousand and nearly half a million acres of land per year for thirty-five years would need to be converted to reach goals. Even a less ambitious goal of twenty-percent of the U.S. production would require land equating to the size of West Virginia.

As the Solar industry grows, and under these scenarios, conventional energy production practices are often implemented with utility scale solar PV, despite the inherently different nature of this renewable energy source, resulting in the disturbance of natural systems. Even with smaller commercial scaled systems within an urban/peri-urban context, PV systems are often implemented without considerations of context and opportunities for integration into the landscape fabric, resulting in potential social consequences or missed opportunities.

Timing and forecasts indicate that we are in the pilot stage for solar development as positive outlooks for a larger slice of the world’s energy portfolio continue. Therefore, it is imperative that we integrate the pattern of solar PV development now, to avoid significantly altering our landscapes at the expense of economically, socially, and environmentally valuable land.

In this study, we reflect on and critique current practices of ground mount solar PV implementation. We seek to find how Solar PV can be promoted while minimizing the social and environmental impacts by assessing, reflecting and critiquing the appropriateness of these light density developments in the context of the urban footprint in Tucson, Arizona. By evaluating context and applying theoretical developments, we explore potential synergistic solutions to enhance the integration and weaving of solar PV systems into the urban fabric.

BACKGROUND
Urban Fabric
Regarding desired qualities in designed places, Dee states that the term, ‘…Fabric’ is used because it suggests interconnected wholes made of parts which are created through process. It also suggests cohesion and robustness…” The physical, environmental, and social contexts allow for a recognition of desirable qualities with a fabric made-up of spaces, paths, edges, foci, and thresholds. Similarly, Lynch’s pioneering study of the image of the city describes essential elements that can be applied at various scales including: paths, edges, districts, nodes, and landmarks. He explains, “None of the element types… exist in isolation in the real case… Elements regularly overlap and pierce one another.
If this analysis begins with the differentiation of the data into categories, it must end with their reintegration into the whole image.” Alexander et al. further add to the interconnectedness of elements to both their contexts and embellishments, creating “timelessness” through the development of a language from appropriate design patterns\(^8\).

Solar Photovoltaics and Colocation

Solar energy is among the most promising of renewable energy sources\(^9\). Among the many technology types used to harness the energy of the sun, Solar PV is seen as the most environmentally friendly\(^10\) and one of the fastest growing renewable energy technologies\(^11\), being applied at both large and small scales, in both urban and non-urban environments. Despite its lowering costs and ability to produce energy without emissions, solar PV systems have faced some resistance in adoption. Aside from smaller scaled residential and commercial systems being placed on roofs, much of PV adoption has been ground mounted on clear cut land, and fenced and managed to resist any collocated uses. Especially in rural areas, PV systems sprawl across the landscape with unnatural uniformity, most often as an unwanted visual intrusion to otherwise naturalistic views.

However, there is a better way of implementation with likely higher acceptances. Contrasting conventional energy production, this clean energy source can be implemented near the source of use without the public safety concerns inherent with other energy sources. Rather than creating a single land use for the production of energy, it is possible to find synergies through collocating solar PV with other urban uses for greater integration into the urban fabric. Solutions may be found through design theory and research for social and environmental services, such as: Agriculture\(^12\), Shade\(^13\), Nature Refuge\(^14\) (e.g. patch/corridor), Habitat\(^15\), and Stormwater Management\(^16\). Most studies concerning colocation with Solar PV focus on the potential for the combination of PV and agriculture, referred to as Agrivoltaics as well as Building Integrated Photovoltaics (BIPV), but further research and cases need to explore the variety of colocation opportunities within the urban environment.

METHODS

This study takes a multiple case-study approach to test theoretical claims of collocating or layering landscape function with ground mount PV in urban Tucson, Arizona. Based on Swaffield\(^17\), the case studies were centered on typologies, rather than exemplars, and use existing theory as a template for cross-case analysis. Eight existing medium-scale ground mount solar PV systems were identified within the Tucson metropolitan area and analyzed based on the site and context to determine suitability of additional land uses for colocation. Comparisons were made across cases to test spatial variation and fit. The selected site typology included systems that are 1) dedicated ground mount PV systems, with 2) a site footprint of three-thousand square meters or greater, and 3) located within the 2016 urban boundary designated by the US Census\(^18\) for Tucson, Arizona.

Context for the eight sites was geospatially explored within four-hundred meter and eight-hundred meter radii based on walking and density calculations from accepted sources such as LEED\(^19\) and others\(^20\). Data collection included direct observation, aerial imagery analysis from Google Earth, and geospatial analysis with data from the City of Tucson and Pima County, Arizona using ArcGIS software and web applications. The Pima Area of Governments (PAG) Green Infrastructure Prioritization tool\(^21\) supplemented the contextual analysis with valuable secondary information containing food deserts, heat vulnerability and other social concerns associated in the vicinity of the eight sites.

The theoretical frameworks to be applied to the case-studies emerged from the literature and was classified by Physical, Social/Cultural and Ecological uses\(^22\). (see Table 1). Each category was evaluated with each case and weighed to determine the appropriateness of the application based on site...
and context data, looking at both potential and current use. Cases were then compared to determine the strength of the co-location potential and inform the outcomes.

<table>
<thead>
<tr>
<th>Physical</th>
<th>Social/Cultural</th>
<th>Ecological</th>
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<tbody>
<tr>
<td>Image of the City</td>
<td>Agrivoltaics</td>
<td>Urban Habitat</td>
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<tr>
<td>Rooftop PV</td>
<td>Connectivity</td>
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**FINDINGS**

**Physical**

**Image of the City**

Using Lynch’s\(^2\)\(^3\) theory on the “City Image and Its Elements,” his five physical elements of Path, Edge, District, Node, and landmark, were used to explore the cases’ integration into the urban fabric. Seven of the eight cases were found to be within four-hundred meters of walking/bike paths, and all eight are adjacent to washes. All edges to the sites were fenced with no public access and include varying degrees of transparency and visual access. Half of the cases were located within industrial districts, and all kept a low profile with none serving as a significant landmark or node.

**Building Integrated Photovoltaics and Rooftop PV**

Suitability of rooftop PV potential was determined by the prevailing zoning for ease of contracting and continuousness of systems, and the roof area estimates for potential energy output, all within an eight-hundred-meter radius of the existing sites. While the prevailing zoning, being Industrial or Commercial, greatly influenced its relevancy, the size and density of the buildings also affected the findings. Collective roof area potential varied with each site from an estimated one megawatt to eight megawatts of potential based on a figure of thirty-five kilowatts per thousand square meters\(^2\)\(^4\), discounted by ten-percent considering potential losses of space efficiency. Residential and Mobile home zones were discounted further due to the potential difficulty of PV adoption. Four of the eight sites were determined to be moderate to high for the opportunity for rooftop PV, with the other four cases with a mere one-megawatt potential. Considering the expense and challenges in retrofit of BIPV, none of the eight sites were determined to have high potential of BIPV, due to assumptions that it would be most likely in commercial and high-end residential with space for new construction and/or high demand for major renovations.

**Social/Cultural**

**Agrivoltaics**

Four of the eight sites were determined to be moderately to highly suitable for agrivoltaics. This was based on the location being in or near a food desert along with adjacencies to organizations and residents that may be able to sponsor or support the efforts. Two of the four systems are located within a food desert, while a third has good proximity to a school and a local urban farm.

**Thermal Comfort/Urban Heat Island Effect**

Six of the eight sites demonstrate moderate to high potential to mitigate issues relating to thermal comfort. This determination considered the amount of exposed parking surfaces, the location in or near districts considered to have above average heat, and below average tree canopy, and locations where
data shows populations that are most vulnerable to heat stress. Potential output ranges from about one and a half megawatts to nearly twelve megawatts.

**Connectivity**

Despite being primarily located in light industrial zones, the case locations all have moderate to high potential to be well connected to major bike paths. Six out of the eight cases are in close proximity to Pima County’s “Loop” trail, a popular two-hundred kilometre paved shared-use path looping the extents of Tucson’s urban boundary and connecting beyond (see Figure 1). Even the remaining two cases are located within four-hundred meters of a bike lane that connects to the “Loop.” Additional consideration for connectivity was based on LEEDs community connectivity credit25. The connection to basic services was greatest in Commercial zones. The number of basic services within an eight-hundred-meter radius ranged from two to eleven with a median of four and a half. Schools are worth noting as amenities within the eight-hundred-meter radius, with two cases located near schools including one near a community farm.

*Figure 1 – Paved bicycle and walking trail allows for connectivity around Tucson.*

**Ecological**

**Urban Habitat**

The locations of the sites demonstrate a strong potential to become a series of connected patches among the urban matrix due to their proximity to the washes, which function as wildlife corridors. Site location may aid in expanding the width of the corridors or small patches for enhanced habitat. All sites but one were graded flat and cleared, resulting in invasive plant species in three of eight cases, and three others that were devoid of vegetation, presumably from chemical control. In one case, Desert Broom (*Baccharis sarothroides*), a common pioneer plant associated with disturbed landscapes in the region, creates a monoculture, and blocks the solar panels, limiting their effectiveness (see Figure 2). The site that maintained the natural topography, demonstrates the lowest impact in development and lacks the
invasive plant problem that the others systems have. A more diverse native vegetation regrowth has been nursed in the understory of the low PV canopy without obstructing solar access (see Figure 3).

![Figure 2 - Clear cut site resulting in invasive vegetation growth.](image)

![Figure 3 - Maintained site topography allows for return of native plant material.](image)

**Stormwater Management**

Seven out of eight sites are located within a four-hundred-meter radius to a wetland and wash, but stormwater management strategies were apparent at only two sites, with one serving for detention for a mobile home development (see Figure 4), and the second as a non-vegetated catchment area adjacent to
an impervious parking lot surface (see Figure 5). Neither are graded to provide significant benefit to the adjacent impervious surfaces.

![Figure 4 - Stormwater detention with vegetation under PV panels](image1.jpg)

![Figure 5 - Non-vegetated stormwater detention under PV panels](image2.jpg)

**Discussion**

**As it is**

Current zoning and practices treat the systems like other industrial uses with fences, no public access and few implementations of ecological sensitivity, despite being close to the important wash corridors. The cases are primarily located in low density industrial districts found between the more urban and suburban neighbourhoods. The majority of the cases were located near walking and biking paths,
suggesting the potential for a strong connection to the surrounding community. Aligned with Lynch’s theories, these “paths,” which are also aligned with the major washes within the urban fabric create a strong image for the city by breaking the formal grid pattern of development. Both in map form and when immersed in the city, these important corridors add to the wayfinding for residents and visitors alike. The spacing of the PV systems present themselves as potential “Nodes” along these corridors, as seen in Figure 6. Colocation of additional uses at these nodes could soften the edge between the urban and suburban development, and additionally provide ecological respite for the diverse wildlife using these corridors. In most of the cases, regrading may be possible for stormwater management and bio-retention through re-establishing native plant material as an adjacency and/or understory. This may lead to a reduction in the need for chemical treatments and labour managing the invasive plants. Research suggests that the colocation of plant materials may benefit the panels by providing higher output efficiencies\(^2\). Additionally, a hybrid ecology may be established by providing an over story microclimate to nurse plant material to establishment, and reduced water needs.

If given visual access from the adjacent walking and biking trails, the aesthetics of the understory vegetation, and the potential for viewing wildlife would enhance the user experience by adding to the biophilic sense of the city with its associated benefits\(^2\). In many of the cases, community agriculture could also be managed with more intensive participation and management from adjacent residences and businesses. If perceived as a more public space socially, these nodes could enhance connections to the Loop trails and washes, and serve as shaded rest areas with educational programming for both green energy production and local culture and ecology. This type of colocation could foster both physical connectivity, and community connectivity for enhanced understanding and pride.
As it could be
When viewing Solar PV systems as a more integrated infrastructure in the urban environment, it is necessary to look beyond a specific site, and into the context. Considering that these eight locations were selected with specific goals in mind, the exercise of branching out even just eight-hundred meters in radius from the site is a fruitful exercise to demonstrate the potential within the urban environment. With sprawling parking lots and lack of vegetation, including natural limitations of the height of native and adapted trees acceptable for this region, shading these surfaces should be a priority. By combining these two single-use landscapes, a synergy is constructed that can aid in mitigating the urban heat island effect\(^{28}\) and reduce the heat stress risks for vulnerable populations. In most of these cases, especially in commercial areas, the output potential in parking is even greater than roof potential. While roof top PV and BIPV are important for integrating PV into the urban environment and may have greater opportunities in more densely built environments, the bigger impact in these cases is possible with parking lot PV. Parking lots provide more flexibility in system design with simplified structural concerns, space requirements, and orientation needs. Observation and maintenance also is facilitated with the easier accessibility to the panels, though security may also be at greater risk. Adding the roof-like surface to the parking lots could furthermore facilitate rainwater harvesting to reduce the stormwater runoff from the parking area with its associated contaminates and decrease the development’s dependence on municipal water sources.

CONCLUSION
Overall, these existing cases within the Tucson urban boundary do not reveal strong integration of PV systems into the urban fabric, but the site location and context analysis demonstrate great potential for colocation relating to physical, social/cultural, and ecological uses. Modifications for more open access for people or wildlife could be made to the existing sites for enhanced landscape layering. Infrastructure within the vicinity also clues us into what could be or what could have been if greater integration becomes a green energy infrastructure goal as we face the increasing rate in which ground mount PV systems are adopted. Predictions from the International Energy Agency indicate that we will continue to see increases in Solar PV development, with the installation of roughly thirty-thousand solar panels per hour in the next five years\(^{29}\). While impact on carbon would be positive, the impact on the landscape would be significant. Because of the scale of such projections, particular attention must be shown towards the placement of solar site in relation to the effectively using the landscape. There is promise for land use layering for a more robust and integrated solar development within our cities, with fewer negative impacts on the land. Further steps must be taken in research and practice to incentivize and facilitate the adoption and integration of large scale solar PV projects within the urban boundary. For our clean energy future, we need to make solar PV do more for us.

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INTRODUCTION
Fluid transnational and internal migration of populations have created conditions of complex demographics in many urban centers across the world. In such demographically diverse places, place-making practices are often unconsciously enacted through cultural practices and habits of citizenry imported from other places. With popular political discourse around the ‘assimilation’ and ‘integration’ of immigrant populations, the agency of these groups at an individual and communal level is threatened.

Emma Perez highlights the importance of sitio y lengua,1 a space where authentic cultural practices inscribed in bodies can be enacted and re-enacted confirming the identities of specific social groups. This is a site of unprogrammed socially produced behaviors that enable for example, immigrants to adjust to a new society; a place where they can ‘live inside with difference’.2 She writes that power for these groups lies in this difference.

It is possible to imagine sitio y lengua consisting not only of space and language but also other, multiple sensory presences produced through embodied action in space. A sensuous-spatial analysis of place is able to provide a framework through which to analyze the interplay between the physical, cultural and social aspects of everyday interactions. While social sciences have drawn from this framework to investigate how cultural differences are lived and spatialized in everyday life,3 little of this knowledge informs design thinking. I have argued elsewhere that one reason for this is that the output from those disciplines are primarily text based and in disjunction with the traditional methods of engagement in architecture.4 This paper presents the application of a multimodal mapping methodology developed for designers that attempted to materialize and spatialize the embodied knowledge associated with place-making that is often revealed through an ethnographic approach.

Theoretically underpinned by the work of Henri Lefebvre I used the concept of rhythmanalysis where the relationship between space, time and the social body is explored to record the multi-sensory rhythms associated with the occupation of space. Immersive ethnographic techniques supplemented the identified rhythms. The resulting information is synthesized and represented in a multimodal mapping diagram that aimed to retain a sense of the multi-sensoriality and complexity of the phenomena experienced on site.5

In this paper I focus on some of the mapping findings in the multicultural inner-Melbourne suburb of Footscray and consider the design responses that emerged by student designers engaging in this methodology. I begin by analyzing selected mapping vignettes that sit within broader themes that emerged across the mappings. That of, ‘time’, ‘bodies in space’ and the ‘socio-sensory’. To speculate on the impact of such knowledge on design, I unpack the mapping episodes to reveal socio-spatial markers which form an analytical framework through which I review two design projects.6

I conclude by positioning the research within broader multicultural social theory, advocating for the design of spaces that value multimodal occupation of space and allow for a dialogic engagement with its social and spatial context.
SENSE OF PLACE

Vignettes of Footscray

Within the broad themes mentioned above, sub-themes emerged in the mappings which permitted the phenomena encountered on site to be discussed in a more nuanced manner. ‘Time’ considered the tactical, the ephemeral, and embodied memory. ‘Bodies in space’ considered gesture/posture, proximity/distance, how objects are touched and the traces of occupation are left in built space, while the ‘socio sensory’ was considered around commerce and leisure. This section presents vignettes that illustrate Socio-sensory...around leisure and Time...and the tactical. The socio-spatial markers are ‘traced’ through the discussions as they emerge, through bold lettering.
The street has a slower rhythm; the predominant sounds are voices in conversation, mainly African dialects. People spill out of cafes and hold conversations outside in small groups. If they are not seated on the chairs, they lean against trees. Sometimes the same people move from one café to another to join a different group of people. The sound of voices peaks at around 6pm. The soundscape is also punctuated by intermittent sounds of clapping – caused by hands clasped in a greeting. As the day moves on the groups become larger and by 7pm they are largest, and spread over fewer spots. People drink red hibiscus tea at the tables. Usually (but not always) men and women are in different groups. The women come out of salons and are a fleeting presence in the sensescape as they do not linger.

The rhythmanalysis revealed how place is transformed through the soundscape – and here quite distinctively, through the sound of conversation that is male, in Arabic and other dialects from the African continent. The diagram also reveals its temporal dimension - as mentioned in the written excerpt, the intensity of the sound gathers momentum and peaks at around 6pm. This coincides with the times the men have finished work. The size of the groups increases by 7pm as a number of smaller groups coalesce. The smellscape also contributed towards the distinction of place through the alternating aromas of the ‘sour’ injera (Ethiopian fermented bread) and hot chips from the nearby burger shop.

Greetings between the men were always accompanied by the joining of hands in the specific way described in the mapping excerpt. This contact also contributed to the soundscape through the clapping sound that was generated. I observed at times, hands continued grasping while conversation was carried on. The collective of bodies constantly formed into and out of groups throughout the day. Because this occurs on the pavement with the men visible to passers-by, chance meetings with acquaintances often occur.

This sociality which was performed in groups was exclusively male (based on the mapping observations) with women being a weak presence in the sensory landscape. Small eruptions of women’s voices were heard as they moved into and out of the hair salon or a restaurant. The genders appeared not to mingle.

It also becomes evident that the enactment of cultural memory often becomes a shared bodily practice in Footscray – mostly performed in small groups. The construction of collective cultural identity is through many different processes but is often communicated through social practices and rituals. Although internalized within individual bodies it unravels in the presence of others through embodied interaction.
Figure 1. Expansion of vertical episode from Path B, Spot 2. Multimodal mappings of Footscray by author.
A Vietnamese grocery store overcomes the inadequacy of the shop space for displaying of goods to passers-by by encroaching onto the public pavement space and expanding onto the back of the bus stand located opposite the shop facade.

By using unfixed, movable ‘props’ such as display stands, protective canvas sheeting and the produce itself, they are able to carve out an ambiguous space in this particular strip of pavement that blurs boundaries between public and private realms. It contributes to the perception that this section of pavement is now – albeit momentarily- a private space is the presence of the shopkeepers who continuously maintain the displays, taking off withered leaves and dropping them into boxes positioned underneath, tidying, refilling and all the while policing their property- a form of covert surveillance as they are visually disconnected when inside the shop. At the end of the day the displays are dismantled and taken into the shop; the floor is swept. Little evidence is left behind of its previous occupation except for the odd wilted leaf and splashes of water used by the shopkeepers to wash down the pavements.

It is possible to see the emergence of a specific type of materiality that results from a tactical and sensorial engagement with space. The shop lends an organic materiality to this section of pavement by bringing the fruits and vegetables out. The smell of ripening fruit intensifies with the heat of the day and spatially extends into the bus stand where although the occupants are physically detached from the displays by the glass backing, they are re-gathered into the space by the smellscape. To extend the display space and to protect the produce from sun, blue canvas sheets were used. These were later taken down and substituted with blinds. As circumstances change, the tactical response evolves in small scale barely perceptible increments –with it, changing the materiality of the place. This illustrates a particular materiality that is not only vaporous and ephemeral, but subject to temporal changes, shifting over time and space.

This tactical occupation of space also involves self-negotiation of territory between groups and within groups. In this instance, it is implicit negotiations between the shop and those occupying the public pavement as people negotiate their way around parked trolleys, prams, the displays and each other. There is also negotiation between shops as some display elements encroach on adjacent shop windows.

**Time…and the tactical**

blurred boundaries  ephemeral and temporal materiality  self-negotiated territory  use of props

*Path B Spot 1* 8am

The pavement is transformed by the displays of the Vietnamese grocery store. No longer is there a direct visual connection to the end of the street. One’s body is confronted by the organic smells and the task of making one’s way around the trolleys and boxes. Attention to embodied engagement is encouraged as opposed to the visual consumption of distant views. The shop further down had appropriated the bus stand as a backing for their displays, and having seen this, they too use the bus stand that is directly opposite their shop. First, using a piece of canvas to extend the display space, then using venetian blinds to protect the produce from the sun.
Figure 2. Expansion of vertical episode from Path B, Spot 1. Multimodal mappings of Footscray by author.
Design Explorations

**Scheme 1**

*transformation of place through soundscape and smellscape/shared bodily practices/nodes of exchange/chance meetings*

The scheme presented here was a proposed eatery combined with an office for the local council in Footscray. The student’s position on urban renewal was therefore of envisioning a space of engagement where the realities of Footscray are confronted in an embodied way.

The design consisted of re-modelling an existing building, with an office for council on the upper floor while the ground level is opened up as a street. Food preparation and selling occurs along the length of this space.

The design programme accommodates multiple narratives. The site is opened up allowing for its appropriation by the community - people and the natural elements are allowed in. As various groups appropriate the spaces, these are transformed through the sensescapes created by groups. Council members are facilitated an encounter with these realities, a chance to be embedded in socio-sensory spaces that may be culturally unfamiliar.

In presenting the scheme, the voices of the members of the review panel were ‘borrowed’ as they were asked to gather around the design and read short pieces of poetry handed to them while the student physically manipulated the model to reflect unfolding scenarios. The voices with a variety of accents and timbres added to the concept of plurality and non-ownership which the design promoted. The presentation was allowed to be ‘appropriated’ by others, much like the spaces in the design, by whoever is there in that space at that time.

The student reflects on the specific narrative approach he adopted, “The presentation was intended to be part of the allegory; uncovering the site, the bodies of a group organizing itself communally around a site which would slowly alter there and then in the presence of all and voices other than mine to tell its stories.”

*Figure 3. Presentation of scheme involving the panel. Photo by Ammon Beyerle*
Figure 4. Design Scheme 1 by Douglas Wan, 2013.

**Design Scheme 2**

blurred boundaries/ephemeral and temporal materiality/self-negotiated territory/nodes of exchange/chance meetings

This scheme is a proposed new building for a bakery in a street corner of Footscray where the mappings revealed the presence of an informal market. This heavily influences the programme where the sellers in the corner are accommodated by allowing them to appropriate elements of the bakery structure for their needs. The design is a store frontage of movable façade sections providing ‘nooks and crannies’ for buying, sitting and eating on the street.

A negotiation of territory between public/private and buyers/sellers is allowed to happen organically. That is, it is self-negotiated. The boundary between the public and private realms is blurred with both
sellers and consumers occupying the threshold simultaneously. Along with the bakery goods, the presence of the sellers with their produce displayed define the materiality of the space and is subject to change over time as varying scenarios of opening and closing sections reveal and hide the different materialities. As identified in the mappings of Footscray, the spatial layout of this design intervention follows the concept of ‘market place’ with goods and sellers/buyers visible to passers-by creating the opportunity for chance meetings. It also becomes a node of exchange based on invitation, resulting in the consensual exchange of culture.

As in the previous scheme, the socio-sensory implications of the design were narrated through readings of poetry. The words evoked the multisensoriality of not only the urban intervention that was proposed, but also of the sense of place and sociality that the intervention generated.

Figure 4. Model and presentation of Design Scheme 2 by Douglas Wan, 2013.
HABITS OF CITIZENRY
Designing for Complex Demographic Conditions

The studio outcomes, while reflecting many of the socio-spatial markers that emerged in the mappings, demonstrated a collective leaning towards designs that explored the temporal potentials of space resulting in schemes that were tactical, incremental or ephemeral in nature. They also frequently privileged the human scale and anthropometrics, emphasizing embodied engagement with the built environment. The mappings gave insight into how gesture and posture reveal particularities and capacities of bodies and how it allows the expression of identity to occur through the way objects are touched and their affordances explored. Acting out through the body to manipulate or reinterpret the built environment to suit specific needs demonstrated individual and group agency of the users is facilitated. This insight resulted in specific approaches to detailing and materiality by the students that were responsive to the agency of users, often allowing for the reconfiguration and manipulation of space. The focus on the human scale also allowed narratives to surface of the daily lives and relationships of the users.

While these aspects characterized the outcomes, it became clear however that it was difficult to identify distinctive formal generators for design emerging from engaging in the multimodal mapping methodology. Instead, because the methods were time-based approaches, the mapping contributed towards the multiplicity of programmatic scenarios as the student designers responded to complex conditions of the site. For example, many accommodated multiple concepts or allowed multiple narratives to unfold in the schemes, resulting in spaces that were plural in identity. By engaging in the mapping an understanding emerged that the activities observed on site created their own space-time generated epistemic spaces. These are nested spatial and temporal scales generated by specific bodies that differed in their capacities and cultures, where specific constructs of knowing and being are enacted. It is in these epistemic spaces that authentic difference resides. To confront difference in all its multiplicity one had to enter and inhabit it. Reflecting this, many of the stronger design responses by the students favored supporting such self-generated activity and then facilitating a confrontation or engagement with it.

Multimodal and Dialogic Spaces

What implications do these insights have for designing in complex demographic conditions? I assert that engaging in the multimodal mapping may foster the design of spaces that hold dialogic potential. As opposed to the synthesizing outcomes of a dialectic process that is often pursued in design, these are places where multiple time-space configurations are allowed to co-exist, choreographed by time, validated by the sensory occupation of space.

The implications for immigrant communities are twofold. The socio-sensory practices evident in Footscray are configured through distant memories of other places, which in turn are produced through ancestral and varying geo-political histories. Tim Edensor writes, “... at a national scale, space is arranged 'in a way that supports the bodily habits and routines of those who dwell there' (Young, 1997:136)....” During migration, when one is beyond the familiar national space where previous rhythms of dwelling are absent, it is found that "...people are apt to restore familiar spaces, routines and timings" based on the memories inscribed in their bodies. Several examples of the recreation of a familiar ‘time-space’ were uncovered through the socio-sensory mappings of Footscray. Memories of other places are re-produced here multimodally through foodsapes, smellscapes and soundscapes, reflecting cultural specificities. The sensory occupation of space and its
temporal significance became a means of establishing cultural presence. The enactment of cultural memory was also often a shared bodily practice. Collective cultural identities internalized within individual bodies unfolded in the presence of others through embodied interaction. These are epistemic spaces where kin-based networks are rekindled and fostered. Where one can live inside with difference with opportunities for agency and self-definition. These spaces also hold the potential for identity negotiation within a broader social and spatial context. Difference carries the risk of conflict and uncertainty. Encountering this difference in a dialogical way enables incremental and cumulative change, allowing people to negotiate the tensions between the self and other in their interactions. Multicultural theory and its policy influences have led to the valorization of ‘diversity’ where differences are settled into confined and static patterns that are non-confronting and easily managed.11 I contend this erases the potential for transformative intercultural experiences. The approach I am proposing where difference is fostered, and encounter with this difference is facilitated, resonates with the idea of a deep and critical multiculturalism.12 Here, the capacity exists to critique dominant narratives through the inclusion of diverse epistemological approaches. It assumes reciprocal benefits, with existing mainstream culture being open to transformation by its encounter with the other. Most critically, it is contingent on authentic dialogic interaction between individuals and communities. Paul Nesbitt-Larking writes, “For a well-functioning multicultural society, such dialogue needs to be found across a range of routine and special social settings in multiple networks of ongoing interaction. In plain terms, individuals and communities from across the society need to be consistently and habitually interacting.”13 I believe the design responses that emerged from following an approach that values intercultural exchange mediated by the senses created situations that facilitated meaningful dialogic interactions.

CONCLUDING REMARKS

Accommodating diversity has become an urgent issue in urban centers around the world. However, in a global climate of increasing nationalistic and xenophobic rhetoric, neutralizing difference and exclusionary practices have become normalized. This not only undermines the agency and autonomy of immigrant communities and but also contributes to increasingly divisive societies. Through this paper I present a particular way of reading demographically complex urban conditions, specifically addressing the socio-sensory occupation of space and the body-space-time issues that result from this. I advocate that designers can address issues of social equity that arise in these situations by programmatically pushing disciplinary boundaries of architecture and re-thinking conceptions of time and space. Designing for difference and facilitating encounter with these alternative epistemic spaces can foster dialogic interaction between diverse citizenry, allowing them to become sites of transformation and re-invention.
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2 Ibid., 78.
4 Paper currently under review for publication in the Journal of Architecture.
6 The work is drawn from a Master of Architecture design studio that the author co-led at the Faculty of Architecture, Building and Planning, University of Melbourne in 2013. Students adopted the multimodal mapping technique and explored design responses within the specific conditions of urban regeneration in Footscray.
7 The vignettes presented here are expansions of the vertical mapping episodes. The text on the left-hand side should be read in conjunction with the supplementing images and multimedia on the right-hand side. The text in grey are diary entries. ‘Bodies in Space’ depicts through photos or sketches the embodied activity that is involved in creating the sensory rhythms. They also depict corporeal engagement in space giving insight into kinaesthetic involvement with the built environment. ‘Plan’ gives an understanding of the density of bodies in space, their orientation towards each other and/ or adjacent structures and their relative positions in space.
‘Section’ elaborates the relationship between bodies and structures/built environment - how something is touched. The section also provides an understanding of the volumetric space and scale. ‘Insights +’ refers to additional supplementary material that provides deeper insight into the phenomena encountered. Multimedia files referenced in the paper can be accessed here: https://www.dropbox.com/sh/hc5o5bxii0z5kl3/AACmbFxkFgBT5_yS3Sy5kUNXa?dl=0
8 Douglas Wan, Essay, Studio S(C)ensory Renewal 2013, unpublished.
9 Tim Edensor, "Introduction: Thinking About Rhythm and Space," in Geographies of Rhythm : Nature, Place, Mobilities and Bodies, ed. Tim Edensor (Farnham: Ashgate, 2010), 9.
10 Ibid., 9.
Furthermore, in current global conditions where ethnocentric tensions are prevalent in many western democracies, multiculturalism is being critiqued as helping sustain impermeable boundaries along cultural lines. This has led to popular backlash against multicultural policy. Recently, intercultural theory is responding to this discourse, advocating cross-cultural dialogue based on valorizing similarities. While this may help engender empathy and cohesion within populations I believe it lacks the truly transformative potential offered by a deep and critical multiculturalism. See Michele Lobo, Vince Marotta and Nicole Oke, ed. Intercultural Relations in a Global World (Champaign, Ill.: Common Ground, 2011).
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DUAL ECOLOGIES: A CRITICAL PRACTICE

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INTRODUCTION
All architectural practice should be capable of criticality, both of their own work and that of the discipline as a whole. To work critically, there is a particular self-awareness necessary for reflection upon decisions, and to arm oneself with the ability to judge the pursuit of future work. But, the pace and struggle of contemporary practice rarely affords most practices this opportunity.

DUAL ECOLOGIES
Dual Ecologies operates between architecture and art. My partner, Bruce Johnson, and I, founded this practice and we work collaboratively on each project. Our name stems from what we’ve based our practice on, two ecologies, which are fundamentally design tenets that shape the way we work and what we try to hold ourselves to in practice. The first ecology involves site – our work is in direct response to the site and seeks a larger order that lies outside its defined boundaries. This corresponds to the scale at which we design, from large to small. The second ecology involves tectonics – this is for us the dialogue of opposites and a negotiated truce: from the base to the frame, the site to the building, or the representation to the construction.

Our projects fall at both ends of the spectrum of architectural methods/modes of practice: on one end, we do what we like to refer to as “reclamation” projects, which are primarily designed interventions into existing residences intended for a broad audience (on completion, these houses are sold in the traditional real estate market) – this work is fabricated by us personally, and is predominately client-less. We also do more conventional design consultation with clients. On the other end of the spectrum, we focus on more theoretical projects intended primarily for exhibition and to offer a new lens on the nature of architecture and art – these can be divided into analytical process-driven projects and theoretical un-built proposals. Dual Ecologies is being used within the context of this paper to frame a way of working critically – part of the reason we employ multiple modes of practice from design-build to analysis is that we are interested in how to practice: for my partner and I, design should not be dictated by clients or budgets – it is a thought process. We are interested in making, and the nature of building and drawing, but there are three key themes that our work persistently returns to, and which provide us with a foundation from which to be critical: the consideration of Process, Space, and Critique.

ON PROCESS
For Architects, the role of process is critical – first in the creation of a design and second in translation to construction. When a piece of architecture is complete, however, the process of its creation has largely vanished, unless the architect has chosen to publish any drawings that might capture its evolution. This erasure undermines what the architect actually does. As with music, the act of
architecture is a practice – we are working at something that is building towards an outcome. But, unlike a performance, we are not physically there at that outcome, and the outcome is not fixed at a particular moment in time. A work of architecture is not “complete” at the moment of occupation – it is a constantly evolving process. This makes architecture more akin to art – the artist creates a work, but it requires viewing, and the viewing of a piece of art (and its context) changes it. Artist Robert Smithson pushes the notion of process even further:

At the low levels of consciousness the artist experiences undifferentiated or unbounded methods of procedure that break with the focused limits of rational technique. Here tools are undifferentiated from the material they operate on, or they seem to sink back into their primordial condition.¹

For Smithson, process and technique were tied together but the limitations imposed by the discipline could be eliminated by considering a “primordial” condition. He argued instead that the materials and methods one uses could merge together, which also reinforces his own process using asphalt, glue, dirt and other materials to pour and pile. Similarly, in architecture the process and technique are tied but the limitations can be rethought. This would facilitate a similar primordial condition, an undifferentiation between design and construction, site and architecture but also a condition where the process itself is the primary goal made evident in the artifact of production. The visibility of process and technique would go beyond, for instance, exposed fasteners as a way to reveal the process of construction, to examine a moment where both the design and the construction are merged.

**90 LINES**

Within Dual Ecologies, our work emphasizes process as an integral part of the finished artifact, be it art or architecture. We approach process as a means and end. The project 90 Lines is an example of our more experimental work where the approach to process explores the limits of architectural space. Its methods were logical and analytical, but it is also a work of art in the sense of that its expressive intent was specific, and its scope was the activity of its making, its own process. The site exists between boundaries, delimiting a malleable space transformed over time through use, neglect, reinvigoration, and gradual sedimentation, adjusting to the urban and rural systems that drive its boundaries through their complex and responsive interactions. In this sense 90 Lines is also a work always in process and fundamentally about process. The space of 90 Lines is architectural: control joints in the path that runs through this space create a primitive tectonic through the process of pouring concrete, and the tree canopy and boundaries provide a sense of enclosure. The rudimentary program is an invitation to move marked by the path. It is a space that exists in time – the control joints meter the juxtaposition of two independent, internalized orders – as lines, the joints provide a counterpoint to the linearity of the space.

The project 90 Lines (Fig. 1) was developed on two simultaneous fronts, as an analytical documentation process through photography / site measurements and as a translation process into a representation of the space that could adequately reflect its specific qualities. The photography was intentionally serial – documenting each line in relation to the boundaries on either side of this space made each line individual, but their emergent interaction drives the complex space created. Borrowing notational systems outside of architectural conventions best captured this space in translation to representation. Using the framework of musical notation, the viewer of the final composition for 90 Lines is challenged to see the space in time, where the meter of the control joints drives the counterpoint between fence posts and trees. In this sense, the viewer is also the performer, and is actively playing a part in the process of making the space of 90 lines.
ON SPACE

The creation of space is paramount in architecture, but the term “space” is often misapplied to rooms or enclosures where little if any consideration has gone into the qualities that would define it as a space. Artist Donald Judd states that, “There is no neutral space, since space is made, indifferently or intentionally, and since meaning is made, ignorantly or knowledgeably. This is the beginning of my concern for the surroundings of my work.” Enclosure does not create space, architects and artists do. However, there is a persistent and ubiquitous amount of poorly conceived space that belies its importance to architecture. The situation is symptomatic: on one hand, very little in the built environment is actually designed by architects. On the other hand, architects may be ignorant of their context and are therefore creating poor space, if space is even a goal, and designed space is also at the behest (and in the hands) of the client, which can undermine or negate the role of the architect in defining space in architecture. In either scenario, well-conceived space – what Judd would describe as “created space” – is quite rare in everyday context, and architects can and should do more to make the average person at the very least aware of the absence of created space in their environment.

The role of space was of particular importance to Judd because it can be easy to see Judd’s work as abstract objects, when they are really contingent on their context – they make their own space through their placement and in juxtaposition to their context. Because of his interest in the space defined by his art, he was a strong proponent of permanent installations, and this ultimately drove him to establish what is now the Chinati Foundation in Marfa, TX. The work shown there is intended for the space it is in – the art defines the space you move through. For Judd, the typical gallery was more often than not unsuitable for his work, so he stepped outside of the normative model of showing work by establishing his own venue to view his work and that of his colleagues.

7930

The design-build work for Dual Ecologies can be seen through the lens of permanent installation. The work is not about radically transforming the form of the house, but about creating space through designed intervention. The site and existing house for 7930 exists on converted agricultural lands in suburban Kansas City, which have been effectively erased in favor of cheap development. The intervention within the house is intended to evoke this agricultural context, looking at the kind of patterns created by the trace of crop harvesting. The existing house is of a type of 1950s California Modern home: many architects and contractors in the area were looking at the original Case Study
Houses and translating those ideas to the Midwest. What predominates these houses beyond the open living/dining areas, large asymmetric window arrangements, and typically quite thin construction, is the roof. Typically these houses have low-pitched roofs with parallel vaulted ceilings, providing an opportunity to define the house’s exterior as a part of its interior.

The skin designed for the ceiling creates a subtly undulating lightweight implied basket weave that unifies and defines the public space of the house, working to manage disruptions such the kitchen’s integrated lighting bar where the oven fan is also housed (Fig. 2). As a pattern, the ceiling is meant to define the interior space, but its directionality also draws your eye through the house from the front to the back, extending this space to the exterior.

**Figure 2. 7930 – illustrating the ceiling from interior and exterior.**

**ON CRITIQUE**

If process is the method (a kind of constant present), space the final intention (always in the future), critique is the way in which one can reflect back on one’s work (to the past). The last theme I want to address is the role of criticism with in our practice. My partner and I are both academics, in addition to our practice, so for us critique – both of the work and of the context of the work – is integral to our practice. Teaching affords us the ability to pursue experimental client-less projects - these projects are a kind of proving ground for our research, and they provide a feedback loop to more normative practice by first allowing us to think at or beyond the limits of the conventions in architecture so that we can then find ways in which this can filter back into more conventional methods of practice.

For us criticism is not simply a method of design refinement, although this is a constant in our practice. It is also important to recognize the limitations imposed on practice that can and should be questioned – in this sense we see a parallel to the mindset and methodologies of Gordon Matta-Clark.

For Matta-Clark, it was not only reasonable, but a responsibility of the artist to claim neglected space. Referring to his Day’s End project, he stated that:

> Since most or all terminals that are not still in use are standing wide open …it would seem a city condoned anarchy reigns there. In this state of affairs it would seem within the rights of an artist, or any other person for that matter, to enter such a premises with a desire to improve the property, to transform the structure… into a place of interest, fascination and value.\(^5\)

Matta-Clark’s early training as an architect also became the ideology he continued to resist throughout his career. His work is not anti-architecture, although his brazen cutting into structures might belie that point – he was interested in what author Stephen Walker describes as “discrete violations”, where the
CRITICAL PRACTICE IN AN AGE OF COMPLEXITY – AN INTERDISCIPLINARY CRITIQUE OF THE BUILT ENVIRONMENT

AMPS, Architecture MPS; University of Arizona
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juxtaposition of removing something we take for granted (like a wall) forces the viewer to engage in the context of the structure – the absence activates the viewer awareness.

CASE STUDY TWO

Within Dual Ecologies, our theoretical projects are intended to critique their context. As with Matta-Clark, it is necessary to respond when the institutions and governing bodies that shape the fabric of cities do not adequately consider the consequences their decisions have on the ground. Many architects do not question the rules that govern city building, but they are often convoluted and change over time, creating strange disruptions within the fabric. Typically these disruptions are governed by infrastructure, which again, architects more typically take for granted rather than to question their appropriateness. By inhabiting these spaces, our practice seeks to challenge the hierarchical character of these systems as well as architect’s role in engaging in them.

Case Study Two (Fig. 3) uses existing water infrastructure to seek out its own land, borrowing from the land leftover by the interventions of infrastructures in the suburban landscape. The project sought its foundations with the original case study house program published in Art in Architecture. The proposals were both built and un-built, often designed for impossible sites, and all were experimenting with new materials and construction as well as a new way of living post-war. A new case study house would consider how one would live today, where residents act as stewards of the site they occupied. The site for Case Study Two is located in a detention basin, which acts as a kind of infrastructural leftover within the suburban fabric of Albuquerque, New Mexico. The basin abuts the Northern Diversion Channel that receives the entire east side of Albuquerque’s storm water coming off of the foothills of the adjacent mountains into a large open drainage channel or arroyo, diverting its passage to the northern end of the Rio Grande. Using two parallel concrete walls, the house bridges from the existing street system of the neighborhood to the pumping station located on the levee that supports the Diversion Channel. The house captures and holds back water that would simply discharge into the river through two large water tanks that are suspended within the house. The resident resides literally within the water system, benefiting from their interaction as it cools and heats the home.

Figure 3. Case Study 2 – section showing layers in infrastructure embedded in the house and larger order of infrastructure in the city seen in models on right.
CONCLUSION

Process, Space, and Critique are significant to any work of art or architecture. However, the role they play within the work and within a practice can differ dramatically. Smithson, Judd and Matta-Clark are suggestive because they use these themes to define their work. The limitations of technique should be broken down, as Smithson suggests, so that the process of the work, while potentially irrational, can be the work itself. Space is not a simple given within art or architecture – it is not neutral, as Judd states. It is something to be activated and defined by art and architecture. Critique is essential, not only of the work but of the context of the work, particularly for Matta-Clark. Architecture (and art) too often accept their context, from clients to infrastructure to the nature of the gallery – architecture and art should be questioning and challenging the where and in what context they find their work.

These artists’ work is both compelling and enduring because of their focus on these aspects of the creative process, while all three refused to be reduced to a single working methodology or medium. They can serve as a model for architectural practice. For us, that is what Dual Ecologies is becoming.

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PHYSICAL AND SOCIAL DECAY: EXAMINING THE EFFECT OF ENVIRONMENTAL FACTORS ON HEROIN USE IN RURAL AND URBAN AREAS

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INTRODUCTION
America is in the midst of a heroin epidemic. According to data from the National Survey of Drug Use\(^1\), in the year 2015, 12.5 million people misused prescription opioids, over 800,000 persons heroin, almost 10,000 people died from opioid overdoses, and almost 13,000 people died from heroin overdose. This is not the first drug epidemic to hit the US, and sadly, it will not be the last but one of the things that sets this particular epidemic apart is that most of the increases in heroin/opioid use are coming from White, rural areas and rural-adjacent suburbs. The difference in setting has dominated the narrative as to why we are seeing this level of drug use in these communities\(^2\). While other drug epidemics have been met with blame and sharp criminal justice action, this has primarily elicited shock and surprise. However, demographically speaking, inner-cities and rural communities have more in common than one would expect. Rural areas have long been characterized by high levels of poverty and a kind of social distance from pockets of affluence that creates a sense of isolation\(^3\). Despite these similarities in the structures of the communities in question, there is a general sense of shock and concern about the kind of drug users we are seeing. Instead of the typical demonization of a public health crisis, rural opiate users are being cast as blameless victims of nefarious forces or random circumstances.

This new way of looking at drug epidemics is most apparent in the dominant explanation for the current crisis: over-prescription of legal opiate pain killers. Accordingly, doctors in the 2000’s overprescribed expensive opioids to populations engaged in manual labor dealing with persistent pain\(^5\). Once addicted, rural populations turned to heroin (which is biochemically similar but cheaper) to cope with their newfound addictions\(^7\). Some would even argue that by decreasing access to pills, the government forced sick addicts to turn to black markets\(^9\). I do not dispute that this may be the case for many persons struggling with opioid addiction. It’s a story that has strong face validity and makes good intuitive sense. However, this explanation individualizes the problem or focuses on flaws with one profession. Drug epidemics are about communities, not individuals. Therefore, we need to examine community-level causes and remedies to this pressing social issue. Additionally, the medical explanation does not apply to many of the cases we are seeing.

Age also plays a role in the media attention devoted to this particular opiate epidemic. In 2015, persons 18-25 became the largest age category for heroin use\(^10\). Even though there are more persons over the age of 21 who are treated for heroin overdoses, persons under the age of 21 experienced a 75% growth in overdose
treatments from 2004-2011. A more detailed explanation of the extent to which opiate abuse is becoming a youth problem comes from a 2016 NPR story about Kutztown, a small community outside of Philadelphia. The heroin problem was so bad that they had to keep Narcan, a heroin overdose reversal drug, on hand because high schoolers were frequently overdosing in class. Are high schoolers misusing legal opioids that they were prescribed to deal with the pains of their manual labor jobs? Maybe, but probably not. This points to a larger, intergenerational, community-wide problem.

Instead of focusing on the ways that this opiate epidemic is aberrant, we need to explore how it mirrors prior community-wide drug events. The emphasis on how different this epidemic is compared to prior drug instances has obscured the truth that this in many ways is nothing new. In particular, I believe that by exploring the commonalities between the community structures of inner cities and rural areas we can better approach this issue from a holistic standpoint. I contend that poverty and its effect on the physical environment creates conditions where drug abuse can decimate whole communities, be they urban or rural.

Social Change in the 1970’s: The Slow Death of the City
When we think of inner city drug epidemics, the crack crisis of the 1980’s typically is what comes to mind, but the first major drug epidemic of the modern era involved heroin in the 1970’s. Although research on this topic is surprisingly scarce, it is estimated that between the late 1960’s through the 1970’s, the number of heroin users doubled, totaling over half a million people in 1975. This crisis was located primarily in large, East Coast and Rust Belt cities like New York. Being a predominantly urban crisis, most of the victims were young African Americans, and vulnerable populations like the homeless.

The public and governmental response to victims of this crisis was one of castigation. President Nixon frequently invoked the idea of the drug fiend while defining drug users as soulless criminals. This individualization and demonization of a clear social problem overlooks the changes that occurred to these precise locations that lead to a drug pandemic.

The 1970’s in many ways represented a turning point for America. As we shifted from an industrial economy to a service-based one, inner cities felt the brunt of the economic shock. Areas that had long been popular because of their proximity to good paying, low skill jobs were suddenly left without any jobs community residents. At the same time, the white flight that started in the 1950’s as affluent, White Americans embraced suburban life intensified due to bussing. It is estimated that during this time, 10% of Americans left city centers, taking with them tax dollars and a shared responsibility for physical spaces. Similarly, racial segregation laws relaxed, allowing more upper and middle-class minorities to leave the racial segregation they were stuck in for at least the promise of class segregation. The sum total effect of these economic, political, and demographic changes was the dramatic concentration of minority poverty in once strong communities.

The rapid depopulation of persons of wealth from cities left an unstable future for cities. Shortages of jobs and a surplus of people without anywhere else to go replaced the opulence of cities. Cities became centers of poverty with little to no way of funding the future. It’s hard to imagine, but large parts of New York, Philadelphia, Pittsburgh, Cleveland, and other cities looked like war zones. What they left was decay and people in need. Drugs had always existed in inner cities, but changes to the social fabric of the city and the way change eroded the physical structure of urban areas set the stage for widespread drug abuse.
Explaining Neighborhood Crime and Drug Use

How can the physical environment affect crime and drugs in cities? Works by criminologists like Shaw and McKay have long shown that the built environment (along with the distribution of people in space) can create crime, regardless of the types of people in a neighborhood. An ecological view of crime essentially argues that it is not the “types” of people but the types of places that create crime. One of the most relevant ecological crime theories that applies to inner city crime is Broken Windows Theory.

First described by Wilson and Kelling in 1982, Broken Windows Theory states that physical and social decay broadcast breakdowns in the physical environment that increase crime by communicating a kind of disinvestment in the area that makes crime permissible. Broken windows, abandoned cars, empty buildings, litter, and graffiti all serve as signs that no one is looking after shared public spaces. Abandoned buildings provide opportunities to commit crimes, especially heroin shooting galleries, while also conveying a sentiment that no one cares. This is referred to as physical disorder. Social disorder often accompanies physical disorder, as it did in cities in the 1970’s. Open air drug markets, visible prostitution, loitering, and gangs all act as signs that a neighborhood is open for crime. In the 1970’s, America’s cities were in a state of physical and social despair, from Times Square in New York to East Liberty in Pittsburgh. Blighted, half-demolished buildings, sidewalks covered in trash, and abandoned cars dotted many urban landscapes.

The sentiment that follows physical and social disorder can be referred to as social defeat. This is a neighborhood process where people resign chances for a better future; where they admit there is no hope. We see these in highly disordered neighborhoods and in communities with high levels of concentrated disadvantage. Growing up or just finding yourselves in these environments conveys that your life chances are diminished. The environment itself conveys a sense of low status, reduced access to resources, widespread crime, and a general sense that things are getting worse and never improving accompany social defeat. Social defeat is essentially an emotional response to disinvestment at the community level. This is precisely what happened to cities in the 1970’s. People watched everything crumble around them. If they had the means to do so, they left. If not, then they saw more impoverished populations move into the giant, prison-like structures of the projects. Under these conditions, drugs like heroin become more widely accepted as they act as a kind of self-medication for whole neighborhoods who felt abandoned. Urban decay and the social defeat that accompanied it allowed heroin to turn from an individual issue to a neighborhood-level social problem. This is as true today as it was in the 1970’s.

CONNECTING THE DOTS: RURAL AND URBAN SIMILARITIES

Our attention to the compositional difference between past and present drug panics has obscured the role of context of contextual and the built environment on drug use. This comes from the way that inner cities and rural areas have been “emplaced” with different values. Emplacement refers to the idea that we create emotional connections to specific areas, and we ascribe moral character to physical spaces. We tend to think that rural areas are moral centers, whereas urban areas are characterized by social decay. This is partially supported by the fact that fewer crimes are known to police in rural areas compared to urban cities, even though the gap between locations narrows significantly when self-reported crime data is examined. This kind of emplacement has prevented researchers and politicians from seeing the commonalities between these two physically distant locations.

In fact, if you were to compare rural and urban locations they would be almost identical in terms of disadvantage except for two things: density and diversity. Concentrated disadvantage, another neighborhood-level crime concept refers to the geographical presence of extreme levels of persons living
under the poverty line, single-parent families with children, receipt of government assistance, joblessness, and hyper segregation of African Americans\textsuperscript{29;30;31}. All of these things, minus the percent African American, can be found in abundance in rural communities. In fact, poverty rates are higher in rural areas than urban centers\textsuperscript{32}. Although concentrated disadvantage was theorized with urban communities in mind, there is no reason why it should not have a similar effect in rural areas, especially since studies show that it operates in a similar manner for Black and White communities\textsuperscript{33}. Of course, rural poverty is nothing new, but many of the same forces that hit cities in the 1970’s have also affected rural locations in more recent times\textsuperscript{34}. As with industry, we have also seen the combined effect of agricultural globalization, the loss of smaller businesses to major corporations, and mechanization. All of which have affected poverty and unemployment in rural areas, just as they did in urban centers\textsuperscript{35;36;37}. This is why rural areas are experiencing the kind of depopulation and resource removal faced by inner cities in the 1970’s\textsuperscript{38}. For example, more rural counties in Western Pennsylvania and Eastern Ohio have lost population than have gained in the period from 2000-2012\textsuperscript{39}. This has left rural communities more economically vulnerable, more socially isolated, and thereby more defeated.

**Rural Disorder and Social Defeat**

Physical disorder is actually more common in rural locations than urban cities. A quick drive through the country will tell you that much like in inner cities, rural areas are full of empty buildings, abandoned cars, and litter. As with inner cities, these provide opportunities to do drugs and a sense that the world around them is decaying. In inner cities we became accustomed to seeing large ruined buildings, graffiti, and dark alleys that spoke of danger. In rural areas, we see long abandoned homes and barns, dumping grounds for goods that the municipality cannot dispose of, and other reminders of how rural communities exist and the margins of American social life.

Rural locations also intensify this sense of social defeat because the structure of rural life isolating. The geographical and cultural distance from populations that often drive American culture creates a kind of social distance\textsuperscript{40}, which intensifies the effect of social defeat. Wide open spaces may be picturesque, but for persons struggling to connect, the isolation can exacerbate any feelings of despair. This is especially true in a world that more than ever emphasizes the need to belong. To live in the margins of society is to live with a constant reminder of just how alone you are. Lipschitz\textsuperscript{41} referred to rural America as a kind of dumping ground where it was okay to dispose of waste, toxic chemicals, and prisons. This is the social location of rural areas, and as the physical environment continues to deteriorate, social defeat will only become more prominent.

The slow pace of rural decay mirrors what we’ve seen in urban locations. And just as with inner cities, we have seen an opiate epidemic sweep in to vulnerable communities. No one is more aware of the social distance, isolation, and social defeat in rural areas as the people who live there. And as the built environment deteriorates, hope erodes. Social defeat sets in.

**CONCLUDING REMARKS AND POTENTIAL REMEDIES**

Built environments matter. They convey status, comfort, and hope. We define “bad” neighborhoods largely in visual terms. If you have ever driven into a neighborhood with bars on the windows, litter in the streets, graffiti, and painfully outdated architecture, you know what I mean. Investment and perseverance largely depend on emplacement, and how we feel about ourselves depends on how we perceive our neighborhoods.
When we see everything around us crumble, we give up. Drug addiction, especially hard drugs that give a sense of total euphoria require a kind of acquiescence to take hold in communities. Heroin has always been around. It’s always taken lives. But what has to happen for whole communities, or “types” of communities to fall? Clearly something shared. Researchers have been so focused on individual choices, so called “bad” populations, and other individual issues to realize that everything starts with structure. In this case, a very real physical structure.

In terms of remedies, we need to keep structures and communities in mind. We cannot repeat the mistakes of the past. We have already made great strides by treating this particular epidemic as the public health crisis it is, instead of as a criminal justice issue. One of the biggest needs for both rural and urban populations is services. We need job training, medical care, nutrition, education, transportation, and all of the other things give people hope that tomorrow will be better than today.

We also need data. Most studies of drug abuse, crime, and neighborhood decline have been conducted in urban areas or suburbs. Studies that include visual depictions of daily life are cost-prohibitive and rare, but vitally important. This is especially true for areas that exist on the periphery. Rural communities need to be included in all fields from architecture to criminology. Once we have that data, we need to balance the commonalities between rural areas and other communities. But, we must keep interventions locally driven. Rural cultures are steeped in independence and distrust of government, again, much like urban areas. Anything interventions need to be based on the oversight of locals, otherwise they will not work. This creates a kind of catch 22. Rural populations largely prefer to be left alone, but isolation can give way to social defeat. These are conservative areas (in every sense of the word), but stagnation can kill communities. What is important is to keep the soul of the community while providing direct needs. In other words, interventions need to leave the social ecology intact as much as possible, but still confront the problems associated with rural life.

Targeted, community-level interventions can provide ample opportunities for small-scale public works projects, assuming there is public consent, funding, and the motivation to carry it out. Rural locations are decaying. New builds represent growth amongst this decay. But, only if it’s the right kind of growth. In some areas, services are administered only in the county seat. For local populations, this works. For others, this is prohibitive. Again, locals need to help plan the growth to make sure it is effective.

Linking architecture and heroin may seem unconventional, but place matters. The environment around us can fill us with hope or defeat. Our surroundings can affect us in profound, and often unexpected, ways. Rural revitalization is not a panacea, but it represents a real, tangible investment in communities that have felt marginalized for far too long.

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ARCHITECTURE IN THE LAND OF DEVELOPMENTAL STATE: INSTRUMENTALIZING THE MUNICIPAL SERVICES BUILDING IN HONG KONG

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INTRODUCTION

Critical architectural practice in Hong Kong is part and parcel to offer both engagement with and resistance to a development model based heavily on land-economy. A phenomenon created by the overlapping of three conditions: land shortage, planning policy and influx of legal and illegal immigrants. The first and major policy to affect this evolving and challenging practice was defined in the “Colony Outline Plan” published in 1965 where large scale New Town planning was advanced to expand the limits of the colonial territory. Through the reclamation of lands and construction of infrastructures and buildings, the execution of policy consequently has increased the construction output of the city for decades to come. However, under this directive the production of architecture is largely synonymous with and diminishable to the financial bottom line where form follows faithfully the buildable area, across scales from urban spaces, public buildings to private dwellings. The distress of these three conditions has given rise to a number of building typologies and spatial praxis reflective of the constraints. One such example is the Municipal Services Building, which began surfacing in 1978 as a government-led effort to provide district-based enhancement of the public life through work, leisure and intellectual development in a self-contained architectural form. This paper examines its performance, and the possibility to transgress within a system formulated upon a capital-driven land-economy.

Developmental State

The implementation of the outline plan is part of the developmental state policy, a form of capital investment scheme embraced by the government, where it determines and carries out the necessary policy to achieve its economic agenda. For Hong Kong a city with seven million people, this means policy expenditures of public funds in infrastructure and related public works. In the current fiscal year, funds allocated to infrastructure alone are as high as 18%. To illustrate the size of the developmental policy, a comparative figure will offer illumination. The 2017-18 infrastructure spending has been budgeted at $87 billion HKD (or $10.1 billion USD), meanwhile in the United States, the Senate is currently debating on a budget deal that includes a $20 billion infrastructure proposal for the entire U.S. The disparity is significant; especially considering Hong Kong has a land area similar to Los Angeles, and a population less than New York City.

The heavy investment has allowed the construction industry to serve as a powerful engine for its economic growth. According to statistics from the Development Bureau, Hong Kong has maintained a steady construction activity with increasing expenditures over the last few decades, 10% in 1997-
1998 to 18% ($93 billions HKD) in 2016-2017 for infrastructure, while 10% to 16% for housing during the same period. Although buildings produced as the result of this developmental process is, for the most part not of any significance. However, it does highlight the impact that the volume of construction has had on the built environment and the mode of architectural practices that transpired in the city.

The developmental state effort is most evident through the form of land reclamation and the building of New Towns. Modern capitalism began as Lewis Mumford has argued, through the act of systematically colonizing the ground⁵. In the case of Hong Kong this notion extends to the numerous reclaimed lands along its coastlines, where approximately 40%⁶ of the total Hong Kong population resides in the New Towns on reclaimed lands that did not exist before, see Figure 1. The dense figuration of Hong Kong resulting from compact and nodal urban planning has eliminated the possibility for sprawl like its neighboring cities of Shenzhen, Mumbai or Tokyo.

![Figure 1. Hong Kong land reclamation 1887-1996.](image)

**Criticality**

*Critical architecture* as enunciated by the architectural provocateurs of —Manfredo Tafuri, Michael Hays and Peter Eisenman— as having the ambition to critique the normative practice by resisting market-driven forces (Tafuri)⁷ and; to search for an abstract and autonomous perfection of form to express the architectural truth (Hays)⁸ or; concerns the possibility of knowledge against any accommodation with the status quo (Eisenman)⁹. I would argue does not exist in Hong Kong, or within the sphere of its pursuits. Michael Speaks made a similar observation when he pointedly announced “theory was interesting or at least not harmful when there was no work; but now that we have work we must leave thinking for later.”¹⁰

The uninterrupted investment provided ample construction opportunities for the greater architectural industry, giving no impetus to confront the notion of a utopian architecture as described by Tafuri where he claims, in order to achieve an utopian architecture, architects must bring an end to capitalism.¹¹ Well, in the case of Hong Kong, the marketization is so engrained and pervasive that the discussion of the "critical architecture" has never entered into the debate. Autonomous perfection of form instead is driven by the knowledge of the spreadsheet, a kind of architectural form mutated from the criterion of carpetable and non-carpetable areas, where architecture is analyzed by its effective
efficiency. Eisenman attributes this absence of criticality to the lacking of an enabling mechanism to support critical architecture, hence “to build in emerging countries requires accommodation rather than transgression.”

Critical spatial practice when defined as the “modes of self-reflective artistic and architectural practice which seek to question and to transform the social conditions of the sites into which they intervene” can be detected in reinterpreted forms within this densely populated, capital-conscious and land-scarce city. Productive ways of appropriating unfavorable conditions have emerged from under-privileged sites for those living on the fringe. For example, a barber who sets up a temporary business alongside a construction hoarding is one of the many scenes one could find in this city where critical praxis exist, see Figure 2. It begs the question what is the minimal sheltering one need to operate a barbershop? In this instance, an overhang, a mirror, chair, pair of scissors, a ritual calendar and an entrepreneurial spirit is all one needs to set up a barbershop. In the older fabrics of Kowloon, tactics are parasitically deployed to appropriate residual spaces underneath stairs, in between alleyways, where small business operates such as a shoe or watch repair store. The business-minded spirit is typically supported by an inventive use of constrained spaces. In the touristy neighborhoods of Tsim Sha Tsui, it is not difficult to find diminutive money exchange booths, some of which measure less than 0.5 meters deep by 1 meter wide. The miniscule scale of the exchange stalls over shadows the fact that shops like these play an extremely important role in not only servicing the tourists, but those Foreign Domestic Workers who sent their remittance to the Philippines and Indonesia annually, estimated at 800 million U.S. dollars.

The implicit critique to the normative and the accepted practices can be understood, I would argue as a conditional situation forced upon those on the fringe by the developmental policy hence, the critical spatial practice is the practiced act of survival.

MARKET AS A CIVIC BUILDING
In between the absence of critical architecture and the presence of critical spatial practices in Hong Kong, I would like to claim a third condition which offers a middle ground in the form of an
architectural typology: the Municipal Services Building (MSB), the unique building type born out of the confined urban context, see Figure 3.

The first generation MSB was passively ventilated with featured brise-soleil in the facade of the buildings. In trying to catch up with and match the comfort level offered by the supermarket chains, the design of the MSB began to mutate to a hermetically sealed building envelope with built-in mechanical cooling system and the elimination of the operable windows in the 1990s. The enclosed facade designs disguises the internal functions of the MSB further diminishes the communication between the internal programming and the external context.

The multi-stories building typically consists of a broad range of community oriented programs and provides its constituents with work opportunities, intellectual growth and leisure activities. Very often involving a wet-market hall, cooked-food stalls on one spectrum and offices, library and gymnasium on the other packaged into a self-contained concrete building. In 1979, Bowrington Market of Causeway Bay became the first building to use the name of Municipal Services Building, ever since that time around 40 more have been added to the list, see Figure 4.

The unique typology differs in many ways from those in the United States or Europe, exemplify by projects such as The Portland Building by Michael Graves (1982), Richard Meier’s Den Haag City Hall (1995) or more recently the Delft Municipal Hall and Train Station by Mecanoo (2017). These projects from the West typically composed of government related programs to provide civic services while the origin of the Hong Kong MSB can be traced back to the informal street markets.

Proxy politic
The governing authority of the MSB is under Food and Environmental Hygiene Department and the Leisure and Cultural Services Department, two separate bureaucracies in charge of the city's affair in dietary consumption and cultural production. Politically the establishment of the MSB served as a political instrument to assist, and manage the street vendors whose livelihood depend upon the selling of groceries and cooked foods. It was a mean to address the hygienic problems and visual incoherence associated with the street vendors.
The creation of an institutional building allows on the one hand, constituents from the community to work by means of a rental space, while on the other, it serves as a mechanism for managing and regulate those vendors that would otherwise roamed the city’s streets.

![Figure 4. Timeline and programmatic changes of the Municipal Services Building (1979 - 2013), diagram by Toni Lui.](image)

**Downtown Athletic Club: Hong Kong Style**

Specific functional mixtures of the MSB depend in part on the district and the zeitgeist of the moment. The common denominator of programs typically consists of a combination of the following:

1. **Commerce**: Daily food consumption products such as fresh vegetables, meats, grains, rice, and various other dietary stables. In some branches, there are also stalls with repair shops, electronic stores and among others.

2. **Education**: Typically represented by a community library, with large a study area.

3. **Recreation**: One of the core purposes of the MSB is to offer a place within the core are of the community a place for physical activities, such that badminton, martial arts lessons and various ball activities could take place within the gymnasium.

4. **Administrative**: Similar to its Western counterparts, the MSB often possesses a civic and bureaucratic function.

5. **Community**: elderly care, a range of rental spaces for meetings, events and speaking occasions.

Until the mid-2000s, all MSB’s consist of wet-market where each stall owner is in charge of selling his or her wide variety of food products. Vendors of related goods are cluster together in the same location allowing the customers to compare the price and quality of products being offered. The hustle and bustles of the wet-market is often a slap away from the noise-mitigated library a floor above, and a sports hall yet another floor above that. This hybridization of the seemingly irreconcilable functional demands within a defined urban situation exemplifies the uniqueness of the composite building

Although the building type continues to evolve over the years, the significance that it once played in offering the community has been overtaken by modernized shopping malls and supermarkets, which proliferated in the 1990s. The air-conditioned, comfortable and well-lit environment eventually rendered the wet-market component of the MSB into extinction.

**Hypothesis**

Despite the attempt to elevate the quality of the MSB for signifying public prominence in the cases of Stanley Municipal Services Complex and the Ping Shan Municipal Complex in recent years, the full potentials of the MSB as an instrument to disrupt the status quo remains unfulfilled. Hence, there lies an opportunity in studying this building type and to inject agency to its role in public life. The following projections are two examples of my students from both the Chinese University of Hong Kong and the Delft University of Technology examining the untapped potentials of the MSB.
**Projection 1: The Marshmallow**

The project proclaims Hong Kong has fell victim to the pragmatic city, which killed the culture of congestion, meeting, expression and experience. The standard cruciform public housing towers dominate the skyline in a homogenous approach; such practice is adversely affecting people in a negative manner. Therefore it is important to create a space and program that enables the community “to express (act) and experience (spectate)” As such, the project acts a” juxtaposition to the public housing blocks by appearing to hold itself up like a squishy marshmallow in between the blocks.” The daily “inflation” and “deflation” of the inflatable structure offers a collective event for the community. After studying the negative space of housing configurations formed by the Harmony Type, the project proposes to situate the MSB within three Harmony towers in a south west orientation. To architecturally respond to the concept of act and spectate, the student proposes a community theatre as the driving program for the project.

The project is conceived so that people could meet in different spatial conditions, architecturally it is composed of theatres at various scales accommodating from 20 to 350 people. Taking the infamous homegrown red-white-blue vinyl bag as a material inspiration, each space is expressed in the symbolic material of the objects in the bag. The building envelope is made of a double layer translucent polymer, with two half of the blue white stripe printed on either layer. Together it is opaque and when separated it is translucent, when inflated expressing a particular unique Hong Kong identity well understood by the community.

![Figure 5. The Marshmallow by Brendan Costello.](image)

**Projection 2: The Monitor**

The project proposes a counterpoint to the chain supermarkets in order to reclaim the prominent position that the wet-market once represented in the MSB. It asserts that the MSB programming although diverse in its composition has not extended its fullest potential. It also claims that wet-market stall renters operating as individual shop owners receives the benefit of their economic independence as opposed to the system offered by the monopolized supermarket chains. Rather than competing with the supermarkets in terms of quality and availability of products sold, the project calls for the integration of a district based center for food safety as a monitoring agency to be
housed within the facility, inspecting incoming fresh seafood from locally sourced and imported products. The idea of the project reacts to a number of norovirus and ciguatoxin contamination, and plastic pellets incidents which came to light starting from late 2000’s. The public outcry created an urge for assurance on its consumed food products. The research reveals that in the existing food testing system, there’s a critical gap between seafood inspection program and the consumption community. It leads to time lag of information to the public. Information of underlying censorship is restricted and restrained into a exclusive monthly report issued by Center of Food Safety.

Events like unloading, processing, trading, monitoring, consumption and learning become performance themselves and unveil by architecturally mechanization. It aims to provoke the need of transparency in local food safety system to the public.

The two main blocks which consist of laboratory and wet-market defines the basic parti of the design. Between the two blocks is a spiraling fish processing system within a three-story high atrium. Visitor circulation is at close visual proximity to the seafood processing workflow, allowing the witness some of the inner workings of the laboratory technician at work. Besides library, wet-market, the proposed project also include restaurants and an education center on food safety to create a circular experience.

![Figure 6. The Monitor by Toni Lui.](image)

**Conclusion**

The paper aims to study the morphological change, and to reveal the potentiality of the Municipal Services Building as a political instrument. The analysis demonstrates the different approaches for the MSB to transgress a developmental system organized around a capital-driven land-economy. Using
two examples as provocations, it critiques the current model while expands on the limits and imaginations of MSB. In one trajectory, an inflatable ‘marshmallow’ creating a community forum to stimulate debate and performance in an otherwise monotonous, typical housing development. In ‘The Monitor’ lies an idea to bring transparency between the ‘institution’ and its people. To bring what is behind the house to the front. These two cases, although conceptualized within the academic setting of the design studio, sows the seeds for challenging the status quo and for advancing the public life in Hong Kong. As demand for infrastructure and mass housing continues in unprecedented scales, does one need to rethink the question of criticality? Is it even a relevant question given Hong Kong’s unique geopolitical and economic conditions? Despite the past records which showed a disdain or blasé attitude toward addressing this question. The author remained convinced that the possible alternative lies in, as argued in this paper, the productive tensions within the Municipal Services Building.

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USING GENERATIVE DESIGN IN THE REHABILITATION OF FAVELAS IN WATERFRONT AREAS

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INTRODUCTION:
About 40% of the population in the city of Recife, in Brazil’s Northeast region, live in precarious conditions, mostly in Special Zones of Social Interest (ZEIS) that occupy 11.8% of the city’s territory, including waterfront areas, such as downtown ZEIS Coelhos, where housing complexes built in the 1970s and informal settlements populate Capibaribe River’s margins. Built with various materials (masonry, cardboard, discarded billboards and timber), the latter contain improvised domestic spaces that lack basic infrastructure, reflecting the need to multiply access to the city land by the poor.

Recent social housing initiatives in Recife financed by the “My House My Life” (MCMV) federal government program have focused on removing these waterfront structures and relocating dwellers to “H-shaped” buildings, reproducing models implemented in 1970s and 1980s, whose failure was later evidenced in morphological transformations and layout reconfigurations by residents. These recent projects follow similar formal and spatial principles that do not seem to reflect inhabitants’ social expectations. Based on this, we presume that the maintenance of such models in ZEIS Coelhos will have the same burden on dwellers.

Our hypothesis is that new approaches, methodologies and design strategies might offer better alternatives for rehabilitating these areas if maintaining their morphological identity and considering the housing cell as a generator of new urban fabric. The approach presented here is limited to the application of shape grammar (SG) in the design of housing units and will showcase one of the grammars developed for the Coelhos neighborhood.

The generative system of SG is able to facilitate the implementation of compositions with diversity of arrangements, regardless of the nature of the application. In the case of low-income settlements, aligning cost and spatial quality is a challenge, so, SG emerges as a useful tool applicable to both the building and urban scales, allowing for multiple variations even when using a modest number of components and applying simple rules to them.

SHAPE GRAMMAR BASICS:
Shape grammar originates from Stiny and Gips’ studies on aesthetic systems to interpret and evaluate works of art, as a form-generating system that operates according to algorithmic rules, in line with the systemic view of production by the mathematician Emil Post and Noam Chomsky’s generative linguistic grammar.

Stiny’s first three-dimensional approach to generate original grammars represented a benchmark in SG’s use in architecture, containing a five-stage program: vocabulary of shapes, spatial relations, formal rules, initial shape, and shape grammars. As analytical applications increased rapidly, Stiny’s idea remained dormant until the mid-1990s, when Terry Knight developed three-dimensional shape and color grammars in undergraduate programs at UCLA and MIT.

SG’s use has since expanded, demonstrating its ability to automate parts of the design process and generate more alternatives to the problem in hand, enhancing and supporting the creative process. In many cases, the focus is capturing the rationale of a specific grammar (analysis) or allowing designers to develop a new grammar (proposition). SG applications are feasible in many design areas: architecture, landscaping, furniture design, painting, product design and mechanical parts.
Recursive application of composition rules on an initial shape, and the generation of new forms conform SG’s logic. The main operations involved in SG are translation, rotation, mirroring and roto-translation, allowing addition and removal of shapes, and using the same rule in similar entities of similar shapes but with different dimensions\(^\text{11}\).

SG has always been associated with computational design. It deals with shapes in two or three dimensions, rather than symbols, words, numbers or other abstract structures of indirect representation of figures. The computational character lies in the use, step by step, of the rules, which reveal the grammars themselves. However, rules are not deterministic and can be applied to new forms emerging from these rules, allowing many other computations, as well as the user to decide, at any stage, which shapes to observe and which way to go\(^\text{12}\).

SG is not bound to computer use, as grammars can be developed and implemented by hand. Although implementation via computers is always possible, it is usually not straightforward, as what tends to be natural and easy if done with one’s eyes can be difficult through machines\(^\text{13}\). Analogically or digitally, generative systems, both in architecture and production, contribute to creating customized solutions using serial production, which originated the concept of “mass customization” and a new, post-Fordism paradigm in contemporary economics\(^\text{14}\).

A widespread type of construction in urban contexts, social housing represents one of the most conservative and homogeneous kinds of production. If modern movement marked the architect’s engagement with mass production, nowadays, the distance between designer and the dweller has increased, disfavoring diversity and personalization\(^\text{15}\). Andrade et al support that SG can be an efficient tool to generate new projects because it allows for more variety of options based on a relatively small number of components\(^\text{16}\) (housing units or building clusters)\(^\text{17}\), adding that SG could minimize the problem of spatial arrangements inherent in the duality of production and mass customization.

In our research we combined a secondary method with SG, named Conditional design, developed by Anthony Di Mari in the Graduate School of Design (GSD), Harvard University. It centered on the idea that, as forms are manipulated with verbs (add, move, subtract, etc.) different spatial conditions emerge, such as connecting one volume to another or opening it to receive natural light. The method facilitates shape composition and arrangements from a set of deliberate actions. It is a system of options, a bridge between abstract geometric manipulations and the project that considers program, site, scale and structure.

**DESIGN STRATEGIES FOR WATERFRONT AREAS – APPLYING SHAPE GRAMMAR AND CONDITIONAL DESIGN**

**Design Strategies:**

The design strategies were elaborated during an undergraduate architecture studio, based on identification and analysis of unique site characteristics acquired through site observations, photo documentation, sketches, and construction of a prototypical cell in real scale.

SG and conditional design methods were introduced later as potential applications in social housing projects associated with the housing cell’s capacity to generate urban fabric and customize cell clusters, typical in the existing site. Defining types of units according to number of bedrooms was established a starting point. Conditional design method was introduced and then analog shape grammar was added through experiments with paper cuts and physical 3D modeling.

Housing units were generated using compositional operations suggested by Di Mari’s method, including adding, displacing, subtracting, joining, and nesting. Afterwards, guided by shape grammar rules for combining units, more complex arrangements were made through a second set of operations, involving translation, rotation, mirroring and roto-translation.

The individuality of the housing unit was the grammar’s conceptual centerpiece, justified as a response to the existing dwellings, largely composed of enclosed (bedrooms) and open spaces (private and collective-use slabs), situated in volumes either sitting directly on ground level or suspended on stilts. The intention was to create a synthetic vocabulary, with a limited number of shapes, which would be combined in order to generate dynamic arrangements, formed by asymmetrically set prisms.
The following drawing strategies were established: (1) adopt the housing cell as the generator of urban fabric; (2) use limited number of shapes that combined could generate dynamic arrangements; (3) accommodate future expansions or spaces to be shared by various dwellings, exploring their productive character regarding the dwellers’ subsistence; (4) generate agglomerates with linear configurations or more intricate ones, conforming shared courtyards; (5) activate the interface between housing unit and river, which, due to the threat of flooding and precarious access to basic services network, is not currently seen positively, as attested during site visits.

The resulting designs point to compositional diversity with either more elongated building agglomerates, favoring more linear configurations, or more compact and tangled massing with series of inner patios. Besides adapting to the specifics of the site, which carries both deeper and shallower portions, these arrangements would be adaptable to other urban areas with similar geography, quite recurrent along the borders of Capibaribe River.

Due to the close proximity between dwellings and river, Gehl’s ‘soft edge’ idea was prioritized, allowing for the water to penetrate under and in-between the proposed structures, together with the staggering and asymmetry of the masses, which would conform a smaller physical and visual barrier when compared to traditional lines of single-story houses or "H" shaped apartment blocks, commonly built by Brazil’s MCMV program.

Although during the 4-month period of the design studio we could not perform a thorough systematic analysis of all existing patterns, site visits and analysis through photos and maps reveal that the aforementioned design strategies are consonant with the existing conditions. Amongst the diversity of building materials and their improvised assembly, one can notice the prevailing orthogonality of the elements that conform the spatial arrangements, highlighting staggered profiles, open slab expansions and, due to the territory’s exiguity of land and flooded condition, houses on stilts (Figures 1 and 2).

A shape grammar case

The proposed design consists of one and two bedroom ground floor units and a two bedroom duplex. Starting from these components and the desired spatial relationships amongst them (proximity, orientation towards South and East, etc), nine rules were created and three derivations established. The proposed SG is three-dimensional and combines color and predefined types, including the use of markers. For each component a color is assigned, representing a type of housing unit per number of bedrooms and floors (single story or duplex). Regarding the predefined character, it concerns the successive application of a sequence of rules for the generation of derivations. In the study, the same rule was applied more than once, but not always successively. The initial design was worked upon analogically, then improved and represented graphically using the computer software (SketchUp and AutoCAD software). At a later stage, we performed digital parametrization simulations of some rules, using the software Rhinoceros and its Grasshopper plug-in.
The first step was defining the vocabulary, that included: a red prism (two-bedroom unit) measuring 15’-6” x 41’-4” x 9’-2” (width x depth x height); a yellow prism (one-bedroom unit), measuring 13’-9” x 33’-5” x 9’-2”; stacked blue prisms (two-bedroom duplex), both with equal dimensions to the yellow volume, and a 3” diameter, 9’-2” tall column (Figure 3).

![Figure 3. Vocabulary of shapes for the proposed 3D grammar.](image)

Although floor plans are not in the vocabulary, the number of bedrooms relates to three layouts with few interior partitions, which could be removed according to the user, facilitating more spatial flexibility, similar to some existing dwellings. Types “A” and “B” have two and one bedroom, respectively, and type “C” is a two-bedroom duplex (Figure 4).

![Figure 4. Three types of floor plans designed by architecture student.](image)

For spatial relations, we chose adjacency and overlap with the following restrictions: the maximum number of floors must be ground plus two, and the yellow prism should only occupy the second floor. Hence, nine additive rules were established, two of which were optional (three and nine), since the column would resemble the existing stilts while fitting conventional structural systems to avoid large spans (Figure 5). The red prism is the grammar’s initial shape, and, as wet areas (kitchen and bathroom) had fixed positions in the layouts, and in the duplex, the staircase location was set, we used markers for most rules, avoiding overlaps that could hinder the logic of the construction. Markers, represented by points on the faces of the prisms, facilitate the control of results because they restrict the way rules can be implemented.
The architectural design process is often iterative, designers devise solutions that generate new issues, which in turn are investigated to produce improved or new solutions. In parametric design and SG, both types of generative design - instead of intuition, precise techniques are involved to arrive at solutions, leading to results that respond to rules and inputs. This process is referred to as algorithmic thinking, which allows the designer to rationalize, control, iterate, analyze, and search for alternatives within a defined solution space.

Parametric design, in essence, is independent of the computer. Originating from Mathematics, it is based on the consistent relations between objects, not in fixed metric quantities. However, as objects, especially 3D models, acquired more complex geometries, problems increased, leading designers to start using parametric software, since it facilitates the specification of relations between several parameters of these models. These softwares, other than direct manipulation of design or modeling programs, go beyond editing the geometry, favoring the very expression and exploration of the design intent. Together with sophisticated Construction Information Modeling (BIM) models and advanced construction techniques, they have been increasingly adopted in this century.

Even if parametric modeling has proved especially useful while dealing with complex shapes, it was used here with a vocabulary of simple forms. However, mass customization and variety of clusters, desirable aspects in social housing, can benefit from the fundamental themes of parametricism: versioning, iteration, mass customization and continuous differentiation.

The grammar’s parametrization was applied to variations of rules four and five, which involve spatial relations of overlap and rotation. The modeling rational (with Rhinoceros and Grasshopper) was based on creating different arrangements for these rules, each organized in a group (of four in total). Versioning was used as, starting from these groups, it would be possible to articulate not only direct derivations, but other versions (of groups) of derivations. The iteration happens when, for example, a derivation generates a certain form ("H" shaped) that is intended to be articulated with another form ("C" shape), by simply creating a series for each form (repetition of actions) and uniting them at the end of the procedure.

Continuous differentiation permeates the process, allowing items in a group to maintain their continuity in other instances, responding uniquely to local conditions. The manipulation of the X, Y
and Z coordinates, linked to numerical sliders, ensures that each parameter (width, length and height), if altered in one form, leads to the same type of differentiation of the other shapes. The parametrization steps follow this sequence: Defining four vertices of the initial shape’s base and another vertex in its upper face; rotating object around the initial’s shape specified point; applying the "vector between two points” input to move the prism in relation to the two previous vertices; generating first floor by deleting previous prism’s preview; establishing the second floor from a new vertex with twice the height of the initial prism; using the same principle of the vector to move the initial prism up to this point/height; repeating move and rotate operations; reaching the desired arrangement, all prisms are merged tool and, subsequently, “array” is used to generate sequences of same organization. (Figure 6)

Figure 6. Synthesis of parametric modeling

Based on the aforementioned SG rules, three derivations were processed. The first focuses on having inner patios on the ground floor, and, due to construction rationality, places the duplex units in a defined portion of the agglomerate. Another characteristic is the positioning of the smallest shape on columns, allowing it to float over water or to be in filled with collective use spaces or future additions. Derivations two and three are more similar to each other, presenting a more linear configuration than derivation one. However, while in derivation two, the intention was to generate a more dynamic and asymmetric massing, with cantilevering volumes, in derivation three the arrangement is more contained, contrasting vertical and horizontal masses that result from the stacking of volumes in greater alignment with each other, when compared to the other derivations (Figures 7 and 8).
The SG presented results from the partial application of this generative method in an undergraduate design studio focusing only on the generation of housing unit agglomerates. The floor plan layouts were conceived without the use of SG. Although a limitation, this first experience had a positive outcome, as intermediate level students were able to apply the systemic logic of SG, achieving compositional diversity in their proposals.

Even though proposals were preliminary when it comes to using SG, the experience showed that the use of this tool has the potential to expand and be fully integrated into the design process. Students developed schematic site plans, reaching results which, although not directly generated by SG rules, certainly demonstrate the application of SG’s logical approach (Figures 9 and 10). A more extensive use of SG is thus a goal to be worked upon towards further developments of this research.
CONCLUSION:
Considering the interdisciplinary nature of generative design and the scarcity of methodologies, materials, curriculum, terms and techniques for teaching it, this research’s positive outcome was to show how undergraduate architecture students used SG, a research area that, together with genetic algorithm and cellular automata, has been featured in the broader field of Computer-aided design (CAD), most frequently in graduate school studies\textsuperscript{24}. Although social housing’s essence lies in domestic spaces, these often turn out to be trivial, with few opportunities for experimentation reduced to exterior spaces\textsuperscript{25}. Even if the SG we presented did not
include interior customization, we intend to do so the in following stages of the research, as site visits showed that interiors are truly unique micro-cosmos expressing dwellers’ life. By using few components, additive rules, and overlap and adjacency relations, it was possible to generate diversity of housing unit clusters based on simple geometries, therefore, matching the goal initially proposed. We observed that utilizing a three-dimensional SG associated to color facilitated undergraduate students’ assimilation of the systemic logic. We also noticed that, once floor plan layouts were established, students perhaps intimidated by functional requirements (stacking of wet areas and room orientation) developed a low number of iterations. After this first experiment, we conclude that SG should be introduced as early as possible in the design process, preferably in conjunction with site visits and notations. Likewise, the use of the method could have been thoroughly extended to site plan design, a currently in-progress stage of this research.

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(4) In the Nineteenth-century the scenario was quite different, with ranches and vocation homes belonging to the higher-income population located alongside the river, which were used even for baths and swimming lessons.
(5) Throughout these decades several large social housing complexes were built in the city’s periphery, in remote neighborhoods that lacked retail, services, schools and parks. These modernist-based morphologies presented serial repetition and standardization, leading to alterations throughout time by the dwellers aiming to expand their residences by adding bedrooms or including services and retail.
(6) Most government-funded social housing projects implemented in Brazil through the “My house My Life” program (MCMV) present morphological configurations that follow the modernist logic of repetition of single and multifamily buildings set loose within the lot, where formal repetition and spatial arrangements with none or very little variation prevail, both at the city and the building scale.
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(17) The study analyzes three examples: Malagueira, in Évora, Portugal, by Alvaro Siza (1977); a complex by Christopher Alexander in Mexico City (1976) and the Jardim São Francisco social housing complex, in São Paulo (Demetre Anastassakis, 1989).
(18) Soft-edge is a concept, originally used by Jan Gehl, that refers to pleasant portions of parks and public spaces, especially places where people could sit and visualize pedestrians in movement, which assured these as the most vibrant spots in the city.

(19) The author points out the following types of grammar: analytical; parametric (allows for certain values to be left open and defined upon implementation); predefined (successive application of a rule or a sequence of rules); with markers (better controls the results by incorporating markers that restrict rules) and color grammar (that replaces markers with colors).


(22) Some examples utilized in architecture design are: Rhinoceros and its plug-in Grasshopper, Revit, Processing and MAXScript. The latter are also programming environments.


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MEDIATIC SURFACES: SHAPING URBAN ENVIRONMENTS.

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INTRODUCTION
The article illustrates how the current logic of capital is driving spatial production—and hence the urban environment—by transforming buildings into scaffolding for mediatic surfaces for fluid media. Mediatic surfaces are defined as physical surfaces that are capable of emitting media, while fluid media is characterized by a constant and usually graphic and/or acoustic flow of uninterrupted information. As a result, building types have become increasingly irrelevant as designers respond to the market’s demand that the public experiences projects as public sphere billboards.

In order to understand the transformation of spatial production from typologically driven to mediatic surfaces, the article utilizes the Industrial Revolution precedent to explain how capital orientation led to the emergence of new building types. Consequently, I discuss sociological and philosophical critiques that resulted from the Industrial Revolution which demonstrate the current Digital Revolution’s potential impact on design. Then, I compare attitudes towards building design and surfaces during the period of 1890 to 1990, to current spatial production attitudes. Finally, the article shows how contemporary re-organization of capital is now conceptually and physically transforming attitudes towards building design.

NEW BUILDING TYPES
During the Industrial Revolution (c. 1750-1950), orientation and intensification of capital allocation to serve market demands for extraction, production, distribution (including point of sales) and consumption generated fundamental transformations in building typologies and consequently urban environments. Larger populations meant larger markets, which in turn meant larger profits from the sale of goods and services. During a virtuous economic cycle (as opposed to a crisis cycle) (Simon, 1994), these profits would then generate market expansion as individuals and companies reinvested, expanding demand for human labor or innovative production technology (or both). These economic growth periods proved to be an urban magnet for rural inhabitants who for centuries had remained in agrarian poverty.

In addition to the replacement of the feudal class with a proletariat class, the ever-growing merchant and professional classes generated new building typologies that obeyed capital requirements. For example, spatial needs for material transformation and production led to factories, while increased human movement between cities and towns resulted in transportation hubs such as train stations (Alvarez, Franch & Marti-Henneberg, 2013) (fig. 1). Other types responded to other levels of capital abstraction, such as office buildings and financial institution installations. The ever-growing urban populations of working poor, middle class, and bourgeoisie, demanded from the city spaces for rest, consumption, and entertainment: e.g., public-access parks, department stores, and off-street commercial arcades. Concurrently, many pre-existing building types fell out of use, becoming spatial relics or disappearing entirely, while other types evolved to accommodate new capital needs.

INDUSTRIAL REVOLUTION IMPACTS
As Habermas (1991) noted, the Industrial Revolution and its ensuing mass migration to cities from the 18th through 20th centuries transformed the public sphere; the medieval town market square was displaced as the main gathering space, replaced by the whole city as a consumable experience. While individual buildings housed competing goods and services for sale, the built environment competed for market share of urban visitors and with other public sphere experiences; parks competed with shopping
arouses, cinemas with theaters, tea houses with pubs, museums with stadiums, and all with each other, for city-dweller visits.

By the first decade of the 20th century, sociologists were observing phenomena related to this spatial competition that remain relevant in the present “Digital Revolution”.

Simmel wrote about two phenomena that he proposed were the result of the changing city environments. Simmel noted that individuals viewed changes (social, technological, political, etc.) as a predictable component of everyday life, identifying this constant change with “fashion”. In Fashion (1904), he described the phenomenon as being the product of two equal but opposite forces acting on individuals acting in relation to groups. He wrote that “fashion” on one hand, “is the imitation of a given example and satisfies the demand for social adaptation”, and on the other, “satisfies in no less degree the need of differentiation”.

Fashion explains the desire of belonging to an “in crowd” by the apparently contradictory notion of “being different”. For Simmel, “fashion” impacts us because we expect constant change. Presciently, he ends the essay by noting that “fashion” is a symptom of social forms that are ultimately vacuous of content: the less sociocultural substance there is in personal and group development, the more attention is placed on fads and trends.

In another essay, The Metropolis and Mental Life (1903), Simmel described another urban life phenomenon: the blasé attitude. He explains the blasé attitude as a self-defense mechanism to the over stimulation pervasive in the Metropolis: an emotional ‘shutdown’ leading to indifference and a non-responsive relationship to urban daily life. This indifference can only be overcome by an ever-increasing amount of stimulation. Increased stimulation is achieved through increased titillation of the senses: noise, light, action; increased use of graphic violence and sexualized imagery. Following Simmel’s analyses, these two phenomena combine to cause city inhabitants to grow blasé to their environment if not increasingly stimulated. Furthermore, the phenomena have become pervasive and amplified during the Information Age and Digital Revolution. With the inventions of television, computers, and smart phones, we see the phenomena augmented, as technological devices increasingly define individuals’ interaction in the built environment. For example, Arbore, Bagozzi, Sossia (2014), point to the increasing role technological devices have in constructing individual and group social identification.

Constructing a sense of self through devices is particularly troubling to our sense of place. In his essay, “Building Dwelling Thinking”, Heidegger (1954) asserts that dwelling “is a language that tells us about the nature of a thing” through an ontological process that allows us to “build” meaning derived from the physical world. For Heidegger, one dwells in space when one observes space. Yet, beyond the ontological premise, Heidegger’s thesis is that dwelling permits comprehension that transcends sensory surfaces and allows us awareness of the substance of objects. Heidegger then argues that in the process of building we seek to transcend our mortality by creating a spatial production that outlasts our life’s temporality; buildings are expressions of immortal permanence. Finally, he proposes through dwelling, the contemplation of the objects that exist in space, we are able to become aware of our existence in space itself. He writes, “the relation between location and space lies in the nature of these things qua locations, but so does the relation of the location to the man who lives in that location.”

Drawing from Heidegger, Borgmann’s “Device Paradigm” (1987) illustrates differences between things and devices. He argues “[t]he experience of a thing is always and also a bodily and social engagement with the thing’s world.” Things embody the object itself, and the processes necessary for the thing to function. To the contrary, devices move us away from the possibility of the worldly experience of things, and function only for that purpose for which it was created, addressing only technological demands. He adds, “In a device, the relatedness of the world is replaced by a machinery, but the machinery is concealed, and the commodities, which are made available by a device, are enjoyed without the encumbrance of or the engagement within a context.” Using Borgmann’s paradigm, smart phones, and the ever advancing communication technology such as ‘Jumbotron’ LED screens—participative, as in a phone conversation, or passive, as in streaming content—have produced an environment where
devices capacity to deliver media is not the main purpose of the device, it is the only purpose. By doing so, buildings are reduced to structural scaffolding for the device delivered fluid media.

SPATIAL PRODUCTION CHALLENGES

Lefebvre (1974) defined spatial production as the process by which physically produced space becomes layered with social, cultural and political meaning. Architects like Otto Wagner, for example, advocated spatial production guided by the “honest”, “true”, “organic” nature of the materials and processes (artistic, craft, and industrial) that formed the narrative of space making. For Lefebvre, capitalism drove a clear semiotic language of production, which designer and consumer could understand and identify.

Current “Digital Revolution” spatial production contrasts with early Modernist architects’ program/materiality-centered debates on spatial production. Most Modernists argued that surfaces should be a rational reflection of a building’s function, mass, and materiality. Le Corbusier, stated, “A mass is enveloped in its surface, a surface which is divided up according to the directing and generating lines of the mass; and this gives the mass its individuality.”

Building facades exhibited functions while competing for consumer attention. This competition of building types and surface aesthetic iterations manifested spatial production through a vocabulary that enriched civic life via the urban palimpsest—each building inserted itself within the existing or newly produced capital-based urban fabric. Modern buildings, such as Loos’ Department Store stood across the St. Michael Wing of the Hofburg, in Vienna (fig.2) resulting in an accretive Collage City. Each intervention exhibiting the demands of spatial production of localized capital logic.

The preference for mediatic surfaces over building-type may signify an unceremonious end to the priority of spatial experience. The Digital Revolution is concerned more with global connectivity than place. Castells (2001) claims that the “space of flows” is not the end of place itself, but admits the phenomenon “links up distant locales around shared functions and meanings on the basis of electronic circuits and fast transportation corridors, while isolating and subduing the logic of experience embodied in the space of places.” He summarizes that “[t]he global city is not a place, but a process.”

By changing the nature of experience from place to process itself, absolute space is rendered meaningless. Information flows from point to point, consumed through surface sensory interactions: it makes no difference where one is, just what exposure an individual has to the medium.

Whereas the design debate between Modernism and Post-Modernism centered on normative design theory, emphasizing program function’s role in producing form, and consequently form in creating complex meaning (paraphrasing Venturi), the discussion still focused on the spatial production of buildings. Currently, spatial experience is becoming irrelevant beyond our own individual scale. Presciently, MacLuhan proclaimed that “the medium is the massage [sic].” It is “the medium that shapes and controls the scale and form of human association and action.” Because the medium informs our capacity to experience meaning in spatial production, it often renders us unaware of on-going spatial evolution or transformation.

The Digital Revolution’s has already had several impacts on spatial production. The first aspect, a result of capital re-orientation, has become evident and now preoccupies all strata of urban groups; traditional building types of physical interaction, ‘brick and mortar’ stores have and continue to disappear regardless of their location in downtowns or exurbs. Office buildings, and the corporate labor they house, continue transforming to survive. Layouts are changing to address flexible technical and hierarchical needs; newer office concepts, i.e. Regus and We Work, exploit individual demands, transforming administrative concentration and supervision into individualized flexible time-space environments. Other office environments have disappeared as employees work from home over powerful internet networks.
The effects of a device-oriented space of flows continue to reshape cities, as stores close and few, if any, new building types substitute inventory (fig.3). There is another more challenging problem in the Digital Revolution on spatial production: What will happen to existing buildings and future buildings’ design? Traditional program-based buildings face capital re-orientation pressure due to their lack of return on investment. The combination of staff salaries, property taxes, maintenance, with competition from automated offsite, de-centralized warehouses that ship goods to residences, or virtual workplaces are leading to the abandonment of existing buildings and re-evaluation of future projects. Paradoxically, locations within dense population centers or transportation corridors have made abandoned buildings, still in-use buildings, and new projects, evaluated for their mediatic surface capacity; buildings whose exteriors act or are conceived as scaffolding for income producing surfaces. Herald Center, in Manhattan, is an example (fig.4):

Owner JEMB Realty plans to replace all the black-tinted glass panels on the gloomy structure’s first three floors with transparent panes, as well as install LED lighting panels on floors 4-10. “This black, ugly building is going to be beautiful,” JEMB principal Morris Bailey said. He described the property, which JEMB bought out of bankruptcy in the late 1980s, as “a source of frustration to us for a long time.”

Increasingly façades will no longer express their spatial program, instead, their capacity to emit income producing fluid media. Seizing on this trend, LED firms promise solutions to outdated traditional building surfaces (fig.5).

Moreover, we should evaluate how built environments will evolve considering Simmel’s dual phenomena of fashion and increased stimulation to compete for our profitable attention. These phenomena, in combination with the market demands of re-orientation of capital production, are yielding urbanscapes whose new building type is to be scaffolding for fluid media. Mediatic surfaces are spreading. Following Stallmeyer’s proposal for “Landscapes of Informational Urbanism” as a description of the phenomenon of capital re-orientation of towns and cities as a function of fluid media from all urban surfaces, the city becomes a landscape of media produced images. These landscapes are utopic, not because they are benevolent idealized spaces, but because they are “nowhere” while existing everywhere (figs.6,7); because LED is a universal material, only language will produce place context. Built mediatic surfaces are the visual and acoustic outcome of Castell’s spaces of flow.

Decades ago, cities studied these emerging landscapes, and consequently passed laws to manage mediatic surfaces. For example, between 1971 and 1973, Boston commissioned City Signs and Lights, an in depth analysis and proposition into the ways the city could manage “environmental information systems” in an effort to mitigate visual contamination. As Chicago’s website demonstrates, current cash-strapped city policies create perverse incentives to permit these environments, charging annual licenses for lit signage thus producing an income stream for coffers.

The challenge to spatial producers is philosophical and financial. While basic spatial needs will never disappear (shelter), practitioners and their clients will increasingly emphasize the surface income-capacities of built environments. Recalling Heidegger, how do we build spatial relationships in a world that is concerned primarily with surfaces? Since we are building through the interaction of surfaces, then we are subject to the ephemerality of surface itself, and its accompanying social implications. In 1986, the symposium “Buildings and Reality: Architecture in the Age of Information” was held at the University of Texas in Austin, to discuss the impact of media on spatial production. Michael Benedikt, focusing on television’s impact on audiences, citing social scientists and developmental psychologists “[n]oted their quantifiable observance of altered attention spans, conversations skills and characteristic interpersonal skills and suggested that the power of medium as dominant and quotidian as television was inescapable.” At the same symposium, filmmaker Bo Gehring discussed with Peter Eisenman the role of media, drawing a distinction between film and television as ephemeral. Gehring considered architecture long term, and argued for different rules that generated design longevity. Eisenman bemoaned that “[a]rchitects today work to turn out things so the media can consume them.”

While the symposium focused on film and television, these serve as a warning of the pernicious effects of today’s fluid media (especially the internet).

In a recent essay, critic Marianela D’Aprile, makes the case that buildings of the past are irrelevant: Architecture, it seems, buildings, are tired. Old, boring, not interesting, we’ve talked about them so much our eyes and ears are going to fall off, there’s nothing to see here anymore, let’s talk about a painting or a living room or philosophy or literally anything else.

She concludes,

It might be that architecture has lost some of its surface attraction, become overshadowed by new technologies or the sheer immensity of cities. But it’s through buildings that people inhabit cities. Our audiences are already there, in the middle of it, in their three-flat apartment or their mid-century office building or their California bungalow; the stimuli itself is ephemeral, subject to fashion, and as such, future generations will not see environments as places that transcend their own temporality. After all, fluid media is predicated on constantly changing content to maintain interest. In contrast, buildings are generally static, and urban environments slow moving backdrops of life. Our attention to a mediatic surface city will only last as long as the stimulation is adequate, leading us to become increasingly indifferent to space itself. Simply stated, the city has gone from being a stage where we are actors, to a stage where we are a passive audience increasingly blasé about our environment.

Fig.2 Loos’ Department Store across the Hofburg.
Growing trends in contemporary architecture

Growing trends in contemporary architecture are characterized by the integration of digital technologies and the use of advanced materials. This approach has transformed the way buildings are designed and constructed.

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CRITICAL PRACTICE IN AN AGE OF COMPLEXITY – AN INTERDISCIPLINARY CRITIQUE OF THE BUILT ENVIRONMENT

AMPs, Architecture MPS; University of Arizona
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ROLES, AGENCY AND RELATIONS OF GIGA-MAPS IN SYSTEMIC APPROACH TO ARCHITECTURAL PERFORMANCE: THE SPECIAL PROTOTYPES OF POST-ANTHROPOCENE

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INTRODUCTION:
The discussion originates from the ‘Systems Oriented Design (SOD)’ methodology (Sevaldson 2013) that started to evolve around 2006 in Complexity and Systems Thinking studio lead by Birger Sevaldson at the Oslo School of Architecture and Design. The field emerged from project related experimenting with various types of visual relating of virtual or physical items into complexity maps, later called GIGA-Maps (see Figure 1). For achieving these, the work required a trans-disciplinary social and physical environment, a so called ‘Rich Design Research Space’ (Sevaldson 2008). This particular environment motivated the relating of full-scale prototyping and time-based design processes and scenarios (see Figure 2 and Figure 3).

![Diagram of GIGA-map](image)

Figure 1: Types of visual relating often integrated in GIGA-Maps (Sevaldson 2014 – with the courtesy of Sevaldson)
The concept of ‘Time-Based Design’, that is crucial to this framework, was established by Birger Sevaldson, mainly in the means of relating time to design processes, analyses and scenarios in reference to generative diagrams (Sevaldson 2005; Sevaldson 2004). Systemic Approach to Architectural Performance mainly relates these design processes with the co-design of its prototypes placed into physical environment, and the eco-systemic co-design of their generative performance, preferably in public space. The tradition of prototyping re-emerged at the start of millennium when for example Bob Sheil, Michel Hensel and Achim Menges were arguing for relating time-based digital processes experimentations and design for performance with full-scale prototyping (Sheil 2008; Hensel and Menges 2006). This prototyping however, was seen as a design process for final products, not for the process of the performance itself. This part was investigated by London based urban office CHORA (CHORA 2017) that questioned the master plan approach and introduced ‘urban prototypical interventions’ that were placed into randomly chosen locations. These were generating the design through interaction with the local community (Davidová 2004; Doherty 2005).
Systemic Approach to Architectural Performance originates from the fusion of these process-based approaches, while considering the performance of prototypes and mapping placed into ‘real life environments’ as generative time-based co-design processes of the local eco-system. Systemic Approach to Architectural Performance involves trans-disciplinary research and practice in historical field studies, systems oriented design and other related methodologies, service design, performance oriented design, material research, landscape, cultural and social ecology, environmental art and bio-art. The paper discusses its GIGA-Mapping case studies to find interpretations of the field in the concluding part.

INTERRELATED CASE STUDIES OF DIVERSE CONTEXTS OF SYSTEMIC APPROACH ARCHITECTURAL PERFORMANCE

The GIGA-Mapping in Systemic Approach to Architectural Performance has, due to its nature, several interrelated layers and agencies. Its necessity of media and agency richness has been discussed in separate paper (Davidová 2017c). The builds prototypes or existing mapped traditional architectures and specifically their performances, are mapped and related in their GIGA-Maps, integrated in new design proposals. The GIGA-Maps are exhibited (preferably together with the prototypes themselves) in public accessible space. These are therefore considered as prototypes of its special kind, acting for public interaction and discussions resulting in generative co-design agency. Therefore, Systemic Approach to Architectural Performance is both methodology and a ‘generative design result’. The author argue that this approach results in how the architectural performance can be met in systemic way.

Ray Project

A responsive solid wood envelope Ray project¹ (Davidová 2016a; Davidová 2014b; Davidová 2017a; Davidová 2014c) focus has been initially placed in effects of relative humidity and temperature on solid wood panels. However, the extensive GIGA-Mapping of data and long lasting ongoing testing of the screen prototypes in outdoor environment resulted in involvement of both biotic and abiotic agency for its hygroscopicity and other performances (see Figure 5). When the system is closed, it is not allowing the humid and cold air to pass through the boundary. At Figure 4, both of the images are shot at the same day after four years of being exposed to weather and biotic conditions. The prototype got inhabited by blue stein fungi, algae and lichen. These, namely the algae, are regulating the moisture content of wood, thus co-causing its warping. Notice also the organisation of algae habitation caused by the material’s fibre direction and position within the design that is affected by material performance and form. Thus, it is organised through its moisture and the organism’s abundance and distribution interaction (Davidová 2017a).

The preceding and ongoing GIGA-Mapping of the project was initiating the author’s research in responsive solid wood was speculation on such performance through mapping systemic relations (see Figure 5). The research first investigates which wood specie to grow and harvest in relation to local eco-system. Than it investigates an interaction of the material interaction with other species that can co-design the performance. Therefore, co-designing and co-living situation might appear through such, first purely speculated, agency (see Figure 4) (Davidová 2017a). This GIGA-Map was used as a starting tool for all the following projects to be integrated to other maps and to take part in rapid learning and rapid communication processes.
CRITICAL PRACTICE IN AN AGE OF COMPLEXITY – AN INTERDISCIPLINARY CRITIQUE OF THE BUILT ENVIRONMENT
AMPS, Architecture_MPS; University of Arizona
22—23 February, 2018

Figure 4: Ray 2 Responsive Wood Envelope Prototype a) in Semi-Dry April Weather When the Screen is Partly Open for Boundary Exchange between Exterior and Semi-Interior; b) After April Light Rain

Figure 5: The Ray GIGA-map showing trans-disciplinary and trans-agency relations, observations and speculations within the project. (Davidová 2013 – images from Forest Products Laboratory, 2010; Hoadley, 1980; Menges, 2009; Němec, 2005; Tolasz & Coll., 2007 or photographed by the author, used with the courtesy of USDA Forest Products Laboratory, Taunton Press, Achim Menges, Grada and Tolasz) – please, zoom in at Systems Oriented Design’s Giga-Mapping Gallery (Sevaldson 2017)

LOOP Project
LOOP – The Environmental Summer Pavilion II (Davidová 2014a; Davidová and Prokop 2016) transdisciplinary studio course covered students of architecture and urbanism, environmental design and wood engineering. The studio resulted in a full-scale responsive wood pavilion (see Figure 6), that was afterwards followed by EnviroCity multi-genre festival (Davidová and Kernová 2016) organised by the author’s NGO, Collaborative Collective.
The studio design process was investigated in better depth in separate paper for RSD 3 Symposium: ‘Generating the Design Process with GIGA-map: The Development of the Loop Pavilion’ (Davidová 2014a). The EnviroCity festival advances the concept of the Rich Design Research Space to public space. This allows extensive public and other participants to engage and participate in the enactment and the discussions of the performance and other issues regarding the pavilion. The performance here has three major layers: 

a) the responsive solid wood performance of the pavilion that absorbs and evaporates moisture based on ambient relative humidity and temperature, thus moderating the micro-climate and generating climate comfort; Here the performance is co-designed by the design-related material bio-morph properties and its interacting abiotic environmental agents.

b) the performance of its users in interaction with the pavilion – The festival’s multi-genre performers, such as dancers, musicians or designers were specifically invited to express themselves in relation to
the performative object the pavilion and the related design-research. All the other human or non-human visitors found their own opportunities of use. Therefore, all of these biotic agents co-designed the pavilion’s performances and interpretations, taking their role in the performing eco-system, next to the abiotic agency.

**Figure 7**: The digital re-designed GiGA-Map serving for exhibition and public debate purposes in reference to the performing prototype (GiGA-Map responsibility: Hrušová & Pokorný 2014)

c) the performance of the exhibited digital GiGA-Map (see Figure 7), is presenting the work’s context, often addressing the tacit levels and therefore generating understanding, motivation and discussion. This dialogue is part of a continuous co-design of the project and its agendas on two layers – bringing new inputs to the designers as well as generating acceptance for the research and involving new participants and issues. The project’s mission thus also includes several DIY modifications and extensions.

**Bio-Climatic Layers in Traditional References and their GiGA-Mapping**

The research that resulted in the ratification of Systemic Approach to Architectural Design field originates from the need of practice to adapt to recent climate change and biodiversity loss. It claims that such adapted architecture has to consist of gradient of heterogeneous bio-climactic layers with diverse level of their boundaries penetrations. This concept is present in traditional architectures from extreme climates such as north, ocean open shores or inland deserts. Today, we experience mix of such climate extremes even in formally mild climates, such as in Czechia, the Central Europe (Czech Republic Ministry of the Environment and Czech Hydrometeorological Institute 2015). Therefore, the research claims, we need to learn from these architectures, because our traditional architectures from the mild climates were not adapted for such situations (Davidová 2016b). The following GiGA-Maps are often exhibited through events such Relating Systems Thinking and Design conferences (P. Jones 2017) to engage professional audience for discussion and motivation of implementation their findings in practice.
**GIGA-Mapping Svalgangs and Skuts**

Figure 8: The ‘Transformer’ Store House from Tjaldaj, Åseral, Vest Agder 1650, today placed in Oslo Open Air Museum that can fully unfold or enclose its semi-interior spaces based on actual weather or use needs while using an insulating performative layer of grass (Photo: Davidová 2016)

Figure 9: GIGA-Mapping Svalgangs and Skuts (Davidová 2017, photos used: Davidová and Raková 2016 and 2017). - the map of Norway is a public source from: Central Intelligence Agency (Central Intelligence Agency 1998); the macro climatic diagrams (yr 2016) are used with the courtesy of yr.no – Please, zoom in the RSD6 Proceedings to see details (Davidová 2017c)
This study investigates the architecture adapted to extreme climates. It notices that this is built of several non-discrete layers; offering layered boundary penetration of both biotic and abiotic agency, interacting in the means i.e. climate control, dwelling, use, work, etc.

The initial winter data and the second updated summer data GIGA-Map (see Figure 9) of svalgangs (see Figure 8) and skuts maps the discussed traditional semi-interior spaces in Norwegian traditional architectures, their performances and opportunities of use in relation to environmental data, biotic and abiotic agency, penetrability and local and spatial distribution. This time, the GIGA-Maps serve as various levels of consciousness data relations of the observed prototypes that evolved over generations and environmental performance interactions adjustments to feed the research by design. Please, note the bio-climatic layers of grass roofs (see Figure 8).

There are different concepts of boundary penetrations in these architectures. The, by now, discussed concept is the responsive solid wood that reacts to relative humidity and temperature due to its tangential section. The tangentially cut solid wood planks in peering structure air when the relative humidity is low while disabling the circulation of the humid air into the structure in high humidity environment (Larsen and Marstein 2000). Another concept of the semi-interior spaces responsive boundary is what the author calls the ‘Transformer’ because it can be fully unfolded or enclosed based on the use and climatic preferences (see Figure 8). These two envelopes’ performances, with the physical openings kinds and sizes agencies were considered for further investigation for applications. This variety of penetrations offer i.e. storing, working, cross-species social, sheltering and habitual opportunities, while moderating the environment of the enclosed parts of the houses. This series of speculative mapping, started with a pure question on climatic distribution from the exterior through the semi-interior to the interior raised several more related investigations and speculations. One of the conclusion there is that the more extreme climate, the more opportunities of co-living with other species these traditional architectures offer (Davidová and Raková in press).

**GIGA-Mapping Cave Dwellings**

*Figure 10: Combination of Subtractive and Additive Building Layers that developed for variety of seasonal use over time and cultures with different preferences in still inhabited city of Göreme (Photo: Davidová 2016)*
The investigation from the extreme political situation settlements in semi-arid, non-infertile land that lasted over hundreds years can well support en rute to adaptation to our similarly envisioned future. The cave dwellings can be found all over the continents (Vegas et al. 2014). However, they seem to be most extensively developed in desert and semi-desert climate areas. The following mapping represents an onsite investigation of Cappadocian caves mainly around the area by city of Göreme. The dwellings developed over time and cultures, layering non-discrete, heterogeneous spaces of bio-climatic layers (see Figure 11), combining additive and subtractive building techniques (see Figure 10). The GIGA-Map (see Figure 12) concludes, that for the climate transition between the bio-climatic layers, the size of the openings and their word axis orientation is not so critical as opposed to ventilation stream and the combination of the additive and subtractive techniques (Davidová and Uygan 2017). The ventilation stream is co-designed by biotic and abiotic agency, such as co-living with pigeons in upper levels (see Figure 11), placement of farm animals in the exits of the caves, the heat of the air that is generated by them and the cooling air generated by the underground water at the lowest levels of the underground cities. This co-living situation was also crucial for food production for all, generating fertilizers, agriculture and then again food for human and non-human animals.

Figure 11: Pigeon Houses higher up and Human Dwellings lower down in the Valley of Zelve (Photo: Davidová 2016)
INTEGRATION OF ABOVE STUDIES TO ARCHITECTURAL AND URBAN DESIGN PRACTICE

The above investigative studies and specifically their mappings evaluated and led to experimental design proposals, layering non-discrete, bio-climatic, heterogeneous spaces of built environment. These studies offer many design-research trans-disciplinary interpretations of variety of layers, scales and impacts.

Responsive Transformer: The Bio-Robotic Adaptive Architecture

Responsive Transformer\(^3\) (see Figure 13) is a synergising competition entry of this research for ecosystemic settlement. The project is integrating the concepts of bio-climatic layers, applying responsive
envelope Ray bounding semi-interior space offering biotic and abiotic exchange and dwelling, such as svalgangs, ground tempering and underwater cooling ventilation flows, additive green roof insulating layer offering ‘edible landscape’ (Creasy 2004) for variety species, including humans (see Figure 14). These structures can re-transform based on the social or environmental settings in a similar way as concept ‘transformer’ (see Figure 8) through co-design of its biotic and abiotic users (Davidová, Zatloukal, and Zímová 2017). The work was concluded from the preceding GIGA-Mapping studies on co-living and co-performance.

Figure 14: A detail of Bio-Climatic Layers within the project: The layers in the cells show green surface roofing, tempering storage space, climatised office space and blue semi-interior space, moderated by Ray envelope. The joints are equipped with natural ventilation system from the underground layers of a water reservoir and tempered unfrequently used rooms (Davidová, Zatloukal, and Zímová 2017; Davidová 2017a) (Drawing: Collaborative Collective 2016)

**COLridor**

COLridor is a trans-disciplinary co-design through GIGA-Mapping and full-scale prototyping project. The project gathers all the above collected data, findings and speculations for co-design and co-implementation of the eco-systemic prototypical urban interventions, to co-generate socio-cultural eco-systemic urban bio-climatic layers in urban environment. These interventions, covering the second EnviroCity multi-genre festival, that ranges from TreeHugger responsive wood insect hotel (Davidová and Prokop 2018) (see Figure 15) and actions such as seed bombing both to interact with
food chain to cultural and social generative events, such as local NGO’s picnics, dance and artists performances, lectures, workshops, the project’s GIGA-Map (see Figure 16) exhibition, etc. serve to motivate the city community for cross-species co-living situation (Davidová and Zímová 2017; Davidová and Zímová in press).

I.e. the intervention TreeHugger has three basic bio-climatic layers of its own:

a) an exterior surface inhabited by algae moderated by terrain and word axis orientation;

b) variety of climatic chambers for variety of species of insects, moderated by variety of responsiveness due to original position in trunk of wood on envelope Ray, terrain and word axis orientation;

c) the living tree itself on which the structure is parasiting, generating a living insulation.

The project also covers larger impact layer, when offering the ThreeHugger parametric code for downloading and local specific adjustment for DIY.
Figure 16: COLridor and EnviroCity GIGA-Map showing different scales, stakeholders and their agency speculation on planned actions that is still exhibited at the location to generate public and specifically stakeholders’ discussion and motivation (Davidová 2017) – Please, zoom in the RSD6 Proceedings for to see details (Davidová 2017b)

DISCUSSION AND CONCLUSIONS:

It appears that in Systemic Approach to Architectural Performance, the GIGA-Maps are inseparable from the biotic and abiotic performance of its prototypes. In fact, they are themselves prototypes of its kind, securing the projects’ developments through generative agency co-design involvement and interaction. There seem to appear two kinds of mapping though without clear boundaries – a) project process based and – b) registering and speculations based. Though these two are fully interrelated, they seem to have often different organisation of their relating: – a) timelines and cross-related bounded fields and; – b) matrixes and feed-back loops. While the first one serves for rather for communicating purposes, the second one rather for recalling and documenting the memories. All of them use images for enacting and relating tacit knowledge with hard data and have generative and, in its sense, co-designing character. They help to engage, involve and internalize the designers as well as the audience and generate the project’s mission understanding, acceptance and the discussion over it that leads to project’s trans-disciplinary co-design. Exhibiting of these also extends the project to different extends of inspirations and DIY variations by both, professionals and amateurs.

The discussed three layers of performances, the material, the user and the GIGA-Map, influence each other and generate the real life ‘Rich Design Research Space’, the ‘real life laboratory’. The cross-relation between the layers seems to be crucial for project’s generative real time performance as well as for this field’s design-research development. As, in a way, an extended item of the GIGA-Map, the eco-systemic prototypical urban interventions enable larger eco-systemic co-design, performing with a ‘real life’ generative agency – being a time-based over-evolving ‘design result’. This research therefore argues, exemplifies and proposes a particular path to that with today climate extremes and biodiversity loss we need to shift to Post-Anthropocene to preserve humanity. This means to co-create habitable and edible environmental input that can regenerate former anthropocentric ‘cultural’ environment into co-living situation. This shift cannot come directly but in similar manner as natural succession, through generative interventions, evolving over time. This again needs human engagement and acceptance, where trans-disciplinary Co-GIGA-Mapping is supportive and generative on its own.

REFERENCES

1 This research by design has been led by the author in collaboration with Defio, s.r.o. carpenters.
The project was lead by the author together with Šimon Prokop and Martin Kloda at the Faculty of Art and Architecture at the Technical University of Liberec and the Faculty of Forestry and Wood Sciences at the Czech University of Life Sciences in Prague.


The project was designed by trans-disciplinary team of architects from Collaborative Collective, building and mechanical engineers from Experis SDKM and landscape ecologists from CooLAND, lead by the author.

The project was a collaboration among Collaborative Collective, CooLAND, the Faculty of Forestry and Wood Sciences at CZU in Prague, the Faculty of Art and Architecture at TU of Liberec and the local community

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SPIRALLING SLOPE AS A REAL LIFE CO-DESIGN LABORATORY

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INTRODUCTION:
The paper is to present the ongoing development and growth of the performance of the family house Sophia. The paper’s first author, architect and researcher from Collaborative Collective, was the project lead from sketch to the building allowance, while she is still active on the site. The second and third author are the AI and Physical Computing developer and researcher from sysloop and NUVIT and culturologist from Open House Prague, that later on joined the team of Collaborative Collective, respectively. Therefore, the paper represents, and witnesses the true ‘reflection in action’ (Schön 1983) of both the first person practitioner and the first person user, all co-designing together in real time. Similar approach was discussed by Sevaldson in the context of ‘Time-Besed Design’ and ‘Research by Design’ (Sevaldson 2005). However, this work extends such approach into the means of co-design. In addition, this co-design does not cover only the clients. The local authorities did still not confirm the built project, while it is inhabited and developed through this inhabitation; therefore continually co-designed by its clients, the overall eco-system and its ambient artificial intelligence. The mission of the building intervention aims to perform in synergy with the local environment, using analogue and digital tools for it. While the first author is leading the research on environmental co-designed responsiveness without use of energy, the second author leads the research in artificial intelligence of so called ‘autonomous dwellings control’ and the third author adds the cultural, social and sustainable dimension to it. However, this division of terminology will be questioned latter in the paper. As opposed to the leading environmental research of the first author, the today practice application has to lower down of its direct, primary resource based performative ambitions. Therefore, this trans-disciplinary research by design project involves and fuses three major cases of time-based co-design development: a) the initial and real time co-design with an ambient eco-system; b) the initial and real time co-design with clients; c) real time co-design with artificial intelligence.
The co-design and co-living with environmental settings is common throughout the architectural history (Hensel and Sunguroğlu Hensel 2015), specifically in extreme climates (Davidová 2009; Davidová 2016b; Davidová and Raková in press). I.e. Hensel and Turko investigate the relation to ground and envelopes, arguing for its intense embeddedness in its local specific settings, its non-discreteness (Hensel and Turko 2015). The first author has performed a hands on traditional architecture study to investigate such relations to ground and other biotic and abiotic agency across the bio-climactic layers, discussing their synergy that is performing across the species in and on the cave buildings in Cappadocia, Turkey (see Error! Reference source not found.) and Southern Moravia, Czechia (Davidová and Uygan 2017). Similar discussion she mapped on semi-interior spaces of Norwegian traditional architectures, ‘svalgangs and skuts’ (see Figure 2), arguing for such co-living situation (Davidová 2016a; Davidová and Raková 2018). This project brings such historical synergic context into today practice.
This approach of the trans-disciplinary research through practice, that has been always natural to architecture and regains its attention due to recent world’s complexity increase (Hensel and Nilsson 2016), preferably investigates the bio-climatic and psychological layers performing across the discussed bounding and/or its extensions. In this case, it also means an investigation of local specific species and/or artificial intelligence for co-living and co-performing across the grounded, the semi-interior and the interior spaces, performing as non-discrete. The biotic and abiotic agency in build environment has been investigated and discussed by Mostafavi and Leatherbarrow as weathering (Mostafavi and Leatherbarrow 1993). Extensive and very impressive research by design as well as historical referencing on grown architecture called Baubotanik is performed by Ludwig, his colleagues (Ludwig, Schwertfreger, and Storz 2012) and others.

This practice based research attempts to merge such environmental performance with computing. Many autonomous operational systems for buildings are recently present on the market. However, these all are done and approached purely from anthropocentric perspective. Co-design, in the means of co-creation was explained by Sanders and Stappers as an active agency within the design process (Sanders and Stappers 2008). We would add that this co-creative design process is best performed as the ‘first person practitioner research’ (Sevaldson 2005) through co-living and co-performing across the biotic and abiotic agency. Thus this research is perceived as a ‘real life co-design laboratory’. The discussion on the contradiction of the building autonomy and local specific adaptation was investigated by Argues (Aragüez 2016). We claim, that the buildings were always ‘allopoietic systems’, keeping their autonomy (autoopoiesis) while being in necessary exchange with their environments (Dekkers 2015). A lot of research of merging biology with computing has been performed by Francois Roche (Roche 2010). However, this research has not yet been implemented enough to architectural practice.

Performance in architecture (therefore Performance Oriented Architecture) was reformulated by Hensel in 2010 as a ‘reconsolidation of form and function into synergy of dynamics of natural, cultural and social environments’ (Hensel 2010). We wish to bring this discussion into real life process of cultural and social architectural practice that offers to the eco-systemic agents both dwelling...
and nutrients. This cross-agency, time-based, co-performative, eco-systemic co-design was ratified by the first author in her PhD thesis as a new design field: ‘Systemic Approach to Architectural Performance’ (Davidová 2017).

THE THREE TYPES OF CO-DESIGN

The discussed co-performance is generated by biotic and abiotic agency across multi-layered spatial and climatic concepts of living built environment. Therefore, the research seeks to establish the notion of ‘real life laboratory’ as a part of full-scale prototyping concept of smaller scale bio-climatic eco-tops and their relations to support bio-corridors across the city. We are aware that the term is an oxymoron as the concept of labs is to isolate the researched items observation and experimentation from real life. However afterwards, such experiments often fail to meet the appropriate interaction with the complexity of real life. Such reductionist approach is criticized in urban context i.e. by Hemmersam and Morrison whose methodology involves transect walks with the purpose of mapping the peculiarities of cultural landscapes (Hemmersam and Morrison 2016). In 2017 the Journal of Design and Science (JoDS) published its third issue called ‘Resisting Reduction’ (MIT Media Lab and MIT Press 2017). The issue is introduced by a manifesto of the same name by Joichi Ito in context of second order cybernetics, the context where the designer participates within the system. Ito explains such approach as the only viable technique to design within the complexity of today world (Ito 2017). Similar discussion is covered by Ben Sweeting from the perspective on how could cybernetics benefit from design (Sweeting 2016). The interaction with the complexity of the ‘real life’ is my main researched item to observe and experiment on. Therefore, I consider the site as a laboratory for real life interaction.

The research by design follows Ulanowicz’s holistic approach of the field of ‘Eco-Systemic Phenomenology’ (Ulanowicz 1988). Only through researching in real life, we can meet strategies for interacting with eco-systemic complexity through prototypical interventions, and therefore co- and re-designing it. This ‘praxiological’ perspective with ‘designerly ways of knowing’ (Cross 1999) is therefore truly grounded in ‘development of theory through practical investigations’ (Sevaldson 1999). Though cross-related, we divided the co-design and co-living in this real life co-design laboratory into three types: a) the initial and real time eco-system’s co-design; b) the co-design with clients; c) the co-design the- and with the- artificial intelligence. Though divided into these sub-sections in this paper in eager of clearer explanation, these types of co-design are if not already fused, than performing in synergy. This explains the cross-relation of these sections that have often not clear boundaries.

The Initial and Real Time Eco-Systemic Co-Design

The villa was co-designed through its environmental settings. This means namely the ground and geographical and topological parameters (see Figure 3), world axis orientation, micro-climate, local fauna and flora (see Figure 4 and Figure 5), including the social pre-sets. It is spiralling into the ground’s topological nature that generates its design. Its design is also formed through its social environment – being on the edge of the lower class flat housing and the villa like area, with the respect to the terrain. Therefore, its entry on the plateau is low level and non-representative, to equalise the social settings (see Figure 5) while the development of the house into the terrain with the view over the Vltava river’s south oriented slope valley has a character of opening itself into the major Prague’s bio-corridor and higher class build up area.

The terrain’s topology is addressed on the inside, where rooms are following the ground. These all are organized around central atrium build of staircase generating semi-interior living room that can fully open to both south and north side of the house on its both levels (see Figure 6). The south oriented side
uses physically generated shading and is fully extended by terrace, connecting the spiralling interior spaces through the exterior. As the disposition is sloping up towards north, it is benefitting from an excellent opportunity of natural ventilation. This one is operated by sysloop AI discussed latter. The atrium’s glass fan is to be inhabited by algae to regulate the sun and humidity concentration on its central part that opens to the sky.

Figure 3: Upper part: The relationship of the ground; and the lower part: the villa during the building time when the mass and spaces are topo- and typo- logically integrating into the present terrain (Collaborative Collective 2014)

As the body of the house infiltrates to the ground, the roofing (see Figure 4), pool and other built environment of it is offering the surface for the original and local species see, adjusted to the topology of the plot, means south slope or the habitation on its northern side (see Figure 5). These species have also performative capacity, generating extended climate comfort - pleasant clime, smell and colour atmosphere, on the exterior, semi-interior and interior, offering ‘edible landscape’ (Creasy 2004; Adams and Lindsey 2016; Davidová, Zatloukal, and Zímová 2017) for local insects and birds. The same is generated by composting of the biological waste by the users and their collection of rain and waste water. Therefore, the building’s performance is co-designed by its ambient eco-system, clients included.

The new plan for willow grown semi-interior living extension is on the table at the moment to meet needs of new users member, the daughter. This ‘garden pavilion’ will be co-designed so it grows with the little new user over her life, while offering food for pollinators and therefore the birds from nearby birds’ reservoir, as a result of food chain. This shows that the time-basis of the actors’ work is present and generative in many ways and meanings.

The presented eco-systemic co-design is to address the today eager for cities’ eco-systemic services that are argued as being deadly existential for human life (Sandhu and Wratten 2013). However, this is approached from non-anthropocentric perspective. When discussing such, we understand the meaning
of the term eco-system as it was described by Allen and Roberts, an ecological system inside the system that includes the geophysical part (Allen and Roberts 1993).

Figure 4: The upper floor excess on the green roof with local species (photo: Birke 2018)

Figure 5: The Northern façade, its relation to ground and inhabitation of pool by algae (photo: Birke 2018)
The Initial and Real Time Co-Design with Clients

The clients participated in co-design on the project from sketch and their envisioned technological, environmental, use and aesthetics preferences were implemented within the building design already when submitting to the authorities. However, the building is constantly developed, while inhabited by its users, the clients (see Figure 7). Though the dwelling has not been approved by authorities yet, it is in use and therefore constantly re-designed due to enacted needs, food and other stuff consumption and biological compostation or opportunistic use of the clients, the users’ family growth and the visitors, including the architects from Collaborative Collective. This part also takes part of co-designing and re-designing the initial eco-system, first by its building intervention, second through its support. We argue, that humans are full part of the eco-system, therefore they have right to take role in its active agency. However, this agency must be very careful and wise, therefore not anthropocentric, urging for co-living with and within the overall eco-system. However, the first author concluded through performative architecture’s mapping, that this large spectre of performative agency is anyway also the most beneficial to humans. I.e. without ground, tree and pollinators, we cannot have fruits and if the eco-system is healthy, we have healthy fruits. Therefore the clients’ motivation of the co-designing of the healthy eco-systemic environment is existential.
The critical part of the house’s co-design through inhabitation is its, so called, ‘autonomous system’ of its ‘agency’, a sysloop AI. Sysloop was designed as an artificial intelligence to co-design this healthy eco-systemic environment. The first set of its transdisciplinary co-design input, lead by the human users, was achieved among all through super extensive visual complexity mapping, so called ‘GIGA-Mapping’ (Sevaldson 2011; Sevaldson 2015) (see Figure 8). Therefore, this house and its ambient environment also serves as a prototype for AI system, that is both, developed and updated by and through its users – means them as designers that test the prototype as well as them as observed ‘laboratory rats’ for machine learning. Here the world environment is perceived as defined by Oxford Dictionary:

‘Environment is physical and biological surroundings of an organism. The environment covers non-living (abiotic) factors such as temperature, soil, atmosphere and radiation, and also living (biotic) organisms such as plants, microorganisms and animals.’ (Oxford University Press, 2004)
However, in this case, the ‘organism’ is rather perceived in an extended meaning for the reason that the agency often merges. Therefore, it can also include the artificial intelligence sysloop that is discussed below.

Co-Design with Artificial Intelligence

The artificial intelligence system sysloop is in depth discussed in separate paper of these proceedings: ‘sysloop: An Allopoietic Environment Agency’ (Pánek and Davidová 2018).

Through house’s environment observations, the artificial intelligence called sysloop, whose base racking space is in its underground space (see Figure 9), co-designs its performance. Therefore, the ambient intelligence is full part of the eco-system across all its interactions and as said above, we can talk about its environment. It co-operates i.e. its natural ventilation, shading, spatial accessibility, therefore spatial distribution and more generally, the heterogeneity of its micro-climates, micro-ecosystems, spaces, environments and opportunities of use based on the observed, learned, evaluated, equalized and developed preferences.

Sysloop its self is co-designed by a) its authors for machine learning; b) its environment, users included; c) BIG data through artificial intelligence. The authors of it gave the birth to the project and constantly co-design and redesign it, while the initial team grows and is altered. Therefore, it is constantly co-designed and redesigned itself. The AI is generatively co-designed and re-designed through its eco-systemic agency (including the clients), which is happening in the house’s real time tracked environment. This helps to perform and/or suggest ecological performance, solutions, re-designs and interventions for the environment to flourish. However, this AI requires a link to human culture to start of, because this is the only interpretation of the world we presently know. Therefore, tracking the environmental real time data is used in machine learning and is interpretatively and generatively linked to, by its working term called, ‘universal human knowledge’ based BIG Data. The, so called, ‘universal human knowledge’ is based in human languages processing in order to grip generic data and while doing that, to generate a new knowledge thanks to the environmental...
observation, enactment and agency. Therefore, the system’s extension grows as well as sysloop system is meant to feed the data of larger systems in urban and even larger scales. Please, note that we are aware of the system’s ethical dangers and the need of separation of the users’ data from internet. However, these issues are discussed in separate paper.

DISCUSSION AND CONCLUSIONS
The placement of the research by design prototype into ‘real-life co-design laboratory’ within the present eco-system is merging the experiment process and prototype with time-based ‘design result’. This approach enables us the work’s first person enactment, being first person ‘rats’ in this ‘real life co-design laboratory’ ourselves. We are aware that the term seems as an oxymoron, however, it is meant as a critique of the common reductionist approach that hardly ever addresses the real life. This work represents similar approach as Francois Roche’s non-discrete and non-anthropocentric architectures (Hensel 2013), often fusing living with digital into one eco-system (Roche 2010). However, this work is explicit that the generative time-based ‘design result’ is an ongoing co-design and co-creation of the co-performance that is synonymous with co-living met practice. Therefore, this Research by Design fights for shift from Anthropocene and therefore for, for shift from master planned anthropocentric landscapes and urban settlements to adaptive and edible ones, appearing through the synergy of multilayered biotic and abiotic agency and interaction in real time and real life. This design-research therefore claims that if we are to survive and adapt to recent climate change and bio-diversity decrease, we have to rethink how we think of architecture, built environment and the cultural landscape in general. We can no longer design for- but we need to design with- the users, the eco-system, the planet, etc.

For starting this shift, we need to combine all present-time available agency, biotic, abiotic, and digital in the search of the most sustainable and adapted balance. Recently, many of these systems’ boundaries seem to be blurred and this blur will most likely increase with the current bio-tech development. Architectural practice cannot neglect this development.

This project represents a case study in such synergy and adaptation. Therefore the fusion of these presented processes- and time-based co-designing of co-performances, involving: a) the ambient eco-systemic agency, b) the new cross-species habitants’ agency, c) the artificial intelligence agency into the one performative eco-system is truly taking part in the first author’s newly ratified design field: Systemic Approach to Architectural Performance that calls for such shift.

REFERENCES:


SYSLOOP: AN ALLOPOIETIC ENVIRONMENT AGENCY

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INTRODUCTION:
In this section, we explain how longstanding common leaning to a fixed structure affects ways of processing information and why it limits advancement towards automated decision-making and what are the implications in order to overcome such limitation. The necessity of organised describing of reality led to concept of a paper form. The paper form has been, until today, across many fields of human activity, considered a convenient method of gathering and storing information. By no coincidence paper form digital equivalents – a relational model (Codd 1970) and a spreadsheet application, i. e. VisiCalc, 1979 (Licklider 1989), emerged at the beginning of personal computing era. Enormous simplicity, capacity and proliferation of this concept shaped the paradigm of individual thinking about information and its processing in general. Despite an extensive advancement across all fields of computer science for almost five decades, the digital equivalent of paper form prevailed and supported common notion of how information should be collected, stored, communicated and processed within information systems.

The relational model has inherited and is based on prerequisite of a fixed structure. As with columns in spreadsheet document, the structure of data in view (i.e. attributes of certain group of objects) must be defined in advance and kept ever after. Common effort of the user and integrator to define data relations of interest in advance then leads to typical tendency (from the integrator’s point of view) to unify and (from the user’s point of view) to confuse the way of distinguishing and classification (technical representation) with the way of displaying (visual presentation). Within relational model design, an information system not only adheres to fixed structure of data, but also inevitably to a fixed set of methods of its processing. Technically, due to the fixed structure, these systems tend to offer just matching, filtering and sorting operations, combined with elementary statistical tools. Practically, the result of such effort is usually a system that just displays data. Due to these limitations, such systems are predetermined for temporary single-purpose use only and for emergency redesigns in future, whenever internal or external conditions change.
Foremost the relation model handles data through symbols (i.e. names of columns or values in rows), it does not cope in any way with actual meanings of things. However, the value of information does not lie in its existence but in its interpretation. In order to assure information system’s ability to evolve and adapt, it is clearly important first to acquire technologies that are capable of processing meanings instead of symbols and that are not restraining users in terms of data relations. In practical area of architecture, sysloop is an experimental technology aimed at overcoming limits of symbol processing and fixed structure paradigm, in order to establish adaptive and evolutive process agency for buildings, cities and larger environments. To overcome limits of symbol processing and fixed structure in the first place, and to do that in conditions of building process co-design (with industrial-grade parameters), several key technologies were needed to be developed from the scratch specifically for proposed system. The proposal is constantly developed namely on the first author’s family house that serves as its prototype (see Figure 1) and operated in other environments such as office buildings, manufacturing, etc.

SYSLOOP: THE METHODOLOGY:

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Figure 1: Construction site of an experimental building representing a prototype of proposed system. (photo: Pánek, 2013)

Figure 2: Entrance to the experimental building developed as the prototype of proposed system. (photo: Pánek, 2017)
The methodology is fully attached to constant reviews, prototyping and prototype’s observation (see Figure 1 and Figure 2) and develops a “real life” Shön’s concept of ‘reflection in action’ (Schön 1983) in a physical built environment. The particular investigated prototype’s co-design process is elaborated in a separate paper of this proceedings under the title: 'Spiralling Slope as a Real Life Co-Design Laboratory' (Davidová, Pánek, & Pánková, in press). Due to the nature of the artificial intelligence and the nature of its development, the design methodology and the prototype itself merge into one. Therefore, the paper represents true ‘research by design’ as discussed by Sevaldson and Morrison (Sevaldson 2010; Morrison and Sevaldson 2010) and because of that, the methodological section is fully integrated into the body text of this paper.

Sysloop is cross-layered and highly scalable concept and systemic design process of “allopoietic system”, a system that is autonomous though dependent on the exchange across its environment (Dekkers 2015). Similar approach was suggested by Ghajargar, Wiberg and Stolterman for designing IoT (Maliheh Ghajargar, Mikael Wiberg, and Erik Stolterman 2018). However, sysloop design does not relate to things but living environment performance and is separate of internet. In this case, the exchange is performed through three types of co-design in several layers of scales: • co-designing of trans-disciplinary co-authors for machine learning, approaching the design process from different backgrounds; • co-designing of ambient environment of the prototype from whose observations and interactions it is learning, users included; • co-designing of artificial intelligence, big data and so called “universal human knowledge”.

• co-designing of trans-disciplinary co-authors

Co-design, as we discuss it was explained by Sanders and Stappers in the means of co-creation as an active agency within the design process (Sanders and Stappers 2008). Trans-disciplinary awareness of ability to automatically interpret human knowledge (as opposed to conventional data processing) allowed to design and implement concepts and use-cases which otherwise would be precluded by traditional processes, especially those in construction projects.

• co-designing of ambient environment of the prototype

Here the world environment is perceived as defined by Oxford Dictionary as physical and biological surroundings of an organism. The environment covers non-living (abiotic) factors such as temperature, soil, atmosphere and radiation, and also living (biotic) organisms such as plants, microorganisms and animals. (Oxford University Press 2004)

For example, due to presence of knowledge processing technology from early stage of project, it was possible to design a nonmaterial aspects such as environment dynamics, allowing designer to extend his/her concept and effectively preserve intended experience in course of time.

• co-designing of big data through artificial intelligence

For autonomous decision making, it is important not only to interact with users and local sensorial data but also with extrinsic knowledge, both static and dynamic. Such connectivity allows environment management coordination and optimisation across all scales, from single building unit through local community environment and services up to the city and global scale. Furthermore it constitutes preparedness for artificial intelligence assisted communication and content sharing.
SYSLOOP: THE TECHNOLOGY

To eliminate restriction of fixed structure and fixed functionality, it is required to (1) dissociate data from methods of its processing systematically (“by design”) and to (2) comply with knowledge representation at all levels (data, methods, relations, communications) of the system. In order to do that, two key components needed to be developed from the scratch for proposed system, with these assumptions in mind:
- a knowledge integration platform,
- a knowledge base.

Once the system does not hinder oneself to work with structures as freely as with data itself, it is possible to handle information not only through symbols or patterns (as in relational model or statistical machine learning), but mainly through actual terms and actual relations, as in real life (see Figure 3). An adequate and practical way to do that is through natural language models. However, conventional (stand-alone) linguistic tools turned out to be insufficient until elaborated and amended through extensive trans-disciplinary effort. In order to exploit the potential of knowledge processing within real-time dynamics of the environment, it was therefore required to include two more key components:
- a knowledge data foundation,
- a natural language processing.

These four key components are described in detail in the following section.

The knowledge integration platform was developed with an ability to store and execute methods of data processing (i.e. transformations) as independent services across the network. Separate back-ends of these services and individual methods documentation are being generated and updated from source-code automatically by knowledge integration platform, allowing hassle-free integration, testing and agile development throughout environment life-cycle. As a part of the platform a “knowledge” communication protocol was developed with an ability to represent and transport high volumes of data of arbitrary structure in real-time.

The knowledge integration platform software is designed to be effectively operated at various scales, from embedded computer controllers to high performance servers. Typically, it is present across environment on larger number (i.e. hundreds) of single-board computers to interface with various hardware components, and on several local and / or remote servers for high performance computing

Figure 3: Trivial knowledge representation of radon concentration sensor within proposed system.
such as real-time knowledge processing. At its every instance, the integration platform hosts one or more mutually independent software units, each implementing specific functionality. Through the knowledge protocol, these functionalities constitute assets that are available for loose coupling to perform real-time operations.

The knowledge base was developed with an ability to store and retrieve data with mutable structure. Within the knowledge base every aspect of reality being described (i.e. building component) has its own, arbitrary set of properties (mostly textual) that evolve over time. Information within the knowledge base is organised with respect to its logical relations, by means of an ability of property to represent relationship to another element (i.e. “has colour”). Due to natural language capabilities of the system, all information within the knowledge base are at the same time organised naturally, by means of a fact that certain elements shared certain subgroup of mutually comparable properties (i.e. “colour”, etc.) described for each of them. Also, the internal storage allocation strategies and APIs of knowledge base technology are carefully designed with the assumption that some properties will potentially represent continuously growing time series of data from a large number of sources, such as sensors.

The knowledge data foundation was developed consisting of three segments:
- selected natural language models (English, Czech)
- fragments of universal human knowledge (i.e. basic physical units and equations)
- building environment model (i.e. sensors and actors interfaces and spatial coordinates)

Within the frame of knowledge base, way of describing human languages is identical to way of describing any other parts of reality – through terms and relations. As human languages stress perfectly natural relations between things, it is adequate and effective to employ these models in all processes of grappling all other data. With feasible extent of linguistic algorithms, it is then possible to make all knowledge available for automated interpretation within or outside the system.

Certain fragments of universal knowledge both static (data) and dynamic (algorithms) are required to be defined in order to support basic interpretation. For example an algorithm to calculate distance of two objects from their spatial coordinates, once defined, may be applied automatically on objects that have location, such as light sources, doors, etc. With universal and model-specific knowledge collected together, it is then possible to implement properly an ability of autonomous interpretation required to deal with specific real life environment tasks.

Utilising human language models, universal knowledge, building environment model and any other information in future are therefore all represented and accessible in the same way as actual terms and actual relations.

A natural language processing technology was developed with an ability to parse input and generate output in natural language, providing certain abilities of automated data interpretation within the frame of knowledge represented in proposed system’s knowledge base. Through this technology, the environment is able to interpret and execute instructions and also answer questions formulated in human language.

All four key technologies described above are implemented in C programming language. Although the knowledge integration platform itself is designed to support any programming language, most of particular software components are also implemented in C. Proposed system also includes C language interpreter to support certain low-level hardware interactions effectively.

Aside from these key technologies, the proposed system also integrates few open-source solutions to incorporate functionalities, implementation and integration of which does not need adaptation in the sense of research subject of this paper, such as text-to-speech / speech-to-text (TTS / STT) transformation, transport layer security (TLS), and unix-based operating system (OS).

With the use of key technologies described above, all particular software components are operated on generic hardware nodes, which in turn may interface directly with specific equipment. Critical hardware nodes are interconnected using metallic cabling to maintain continuously reliable connection required for safe, real-time interaction. Where possible, these hardware nodes are connected in a star network topology in order to provide each hardware node with power supply option together with data through a single link (see Figure 4). When combined with managed switches or routers, single metallic
link to each hardware node also provides significant benefits in terms of extrinsic monitoring, management and power efficiency. Wireless communication is also supported, but not recommended except for defensible situations due to variable signal strength and interference implications of buildings’ environments.

Proposed system communication is performed through the use of IP (Internet Protocol), at transport (4), session (5) and presentation (6) layers of OSI (Open Systems Interconnection) model. For self-configuration, such as hardware node insertion or removal detection, and self-diagnostics it is using
UDP/IP (User Datagram Protocol). For general communication it is using TCP/IP (Transmission Control Protocol) with altered fragmentation parameters in order to maintain control over latency. Proposed system communications support both link (2) and network (3) layer switching. It is therefore possible to operate control-loop within local isolated network as well as control-loop distributed across separate sites interconnected by Internet, where required.

General intention of proposed system to transfer as much complexity as possible from hardware to software domain (in order to gain reliable real-time control) implies preference of single-purpose components over special-purpose appliances. Therefore an ability to interface directly and effectively with hardware components (i.e. individual sensors or controllers) is as significant as ability to absorb and control smart, usually stand-alone systems, such as air-conditioning technological compartments (see Figure 5 and 6). For example, within proposed system, it is not adequate to implement lighting control with higher-level protocols such as DALI (Digital Addressable Lighting Interface) where lower-level protocol such as DMX512 (Digital Multiplex) can be used because real-time dimming properties are hard-wired or throughput-limited in the DALI case, while complete control over dimming curve in real-time is available with DMX512. What can be considered less important aesthetic gain in case of decorative light, represents qualitatively different situation if dynamic digital signal processing is required functionally across certain building automation layer. As signal transformations are essential to many layers of designed environment, proposed system implements generalised software forms of digital signal processing (DSP) algorithms to perform tasks that are conventionally solved through dedicated electronic circuits, such as Arbitrary Waveform Generator (AWG) or Arbitrary Waveform Transformer (AWT).

Through generic (universally capable) hardware nodes, proposed system interfaces directly with individual sensors and actors over low-level bus standards such as GPIO (General-purpose input/output), UART (Universal asynchronous receiver-transmitter), I²C (Inter-Integrated Circuit), or SPI (Serial Peripheral Interface). Industrial equipment with a higher degree of self-reliance is supported through own implementations of proprietary RS-232 based protocols and Modbus standard. Peripherial devices are supported through 3rd party implementations of USB (Universal Serial Bus) standard and Bluetooth wireless technology standard (see Figure 5 and Figure 6).
In terms of low-level process control, proposed system forms a loose coupled system, performing combinations of feed-forward and feed-back interactions between elements. Real-time sensor / actor data, as well as high-level knowledge elements, are being streamed and processed through dynamically bound sets of functional units that are distributed across the environment on single-board computers and servers.

Figure 7: Example of I/O expander “freedom” developed for proposed system. (photo: Pánek, 2016)

Figure 8: Real-time radon probe co-developed with creators of proposed system as example for integration. (photo: Pánek, 2016, graph: Pánek, 2016)

Figure 9: High-tech acoustic piano integrated with building artificial intelligence within proposed system prototype building. (photo: Pánek, 2018)
Several industrial-grade hardware modules were also developed for common interfacing with sensors and controllers, such as sysloop “freedom” I/O expander (see Figure 7) with hardware interrupt signalling to increase I/O management and power efficiency. Various measuring instruments and sensors were developed and integrated within proposed system in order to demonstrate benefits and true potential of real-time knowledge-driven environment control. For example, an integration of real-time radon probe (see Figure 8), loosely coupled with several active ventilation capabilities (as simple ventilators or advanced doors and windows opening systems, etc.), demonstrated practicability of health risk mitigation through informed real-time decision making, as opposed to conventional (cost ineffective) static construction solutions.

In another example, high-tech acoustic piano with electronic sensors for recording and electromechanical solenoids for player piano-style playback was integrated with the building environment through proposed system (see Figure 9). Deep integration at both MIDI (Musical Instrument Digital Interface) and DSP (Digital Signal Processing) levels allowed practical sound background interaction with other environment layers and with users, based on proposed system’s real-time knowledge evaluation.

Through same key technologies proposed system is intrinsically capable of acquisition, visualisation and interpretation of heterogeneous data in real-time. At city scale it brings technical pureness, uniformity and low complexity in terms of heterogeneous systems data collection and interchange (see Figure 10).

![Figure 10: Element maps rendering within proposed system testing environment and its scalability. (Illustrative diagram: Davidová 2018, generative model: Pánek 2017)](image)

**DISCUSSION AND CONCLUSIONS:**
In relation to growing complexity, users are often concerned about operational demands and reliability and developers / manufacturers tend to focus on particulars at the expense of context. However, it seems, that the complexity will continue to grow and data cohesion of systems in general and artificial intelligence applications are required to cope with that complexity. Requirement of paradigm shift from relational model towards knowledge approach is already apparent in the area of application software (where data is everything), as common information systems cease to satisfy everyday needs in always evolving complex reality. Since knowledge of not-uniform structure can be technically represented in a unified way, it can also be shared in a unified way. Technical accessibility of such knowledge from anywhere in real-time then represents not only quantitative, but predominantly qualitative advantage in terms of information systems and – in our case environment dynamics – continuity.

Similarly to the automotive industry, the complexity in building construction and automation can be and is step-wisely being transferred from hardware to software domain, in order to improve sophisticated capabilities without sacrificing operational simplicity or reliability.

Overcoming “critical mass” of integration leads to ultimate simplification from user point of view (and also at physical layers of technology), as such modern systems will contrive complex tasks like knowledge sharing, adaptation and self-repairing. Proposed system exploits the non-relational
CRITICAL PRACTICE IN AN AGE OF COMPLEXITY – AN INTERDISCIPLINARY CRITIQUE OF THE BUILT ENVIRONMENT
AMPS, Architecture_MPS; University of Arizona
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approach to data processing to introduce such paradigm shift into the area of building design, construction, habitation and maintenance.

In the context of building design, construction, habitation and maintenance, proposed system copes with component granularity and overall complexity by exclusion of fixed coupling at both physical and virtual levels and introduces central artificial intelligence as primary process control agent. Through a combination of knowledge processing technologies with loosely coupled architecture it was possible to implement advanced building environment capabilities, such as human instruction interpretation and question answering within the context of building. Application of non-relational approach allowed achieving autonomous behaviour, alterable functionality and evolutiveness, qualities not typical for traditionally rigid areas of building construction and automation.

Proposed system allowed to integrate artificial intelligence elements into environment process control of a complex prototype building. Through same key technologies, larger sensorial network has been created in order to verify capacity of knowledge-oriented processing within a scale of a city. Such complex integrations not only create unique laboratories required for further trans-disciplinary research, but they also provide attractive way to demonstrate and understand importance of structural freedom, its attainability and feasibility even within fields where traditionally the opposite was the norm.

Through the fusion of processes-based co-designing co-performances of: • ambient eco-systemic agency; • large scale eco-systemic agency; • artificial intelligence agency into one performative eco-system, the sylloot prototype finds its place within the second author’s newly design field ‘Systemic Approach to Architectural Performance’ (Davidová 2017).

REFERENCES:
CRITICAL SPATIAL PRACTICES OF MONUMENTALITY IN THE SMART CITY

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INTRODUCTION
How can media architecture — the expressive, often digital, mostly “screen-reliant,” sometimes interactive, architectural displays of urban screens, public projections, and media façades — function as a critical spatial practice in so-called “smart cities,” and thus represent a new “new monumentality,” a necessary update to the theories of early twentieth century thinkers and makers from the Congrès International d’Architecture Moderne (CIAM) and the Bauhaus, — one that explicitly foregrounds equity and inclusion? Throughout this paper, I will unpack these terms and develop a theoretical framework through which to view media architecture as a critical spatial practice, namely through discussions of monumentality and the history of expressive architectural displays, more recent discussions of relationality and “geomedia” in the “media city,” and hybridity with respect to ubiquitous, networked, mobile interfaces. I will then apply and illustrate these concepts through case studies which anchor three distinct categories for media architecture as critical spatial practice: Firstly, through temporary activist interventions such as the work of The Illuminator’s guerilla projections; secondly, through the treatment of highly visible and iconic structures and monuments such as the Ryerson Image Arts Centre in Toronto as permanent media channels for the public display of diverse causes and concerns; and thirdly, through the organization of grass-roots tactical actions such as the #WeLiveHere2017 project at the Waterloo council housing estate in Sydney. Throughout, I argue that media architecture offers a broad range of expressive and structural tools for the critique and reconstruction of collectivity, power, and meaning, and is crucial in developing new approaches to monumentality that address important contemporary issues such as housing, poverty, indigenous rights, climate change, and discrimination. To develop a critical spatial practice of media architecture, cities and citizens must see media architecture as core elements in a contested and ever-evolving public sphere of experience, emotion, and ideology, and stakeholders must develop forms, skills, and attitudes that support diverse and equitable access to the making and experiencing of media architecture.

MEDIA ARCHITECTURE AS CRITICAL SPATIAL PRACTICE

... art, as a form of critical spatial practice, holds a special potential for transforming places into spaces of social critique.

Architectural designer, historian, and critic Jane Rendell highlights the latent potential within architectural sites for social critique and the unique position that art holds as a catalyst. The concept of critical spatial practice aligns with a reconsideration of a number of binaries and divisions that are
spatial, temporal, and social, and something that media architecture may be well suited to addressing. The concept of critical spatial practice can also be related to the “media city” and “gemoedia” as outlined by media theorist Scott McQuire, thus bringing us closer to an understanding of the connections between critical spatial practice and media architecture. Building on Lefebvre’s foundational work on the social construction of space, McQuire exposes the ways that media technologies are central in the dynamic production of contemporary urban space. He notes that media such as film, newspapers, and more recently, mobile media and media architecture, are involved in “binding affect and cognition to space” in ways that are relational, that is, in ways that are both contingent and ambivalent, creating spaces of attraction and distraction, connection and disconnection. Advances in cities and how space is managed and socially constructed through technology provide new challenges and possibilities for critical spatial practice through media architecture. These principles also characterize what has been called the “smart city,” which has been defined as “constellations of instruments across many scales that are connected through multiple networks which provide continuous data regarding the movement of people and materials.” Examples of elements of smart cities include wifi and infrared sensor equipped light posts gather information about people and devices that pass by, aiding in urban wayfinding, traffic management (particularly with the advent of driverless vehicle technology), and “smart” trash bins that optimize sanitation services. The overall goals of smart cities and their attendant technological constellations of sensors, monitors, relays, and screens, is to create efficiencies, thus reducing costs and decreasing urban frictions and challenges such as traffic congestion, pollution, and disorientation. Smart city critic Adam Greenfield asks, “How might we leverage the potential of data-gathering, analysis and visualization tools to improve a community’s sense of the challenges, risks, and opportunities facing it, and support it in the aim of autonomous self-governance?” As dense transfer points for data, analysis, and visualization, similar questions might be posed of a critical spatial practice of media architecture. An understanding of the hybridity and relationality of space that media architecture exhibits is central to Eric Kluitenberg’s claim that public space today is a “hybrid monster,” and something that a contemporary concept of critical spatial practice must consider. He argues that publics in real space (crowds and individuals) need connections to the Internet, but just as importantly, Internet publics need connections to real space. To break the isolation and ghettoization of the Internet (ie. “filter bubbles”), virtual publics need to get outside. Towards the ends of inclusion, they also need to find expression in the messy physicality of the street. Similarly, real publics need network access in order to be included in the hybrid monster that is the contemporary public sphere. It is for these reasons that media architecture may be well suited to bridging the gap, performing as a public onramp for the messiness of the street to enter the clean media interfaces of the online world, and a release valve for the immense pressure produced by torrents of digital data, making these apparent in relevant physical contexts.

An appreciation of critical spatial practice through media architecture may benefit from historical grounding. Reacting against what they saw as stoic and stuffy monuments of pre- and early-modernity, Sigfried Giedeon, in his Nine Points on Monumentality written with fellow members of the Congrès International d’Architecture Moderne (CIAM), first proposed the idea of a “new monumentality” in 1944 which would be comprised of sites for “collective emotional events, where the people play as important a role as the spectacle itself, and where a unity of the architectural background, the people and the symbols conveyed by the spectacles will arise.” Presciently, their proposals imagined that “During night hours, colour and forms can be projected on vast surfaces for purposes of publicity or propaganda.”
Does a new “new monumentality” via media façades, urban screens, and public projections, materialize such visions and ideals presented by modernist thinkers such as Ebeling, Moholy-Nagy, and Giedion in today’s smart cities, and thus represent a viable site for critical spatial practice? Questions as to who, why, and how this is performed remain, and will be the subject of my inquiry into the potential for media architecture to be a critical spatial practice that addresses issues of inclusion and equity via three case studies that follow.

SHINING A LIGHT: TEMPORARY ACTIVIST INTERVENTIONS


On the two-week anniversary of the Occupy Wall Street (OWS) movement, Brooklyn based artist, educator, and activist Mark Read led efforts to present what has come to be known as the Occupy Wall Street Bat Signal on the Verizon Building in New York City.26 Projecting the “99%” symbol and other messages related to the ongoing global resistance to austerity and the demand for infrastructure improvements and jobs, popularly referred to as the Occupy movement, Read, along with a number of activists, filmmakers, and citizens, helped to address and galvanize a 20,000-strong crowd participating in a march across the Brooklyn Bridge and capture wide-spread media attention by projecting large, high-contrast text on a towering, concrete structure.

Figure 1. The Illuminator, OWS Bat Signal, 2011, projection. Source: Image courtesy of The Illuminator.

The success of the OWS Bat Signal encouraged a number of the participants in this action to come together to form The Illuminator, an art-activist collective comprised of visual artists, educators, filmmakers, and technologists living and working New York City.27 A built in focus on equity and inclusion makes the work of The Illuminator a prime example of how media architecture can be deployed as a critical spatial practice. Just as Rendell28 notes that critical
spatial practice “holds a special potential for transforming places into spaces of social critique,” large-scale public projections that juxtapose anti-capitalist messages on the soaring façades of global capital and anti-xenophobic messages on the surfaces of government buildings augment and support social critique. Through the use of hashtags and references to other locations engaged in similar actions (ie. OWS’s listing of multiple cities and countries) the work of The Illuminator also seeks to open up temporal and social dimensions that acknowledge and engage the hybridity of contemporary public space and translocal, pan-urban concern.

This form of media architecture demonstrates an understanding of the “hybrid monster” that is contemporary public space and an acute sense of the power that remains to be exploited within bricks-and-mortar monumentality coupled with online structures. In these works, the messy physicality of the street is amplified and mirrored by the ephemeral, provisional projections which make explicit reference to wider online publics organized by terms of engagement that appear too large, literally and figuratively, to be silenced or contained.

We might also count temporary activist interventions of The Illuminator as a much-needed update to the concepts of Giedeon et. al’s “new monumentality.” These works seek to create a “collective emotional event” where people, symbols, and structures are unified through ephemeral light. Unlike these thinkers, the efforts of The Illuminator go beyond general aesthetic shifts and address specific social and political issues of inequality and exclusion such as gentrification and racism. That said, although the work of The Illuminator reinserts marginalized voices into the public sphere, the impermanence and guerilla nature of the work means that these remain temporarily visible both on and offline. While temporary activist projections provide necessary fissures in the pervasive private fabric of public space they run the risk of turning oppositional and radical politics into temporary entertainment for protesters with little long term gain to be had. Permanent public platforms, monuments, and iconic buildings that embody the concerns of equity and inclusion from the ground up may be required to more effectively and sustainably challenge power through light and architecture.

**MASS MESSAGES: PERMANENT, ICONIC MEDIA CHANNELS**

*Infrastructure is proposed as a gathering force and political intermediary of considerable significance in shaping the rights of the poor to the city and their capacity to claim those rights.*

We might extend urbanist and geographer Ash Amin’s quote regarding more traditional forms of infrastructure such as roads, pipes, and wires to include the expressive infrastructure of media architecture. A similar discussion that considers the rights involved in their construction and use, as well as their roles as political intermediaries is necessary as media architecture becomes more ubiquitous and connected in and through smart city infrastructure. Expressive architectural surfaces on buildings that are central to communities, cities, and regions, should be considered within a politics of representation and use they engender. It is with this in mind that I have engaged in a research-creation project aimed at creating a permanent, iconic media channel via a media façade (a programmable and expressive lighting system incorporated directly into the fabric of a building) as a form of critical spatial practice.

The Ryerson Image Centre and Ryerson School of Image Arts building (RIC/IMA) lies at the heart of Ryerson University’s campus in the centre of downtown Toronto, Canada. In May of 2009, the building underwent extensive renovations which included the installation of a media façade consisting of 1400 LED light modules mounted on custom brackets behind 727 3’x8’ translucent glass panels. By the time of its completion in the fall of 2012, the once unremarkable exterior of the building had
become a translucent, glass cube during the day and a glowing, animated multi-colored beacon at night. For the first few years of its existence, the building ran primarily on “screen-saver” mode: it simply displayed school colours (blue and yellow) and ran pre-programed shows for holidays like Christmas, Easter, and Canada Day. As a student at the school at the time, I sensed an acute lack of citizen and student involvement in this important iconic symbol of the school and the community. Given that there was no formal mechanism for interfacing with the lights, directly or indirectly, the community was left to simply marvel at the sight of it and wonder how it all worked. After investigating further, and pitching to various stakeholders at the school, I established a protocol that would allow members of the Ryerson community to request changes to the colour of the RIC/IMA building to highlight important events and causes of their choosing.\footnote{33}

Since the fall of 2016, lighting requests submitted via a website have been evaluated by a panel of staff and student representatives based on the timeliness (how the proposed date of the lighting proposal is relevant), tie-in to community events (whether the lighting request compliments community functions), and inclusivity (whether the lighting request supports the promotion of inclusivity and diversity). The focus on time and site specificity, and well as the explicit goal of inclusion, make this an example of, or at least an attempt at, creating a work of media architecture as a critical spatial practice. Examples of lighting requests have included local, school related events such as awards ceremonies and sporting events, but have also included special lightings to support on-campus protests related to issues of national and global significance such as Tibetan Uprising Day and Trans Awareness Month. In November of 2016, RyeLights collaborated with Shades of Our Sisters, an exhibit and online experience created by the families of Missing and Murdered Indigenous Women.\footnote{34} The project was aimed at sharing “the memory of loved ones and what the loss of their life means” to a wider public. For three nights, RyeLights glowed red in honour of Missing and Murdered Indigenous Women, Girls, Transgender, and Two Spirited People in Canada (MMIWGT2S). Light pulses on the building indicated when the hashtags #MMIW #MMIWGT2S and #MMIWG were used on Twitter. Thus far, RyeLights has attempted to transform this once inaccessible and primarily ornamental building into a space of social critique. With the integration of social media, the building has become a hybrid interface that, albeit temporarily, writes previously marginalized voices into the fabric of the city and does so not through an unsanctioned, provisional projection, but through an official and
complete transformation of a buildings façade. This creates a closer coupling with traditional concepts of monumentality, which see iconic buildings as condensers of memory and ideological meanings, but also with the “new monumentality” concept which envisions structures and spaces that reflect the collective emotional life groups and individuals. Taken a step further, RyeLights might be seen as an example of a new “new monumentality” as it begins to explicitly address issues of inclusion and equity in its core criteria and function. Despite its advantages, permanent iconic structures and buildings as media channels for inclusion and equity are hampered by obfuscating and inaccessible technological systems that make direct community control difficult without specialized training and bureaucratic clearance. Political and technological barriers remain particularly strong inhibitors to the development of permanent, iconic media channels as a critical spatial practice. Nonetheless, this form holds great potential and promise as an element of a truly smarter city.

WE LIVE HERE: GRASSROOTS, DO-IT-TOGETHER MEDIA ARCHITECTURE

The act of lighting up the towers signals that lives are lived here, illuminating the often overlooked human dimension.\(^\text{35}\)

When considering media architecture as critical spatial practice, how someone can speak is just as if not more important than who can speak. In the case studies of temporary activist projections and permanent, iconic structures, the “how” has been mainly controlled by a few gatekeepers that, while sympathetic to the overall goals of critical practice in urban media, stop short of handing over the means of production to diverse groups and individuals.

This was not the case with the #WeLiveHere2017 project in Sydney, Australia. The Waterloo Public Housing Action Group with the help of creative producer Claire Lewis worked with the residents of the Matavai and Turanga towers to organize the distribution and installation of hundreds of multi-colored LED lights strips in the buildings’ windows as a protest against the impending eviction of over 4000 residents as part of the city’s urban renewal plans.\(^\text{36}\) In total, 234 of 480 windows were lit up every night, from September 9 to October 1, 2017, each with its own distinct colour and rhythm selected by the residents.\(^\text{37}\)

Figure 3. #WeLiveHere2017, Waterloo Public Housing Action Group, LED light strips. Source: Image courtesy of Waterloo Public Housing Action Group.
Even at this early stage, #WeLiveHere2017 represents a rare and unique example of critical spatial practice through media architecture and a truly new “new monumentality” that respects the intelligence and wishes of citizens in the smart city. It presents a collective emotional response from the coordinated, individual efforts of marginalized citizens and does so through expressive lighting that recognizes the hybrid nature of monumentality and public space. That said, since the redevelopment project is still scheduled to go ahead as planned, questions regarding the efficacy of such efforts remain. Most notably, although residents were involved distributing, installing, and individually selecting when and how to display their lights, they were not given any tangible skills or experience with the technology they were using that might empower them in other parts of their lives. Opportunities for workshops in coding, using social media, and documentary film were missed in this instance.

Regardless, #WeLiveHere2017 has transformed the site into a space of social critique. A low-cost, community-based, temporary, grassroots creative action has helped people claim space and, hopefully, catalyzed gradual, long-term change, both for the way marginalized people are treated in the rapidly developing smart city, but also how they are given opportunities for meaningful and powerful self-expression through media architecture.

CONCLUSION

Media architecture can function as a critical spatial practice in smart cities and thus represent a new “new monumentality” that fosters equity and inclusion through temporary activist interventions such as The Illuminator’s OWS Bat Symbol, permanent, iconic media façades as channels for community engagement such as the RyeLights program, and grassroots, do-it-together tactical actions such as the #WeLiveHere2017 project. These works demonstrate the potential for media architecture to transform places into spaces of social critique and bind affect and cognition to space. To various degrees, they turn buildings into geomedia, thus making them more like everything else in our digital/physical environments: hubs for place-specific data, well suited to real-time feedback, and location and context aware. To various degrees, they use these qualities to translate the ever-shifting emotional and political experiences of citizens into equally ephemeral, relational, and emotional displays through light, architecture, and digital networks.

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LOST URBAN CONDITIONS OF HONG KONG: THE INFRASTRUCTURAL SPACES OF THE MEI FOO HOUSING ESTATE

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INTRODUCTION

This article investigates the "Lost" urban conditions of Hong Kong, exploring how under-used infrastructural spaces can become integrated into everyday community life. It takes the Mei Foo housing estate as an example, analyzing the inhabiting activities within infrastructural spaces as well as representing how the residents engage directly with the existing environments without the participation of architects and planners. The objectives of this article are to learn from the infrastructural space condition of the Mei Foo housing estate and show the latent potential of inhabiting urban by-product spaces. The present problems affecting the infrastructural inhabitation will be described, establishing suggestions for future development of the infrastructural spaces.

Lost Urban Condition

Due to rapid urbanization, urban space becomes a scarce resource. When many architects and urban planners seem obsessed with building new environments to confront increasing demands for living space, the residents have found the alternative solution to solve the scarcity of space from their existing surroundings. We rarely pay enough attention or realize these existing space resources around, and they are neglected by architects and urban planners over many years (Trancik, 1986). Literally speaking, a large number of hidden spaces are situated in urban areas but in “lost “conditions, what we would refer to as “lost urban conditions."
Hong Kong density
Hong Kong is a city renowned for its extremely high density, located on the south coast of China. Today, Hong Kong’s population stands at 7.43 million and is one of the most densely populated areas in the world. The massive flow of immigrants and the baby boom in the post-war period are the major factors contributing to Hong Kong’s population growth. As a result, Hong Kong is confronted with a severe deficit in living space for its city residents. An example of this high density is the average living area per capita of Hong Kong’s subdivided flats is only 47.8 square feet, is barely larger than a table-tennis table measuring 9 feet by 5 feet. Hong Kong residents also enjoy less open space on average which just two square meters per person, the same as the size of a coffin or a toilet cubicle.

Infrastructure Spaces in the City
Hong Kong has enjoyed solid economic growth over the past decades supported by the vast construction projects for its infrastructural system. A necessary part of the development associated with a growing population, the Infrastructural network occupies large area portion of the land. There are around 1,300 flyovers located in the urban areas of Hong Kong, crossing in-between lots and connecting different districts. As a by-product, they create the huge amount of open spaces underneath. Such open spaces below the roads have great potential within the dense urban area. However, today few people would like to inhabit in such spaces because of its issues with noise pollution, poor air quality, and darkness. Only a small portion of these infrastructural spaces become places for storage or used as bus terminus, mostly become wastelands.

Mei Foo Housing Estate
The notion that these spaces are seen as negative is not the case in the Mei Foo housing estate. Mei Foo communities take advantages from these apparently redundant infrastructural spaces by transforming the negative environment into positive space in order to connect the residents to a series of community amenities. The Kwai Chung Road is the main connection between Tsuen Wan and Kowloon and was built in the 1960s. Bisected by the road, the Mei Foo housing estate accommodates approximately 50,000 residents in 99 identical towers, which built on forty acres of land reclaimed from the harbor (Rosen, 1976). With the growing demands from the residents, the Mei Foo communities realized the potential of the open spaces below the Kwai Chung flyover and spontaneously reclaim the residual space for years. The lands under the flyover were soon borrowed by the communities and placed by various amenities. This infrastructural space bisecting the Mei Foo housing estate has been efficiently engaged by the residents every day.

LITERATURE REVIEW
The Definition of Terrain Vague
According to Roger Trancik, ill-defined, undesirable urban areas have been created in the cities due to the process of urban development treats the building as isolated objects which resulting in the urban fabric lacking connection with its surrounding environments (Trancik, 1986). These spaces are geographically within the urban landscape but neither included in the scope of the city planning nor making the positive contribution to the surroundings. Scholars and professions have defined these spaces in varied terms, such as Wasteland (Lynch & Carr, 1990), Lost Space (Trancik, 1986), Derelict Land (Kivell & Hatfield, 1998), Superfluous Landscape (Nielsen, 2002), Vacant Land (Northman, 1971), and Terrain Vague (Sola-Morales, 1995).
The concept of “terrain vague” was first theorized by the architect and urbanist Ignasi de Sola-Morales and has been widely applied to different fields since the mid of the 1990s. In the paper of “terrain vague,” Sola-Morales denotes the empty, abandoned space in which a series of occurrences have taken place by the French expression “terrain vague” and proposed that these spaces within the city fabric were portions of cities that offered evocative potentials of free, available and unengaged exploitation. Taking the definition of terrain vague as a space of possibility, Sola-Morales goes on to discuss how should we treat these enormous existing voids outside the urban system. In his opinion, instead of violently transforming the void into the built, we should preserve the positive alternatives of the residual spaces to “maintaining its continuity in time and space” (Sola-Morales, 1995). Because these residual spaces are “mentally exterior in the physical interior of the city” (Sola-Morales, 1995), they are secure spaces for play. The freedom and accessibility allow the residual spaces to act as a stage for diverse social activities which rarely tolerated in designated public spaces.

The Practice of Everyday Life

For conceptualizing the everyday practice as acts of appropriation, a French Jesuit and scholar Michel de Certeau has developed a theoretical framework for describing how the “ordinary users” take tactics to misinterpret the given orders and turn it into opportunities for satisfying their real needs. He gives special attention to strategies of manipulating meaning and “way of operation” in various areas of activity in his book The Practice of Everyday Life.

Furthermore, Michel de Certeau applies his investigation in the urban fields and cites a statement by Erasmus “the city is a huge monastery” to represent the immobile state of today’s city. According to de Certeau, the concept of the city is considered to be a field regulated by local authorities, continually applying orders to the “ordinary users” in their everyday lives. However, as the dominated actors, the “ordinary users” have tactics to open up the space possibility from the highly programmed conditions. Because of it, they can find the real experience of the city through inhabiting in residual spaces. In de Certeau’s regards, the city is constructed on the basis of a finite number of stable, isolated buildings and properties, and on the other hand, it unintentionally makes room for residual spaces allowing the ordinary users to practice and turn the spaces into their advantages.

Hong Kong Conditions

Hong Kong is known as a city with kinetic reality and extreme density. “More than a city,” CUHK professor Peter W. Ferretto considers Hong Kong as a condition collectively generating a form of local way of adapting to the given conditions. In his paper Chasing Ambiguous Coexistence, Ferretto identified how the residents dwell in the problematic situations through portraying a series type of urban inhabitations of Hong Kong, proving the way of adapting can be classified as a form of “urban dialect.” As he states “Inhabited urban conditions are a form of urban dialect, indigenous to the area. These conditions reflect quotidian occurrences and at the same time present fragile temporality” (Ferretto, 2016).

Therefore, one should never take any condition for granted concerning how people inhabit spaces in Hong Kong. Every type of inhabitation seems reasonable only because it is formed by specific environments and embodied in the everyday situations. To understand the Hong Kong conditions, we should look at how residents adapt to the given circumstances, differentiating themselves from the standard language and transforming the negative environments into positive by applying their tactics on the site.
THE TRANSFORMATION OF THE INFRASTRUCTURAL SPACES
From the Urban Voids to the Functional Spaces

Located in Kowloon district of Hong Kong, Mei Foo housing estate was built on forty acres of reclaimed land. The Whole area was covered by the trees until in 1965 when it announced to develop a housing estate on the site (Rosen, 1976). At the same time, the Kwai Chung Road Flyover was constructed together with Mei Foo housing estate, bisecting the estate into two.

All the lands under the flyover are the government’s properties. The Mei Foo community spontaneously borrowed the lands from the Hong Kong government and took it for conducting public events. As the infrastructural spaces have sufficient width and height to locate small buildings, the Lai Wan Market was first installed in 1990 housing 42 stalls. Since then, the open actions are held annually by the Food and Environmental Hygiene Department of Hong Kong, renting the stalls to the local retailers. Besides the market, a signature project is underway to construct an activity center where holding events and offering services to the Mei Foo residents in the future. Both of these two projects are permanently permitted by the government while some other lands were lent to local charities only for temporary uses, such as the Elder Health Support Center and the Farm Fest market where the elders could take health cares, and local farmers sell organic products at the weekend.

According to the renting regulations, the place owners take the responsibilities for the security and cleanliness of the spaces under the supervision of the government. The using of the infrastructural spaces is generally restricted and only complying with the requirements of public facilities. However, the lending policy in Hong Kong provides the opportunities to the local communities for reinventing the by-product spaces. Finally, the spaces under the Kwai Chung Road have been transformed into many designated independent places situating one next to another and no longer void after the reclamations.
Inhabiting in the Infrastructural Spaces

Today, the infrastructural spaces have been occupied and tightly bonds with the Mei Foo neighbourhoods. The use of the spaces is very diverse. As an example, the pedestrian spaces cross under and run alongside the Kwai Chung Road, are used as pedestrian walkways connecting the Mei Foo housing towers with the bus terminus. The flows of people pass through the spaces in working days while lots of domestic foreign helpers occupy it for group gathering at the weekend, dividing the spaces into separate sitting areas for setting up picnics.

Also, some spaces are freely accessible and carry out multiple functions based on the needs of different users. For example, the corner situated at the edge of the flyover offers up a semi-private space welcoming people to take seats for having their lunch. When it comes to afternoon, many middle-aged residents like sitting in the corner and play cards. After they left, the corner becomes a perfect outdoor party area, gathering many young people at night.

The spaces below the Kwai Chung Road flyover are heavily used in combined manners. Some spaces are used with certain functions, like the markets, the activity center, and the elder health care center, which are built on the site and strictly administered by the Hong Kong government. Other spaces include the pedestrian spaces, open plazas and small corners which are used in alternative approaches and allow people to play all the time.
CONCLUDING REMARKS

Learning from the infrastructural spaces of Mei Foo housing estate, it provides the perfect example to prove the high value of urban residual spaces and shows how people find opportunities to adapt to the problematic environments. Through studying the case of Mei Foo, we recognized much space resources locating in the urban areas of Hong Kong, are waiting to be activated. These residual spaces will contribute large values to release the urban dense and offer many public spaces to improve the living quality of the residents.

The scarcity of urban spaces is not only the issue for Hong Kong but many highly engineered cities. Inspired by Mei Foo, reclaiming the urban residual spaces can be beneficial to have sustainable development of cities in China, decreasing environmental pollution from the mass constructions. Meanwhile, it had better seek the space opportunities from the existing environments since lots of by-product spaces have been constructed and wasted during the process of the modernization in China.

The lending policy of Hong Kong offers opportunities for inhabiting in the urban residual spaces. However, it decreases the space flexibilities through applying the organizational system on the site. Following the government regulations, the opening hours are limited for all buildings and facilities, resulting these activated spaces cannot be fully used by the residents. Because of lack of enough light, few people would like to stay longer in the spaces under the flyover when it gets dark, leaving amounts of infrastructural spaces vacant at night. Also, over six feet height fence or walls enclose each activated space, making the areas in between the structures rarely be used due to its irregular shapes.

As a result, it causes many small spaces were wasted during the process of reclamations. Even though it has been activated by local communities, the usage efficiency of the infrastructural spaces is not as good as expected and the problems of the lighting and waste are eager to be solved. It is evident that the infrastructural spaces of Mei Foo housing estate are in need of better utilization and further activated under the professional guidance. Since more than 50,000 Mei Foo residents have significantly benefited from it so far, we could foresee the space future after it being redeveloped by architects and urban planners. In conclusion, these urban residual spaces deserve more attention from the architectural scholars and professions, expecting to be highly effective and livable places after the further reclamations.

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THE PROJECT IS PRESENT: MINIMAL ART AND ITS CONTRIBUTION TOWARDS THE DEFINITION OF A NONREPRESENTATIVE ARCHITECTURAL MEDIUM

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INTRODUCTION

Political clash is entailed in every architectural project as the opposition between the designer's normative role with regard to future occupants and the attempt of these latter to fulfill their specific needs. Nevertheless the present paper argues that this gap cannot be bridged through the engagement of affected subjects during project conception, because their needs, especially in the case of complex projects, are divergent and contingent: they cannot be met on paper but only in situation. Therefore future occupants' contribution to the definition of the project must be promoted directly during its situated fruition in terms of the inventive uses they are allowed to enact.

Architects must adopt new tools addressing the realm of sensation rather than representation if they want to consider the project as defined through situated fruition rather than during its abstract conception. Indeed representation is information prepackaged by the architect who expresses his particular viewpoint in a transposed moment with respect to the scenario he addresses, thus missing both the contingent and plural characters of fruition, which are instead met by sensation, i.e. raw physical stimuli expressing no single viewpoint and occurring alongside the event which physically stimulates the occupants.

The nature and usability of such tools addressing sensation is the research focus of this paper: which media can represent, or better present, the sensory dimension where uses arise? This question is better answered in the artistic domain, especially in Minimal Art. Robert Irwin provides us with a model describing the production of representations from sensation which will be used for understanding how to invert the process in order to address sensation directly. Nevertheless the adoption of concepts derived from artistic practices in the architectural field requires a disciplinary adaptation which will be discussed in the conclusion.

Dealing with Occupancy through Representation

Architects make decisions from their single perspective and in a transposed moment with respect to the fruition of the project, so that future requirements are identified once and for all with regard to a fictional subject modeled by the architect. On the contrary, occupancy concerns specific subjects engaged with the project here and now. This gap can lead to unfitting occupancy practices, especially in the case of complex projects where preordained requirements can hardly be defined because of the large scale and long term involving a plethora of present and future subjects.

Representative tools adopted in the architectural field are not able to deal with specific and situated occupants. Indeed through representation the architect freezes flowing reality into persisting states, thus missing the situated character of fruition, and moreover he selects those frozen states as desired
by himself, thus missing its plural character too. Even when the architect cooperates with stakeholders in the framework of participatory practices, decisions take into account only present stakeholders and their abstract rather than situated perspective. The opposition is not between architects and occupants, but between reality and its representation.

Which tools can address reality if representation is not a viable solution?

The answer to this question must follow a deep inquiry into the nature of reality before it is represented and the way an idea of reality as such redefines the field of intervention for architecture.

**The Architectural Return to the Real: a Definition**

Representation deforms reality as perceived from a subjective viewpoint frozen in time. But what is reality before it is perceived?

Traditionally, reality before perception is considered a sort of darkness from where things can be rescued by the consciousness of a subject working as a beam of light. Whether the beam is radiated by an absolute reason as stated by Idealism or whether it is powered by the anchoring of the subject in the world as stated by Phenomenology, light is always on the side of consciousness. Actually, these theories must be reversed, because consciousness does not work as a beam of light, but rather as a black screen impressed by a light which is outside and is reality itself. The function of the black screen is to reduce the blinding light stimulating perceptual organs into meaningful information for the subject. Meaningfulness is therefore subjective and consists in the identification of objects as targets for subject's action and in the identification of persisting states the subject desires for those objects and wants to achieve through the action. Instead reality before perception, as radiating light, is a chemical-physical continuum which cannot be divided into objects and which cannot be partially affected, so that it lacks any inherent request for action, the determination of which is left to subjects.

In short, reality before perception is flowing-matter received as sensation by the subject, who later splits it into objects and persisting states through representation in order to guide his action.

What would a return to the real mean for architecture?

First of all, since reality at the interface with occupants is sensation, it would mean the foundation of an aesthetic regime of architecture. From an operative point of view, the project would no longer concern the composition of objects, but the distribution of chemical-physical events, potentially stimulating a subject occupying a location in the environment. Moreover, while the composition of objects is confined to objects themselves, the chemical-physical distribution engages all the external factors, even the ones out of the control of the architect. Finally, the distribution is influenced by external factors in its turn, so that it is continuously regenerated in terms of a qualitative transformation of the whole. On the contrary, objects are influenced as objects by external factors only during their conception, on the basis of the aspects the architect considers significant for the project, but then they persist unvaried during their lifespan.

**TOWARDS A NONREPRESENTATIVE MEDIUM**

What kind of tools can address this new architectural field of intervention?

Architectural tools based on representation are unable to work with the project in terms of chemical-physical distribution because they deal with a version of reality already processed into information depending on designer's objectives.

What are the alternatives to representation and its mediated relationship with reality?

Rancière identifies three kinds of relation between reality and the sign referring to it: the ethic, the mimetic and the aesthetic regimes.
These different regimes propose reality more or less processed towards information. As information is processed, reality is substituted by increasingly fictional reproductions, so that the way these fictions refer to the original must be agreed upon in stricter and stricter ways to be comprehensible in the context of a community.

The ethic regime substitutes reality with meanings it is supposed to automatically elicit in the context of narrow cultural or disciplinary groups on the basis of conventions. The sign carrying these meanings refers to a connoted version of reality and it does not recall its observable characteristics. Instead the mimetic regime, which is actually the representative one adopted in architecture, substitutes reality with objects which are recognized in the context of broader communities on the basis of members' previous experiences with their properties. The sign conveying objects refers to a denoted version of reality the properties of which are recalled by the properties of the sign. Finally, in the aesthetic regime the sign does not substitute reality, it rather partakes in it as producer of stimuli. It is therefore accessed raw by the subject who can subsequently process it on his own: this is the reason why the aesthetic access to reality is considered private.

The aesthetic regime constitutes the most suitable condition for a medium intended as operative tool for an architectural return to the real. The medium as producer of stimuli is included in the continuum and it is therefore affected by the same issues related to the project as chemical-physical distribution, especially in relation to its dependence on external factors and to its continuous regeneration. This dependence of the aesthetic medium on the environment and vice versa is what makes it differ from the representative one. Indeed while the latter concerns communication of information existing only as a mental fact, the former concerns the production of chemical-physical events having consequences on the environment where it is displayed.

Such a kind of medium has never been adopted in the architectural practice, but Minimal Art can provide many examples.

**The Representative Concern in Minimal Art**

Minimalist artists shared the concern about the relationship between representation and reality. Robert Irwin unequivocally formalized it into a model explaining how representations are produced starting from stimulation. Representations are arrangements of meaningless perceptions into structures of intelligibility. To Irwin, the concern is that these structures are established in advance on a cultural or disciplinary basis and acquired by the subject so that they become unconscious lenses mediating between the subject and reality: "we do not begin at the beginning, or in an empirical no-where. Instead, we always begin somewhere in the middle of everything." He also answers a question that could arise when the mimetic regime of the sign, which is convincing in the way it refers to reality, is claimed to be a construction: why is the observer unaware of its abstractness? To Irwin the answer lies in the fact that abstractions are compounded, i.e. they are developed and taught over a so long period of time and through so imperceptible steps that they become second nature for the observer. The conclusion is that the only thing which is real, and as such must be the subject matter of art, is perception before any operation of abstraction.

Irwin's model is a sequence of abstraction levels which parallels Rancière's categories in the way these levels refer to reality according to rules which become stricter and stricter as they are shared in the context of increasingly specialized cultural or disciplinary groups: "it is indeed the fact of the contextual nature of experience which will allow for the further compounding of the abstraction." To Irwin the purpose of art is to reverse the abstraction process described by the model, that is to pass from what has been previously defined the mimetic regime to the aesthetic one.
From Theory to Practice: Presence of Modalities and Presence as Difference

From an operative point of view, the first step taken by Minimal Art towards an aesthetic regime of the medium in general and painting in particular is to cross the limits of the frame separating the side where the observer stands from an imaginary beyond. The content of the painting is a pure mental fact or representation when it is beyond the frame, because it has no chemical-physical consequences on the other side. The content must rather cross the frame and become present in the space of the observer to affect it in an aesthetic way. In Minimal Art this crossing occurred by degrees.

At the beginning, the support is emphasized, because it is the only thing which is actually present in the environment of the observer. The content is consequently arranged as the geometrical subdivision of the support, in order to be considered part of it and therefore present in the environment in its turn. Of course the classic rectangular form of the support offers limited possibilities of subdivision, and even if supports characterized by different shapes can be adopted, at the end the exploration of the single plane is exhausted and has to give way to the exploration of the three dimensions. Nevertheless three-dimensionality does not mean sculpture: while sculpture represents something else through a correspondence of properties, this new medium stands for itself as producer of stimuli. It achieves this goal through wholeness, singleness and indivisibility, which prevent the identification of parts and their possible representative and meaningful relationships.

But what is the usefulness of media which are present rather than representative? First of all, they reproduce experience in terms of modalities, or at least they offer the illusion of these modalities. For instance, when Tony Smith wants to convey his experience of a car ride taken at night on an unfinished turnpike, he claims that there is no way to frame it and that every painting would result too pictorial: the only way to understand it is to experience it. The solution is to reproduce the modalities of its experience, such as "the constant onrush of the road, the simultaneous recession of new reaches of dark pavement illumined by the onrushing headlights, the sense of the turnpike itself as something enormous, abandoned, derelict." Secondly, the subject matter of such media can be the difference they produce in the site due to the fact that they are absorbed in the chemical-physical continuum. Indeed they influence, and are influenced by, the external factors of environment, and difference is a measure of this influence. More exactly, since in the continuum no parts are recognizable, the medium cannot even be distinguished from the environment, it cannot be accessed as something present, but as difference as such. From this perspective, difference is not only a measure of the effects, but the detector of one thing which is not perceivable as an object. On this topic, Light and Space current of minimalism is a model in the way it uses transparent prisms which are mainly noticed as light effects.

CONCLUSION: THE ADOPTION OF NONREPRESENTATIVE PRACTICES IN ARCHITECTURE

Minimal Art addresses the same architectural concern of a return to the real. In particular, it provides some operative ideas to deal with reality as flowing-matter, first of all in relation to the fact that the work of art is extended to the environment and secondly in relation to the fact that it is continuously regenerated. The result is that the object disappears, and the only thing which can be observed is the difference produced in the environment and experienced in terms of modalities. But the adoption of these artistic practices in the architectural field raises some methodological questions. What is the relationship between the difference a medium produces in the environment where it is displayed and the difference the project presented by the medium produces in the environment where it is deployed?
The relationship is not direct but based on analogy. By substituting the elements, i.e. the medium with the project and the laboratory with the site, only the properties emerging as relationships between the elements and not depending on single elements can be saved. Therefore the design focus should be the difference induced in the environment as far as these emerging properties are concerned, because these are the values aesthetically presented by the medium and also present in the project.

Moreover, these values are freely discovered by occupants independently of architect's intentions because of the private character of the aesthetic regime. However the architect must adopt some objectives to orient his design process. Which objectives can be pursued by the architect if the project must be defined in its situated fruition by the occupant?

The objective would exactly be the construction of necessary conditions for an active engagement of occupants. The premise is that some conditions of perception are more suitable than others for the processing of individual meanings and requirements based on the situation. In particular, more indistinct and long-lasting the perception, more creative and engaging its processing for the occupant. To Shklovsky "the purpose of art is to impart the sensation of things as they are perceived and not as they are known. The technique of art is to make objects 'unfamiliar,' to make forms difficult, to increase the difficulty and length of perception because the process of perception is an aesthetic end in itself and must be prolonged."  

In a similar way, the purpose of an aesthetic regime of architecture is not to design the way an environment must be known and consistently used, but the conditions for a challenging perception which takes time because of the active engagement of subjects in its processing into their individual knowledge and ends. The result is the same: perception becomes an aesthetic end in itself.

The project based on such a practice is present in two ways. The first one is related to its presence during the design process through the aesthetic regime of the medium, while the second one is related to the fact that during occupancy it is always able to addresses contingency since its uses are enacted in situation: the gap between conception and fruition as well as between representation and reality is bridged.

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SPATIAL UNCERTAINTIES OF EDUCATION REFORM: THE CASE OF HENDERSON-HOPKINS SCHOOL IN EAST BALTIMORE

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Introduction

Deep-seated progressive and traditional beliefs about rearing children, classroom teaching and learning, and the values and knowledge that should be instilled in the next generation will continue to reappear because schools historically have been battlegrounds for solving national problems and working out differences in values.1 — Larry Cuban

INTRODUCTION

The Henderson-Hopkins School in East Baltimore is the civic anchor of a $1.8-billion, 88-acre redevelopment project near the Johns Hopkins Medical Center. From the beginning, Henderson-Hopkins was designed to be “a national model for urban education reform” by advancing specific educational and social priorities.2 It was the deliberate product of a long design process carried out by a coalition of a diverse actors, seeking to facilitate rigorous educational practices and social services. From the school’s placement to its careful programming, these actors sought to address many high-minded objectives, brought to their final articulation under the leadership of Johns Hopkins University, the principal institutional steward of the school. Opened in 2014, the school was celebrated as a product of visionary architecture. But only three years after its opening, The Baltimore Sun reported on the school’s plans to permanently convert some its open spaces into conventional classrooms. Citing declining achievement rates, The Sun suggested, these spaces that were “meant to spark creativity, proved more distracting than helpful for teaching.”3 Architectural Record followed with, “Is design to blame when a school underperforms?”4 The reports invoked the open-plan school debates of a past era, often attributed to architects’ guileless imaginations removed from realities of education. Yet, Henderson-Hopkins was the product of a thoughtful decision-making process involving participation and research—a promising model that all our public institutions should learn from. What went wrong?

HENDERSON-HOPKINS

Launched in 2001, the East Baltimore Development project sought to develop a new biotech-centered expansion near the Johns Hopkins Medical Center and bring jobs to the embattled district. A robust educational initiative and improved housing would attract middle-income families in order to build a mixed-income neighborhood. The project was led by a not-for-profit development company, East Baltimore Development, Inc. (EBDI), which included members from the City of Baltimore, Johns Hopkins University (JHU), Annie E. Casey Foundation (the philanthropic partner), and several community representatives. The project was mired in controversy from the outset due to the use of eminent domain powers, which led to the displacement of 800 residents.5 The demand for biotech space remained lower than the bullish projections. In 2006, when the redevelopment project was at a low point, EBDI adjusted its strategy and
brought in new urban design consultants, who led community workshops for a new school. As the demolished blocks sat empty, these workshops provided the first meaningful openings for the community to exercise ownership of the redevelopment project and shaped the initial ideas for the school.

The initial ideas for the new school emerged through the workshops, in which the nature of curriculum and school operator were widely debated from early on. The neighborhood was suspicious of bringing a national charter school entity. They associated these groups with loss of community control and overly disciplinarian educational practices. Instead they preferred a ground-up, customized approach in establishing the school and a more open-ended, child-centric environment, while expressing a preference towards expeditionary learning concepts.

These predilections were reflected in the design competition led by EBDI, featuring three architectural firms. The brief placed a strong emphasis on the notion of “personalized learning communities,” where each age group could have a clearly demarcated “house” within the larger school. Each house would have its own “community center” that would contain instructional and dining uses. The houses would offer a great level of flexibility, defined in temporal and spatial terms. The intent was to address long-term and short-term (“on-demand”) changes in pedagogies and learning modalities, and also support various teaching and learning scenarios by offering “spaces of a diversity of sizes, uses, and qualities.”

The winning scheme by Rogers Partners responded to the aspirations of the brief with a horizontal, mat-like configuration. The houses were distinct masses with courtyards in-between, integrated within a unified expression that simulated the scale and materiality of typical Baltimorean blocks. Shortly after the competition in 2011, JHU formally took over the leadership of the school. A team embedded within the JHU School of Education (SOE) would carefully consider all formal and procedural details for the next three years in collaboration with the architects and numerous consultants.

The most evident changes during design development took place in the house layouts. In the final configuration, the commons spaces were significantly more systematized. They were shifted into the by the gaps between the houses and served as connectors to the circulation spine. This revision made the houses diagrammatically consistent but diminished the spatial variety. Another major change was the number of...
enclosed classrooms. In the competition brief, lower school houses included three enclosed classrooms per grade level, enough to house all lower school students. The Rogers proposal followed the brief and, in fact, made the classroom design an important component of the initial design. But in the final scheme, there were fewer enclosed classrooms, making group teaching and flexible groupings a necessity for the functioning of the school. The head of the SOE group believed that the type of personalized learning they desired required moving away from one teacher per one classroom configuration and radically doing away with traditional age-based grading. Certain types of instruction and content delivery could be done in larger groups, while free teachers work with smaller groups organized by ability, evaluated by tracking student development at a granular level using fine-tuned methods of assessment and data gathering.

Figure 2. Looking back toward the Johns Hopkins Medical Campus, March 2016. (Photo by author)

HENDERSON-HOPKINS IN PRACTICE
Converting these ideas into a seamlessly working institution proved elusive. Two years after the opening, a visitor would find signs of how the school struggled to move away from the classroom-based approach. Three commons spaces from 1st to 6th grade had makeshift homerooms defined by temporary partitions. This arrangement also made the utilization of commons a lot more difficult as only a single grade group, as opposed to two, could eat lunch at one time due to constrained space. This required significantly more supervision time dedicated to lunch shifts every day.

Limited group teaching took place for several courses, but not to the degree desired. Flexible learning areas worked considerably better, especially in the upper school. For example, parallel math instruction in three classes, separated by white boards, could take place with little distraction. But, the use of commons was challenging. Small and medium groups, clustered according to reading level twice a semester, used them for 75 and 90-minute reading drill sessions. Surprisingly, the size of the group and the space assignments were inversely proportioned; smaller reading groups tended to get scheduled in the commons while larger groups ended up in enclosed classrooms. In general, most teachers preferred the enclosed classrooms.
FORMAL MANIFESTATIONS OF EDUCATION REFORM

What do we mean by the term “reform”? From the late 19th century on, since it became the primary obsession of American progressives, it represented highly divergent perspectives. For urban reformers it meant weakening machine politics and appropriation of power from the wards to centralize city governance. For administrative progressives in education, it had similar connotations, paving the way for larger districts and school boards. For the pedagogic progressives, it represented concepts such as child-centric education, project-based learning, etc. While the first group of educational progressives aspired for uniformity, standardization, and efficiency, the second group focused on converting the schools into embryonic communities in order to instill democratic values in citizens. And finally, the most recent reform wave dating back to the 1980s has been reactionary in nature, finding its roots in the neoconservative backlash against the New Left, championing traditional methods and basic education.9

Figure 3. A makeshift classroom located in one of the commons spaces, March 2016. (Photo by author)

The so-called “irony” of school reform lies in its historic inability to clearly delineate its efficiency/administrative ideals with its pedagogic/democratic aspirations.10 If, when we talk about progressive education today, we mostly think of soft concepts (child-centric pedagogy, hands-on education, etc.) it is because progressives failed to exert meaningful changes in the structures of public education. How would good pedagogic principles relate with efficient management? How can paternalistic and controlling bureaucratic structures enable the enactment of democratic principles in the school?

Take the problem of classroom. When it was first implemented in Boston, in 1848, the grade-grouped classroom was a major progressive innovation. It also became a sacred domain, defined by the education historian David Tyack as the teacher’s “pedagogical harem.”11 Many urban schools built in the late 20th century, in rapidly urbanizing cities such as Baltimore, disregarded the problem of classroom—size, safety, access needs—rendering a majority of these buildings obsolete.12 By 1901, the classroom grew even bigger to accommodate more students, turning into a major architectural problem as noted by Edmund Wheelwright, who advocated for smaller groups per classroom to ensure better lighting and more efficient structural spans.13 Classrooms became the target of teachers’ unions by the 1920s, pressuring districts to
limit the number of students per teacher by making them smaller. But as activity-oriented education and so-called casual classrooms became the norm in the postwar period, these schools were deemed unserviceable. Finally, by the late 1950s, demographic pressures, a shortage of qualified teachers, and the angst of the Cold War compelled administrative progressives to rethink scheduling and staffing mechanisms, forcing them to question the one-teacher-per-classroom model. In each case, pedagogic reformers and architects were there to provide cover for bureaucratic hawks.

The publication New Schools for New Education of 1960 provides a compelling snapshot of the debates prior to reactionary reforms. The book chronicled a 1959 conference held at University of Michigan, which brought together ten prominent school architects to present illustrative projects in response to the ideas furthered in the Trump Plan, a provocative report prepared under the leadership of J. Lloyd Trump, calling for drastic reforms in secondary education. Trump was an influential educational researcher and a former administrator and became a prominent figure, whose ideas were featured in Time magazine under the title “Trumped-Up School.” The Trump Plan was structured around four primary notions: “reorganization of instruction,” “rearrangement of curriculum and class schedules,” “changes in staffing patterns,” and “more extensive use of technological aids.” He proposed that, the majority of spaces in a high school should consist of large instructional spaces (auditoriums, theaters, cafeterias, study halls, etc.) and individual study spaces (libraries, laboratories, workshops, etc.) where students would spend 80% of their time. Trump thought this approach was not only more efficient, he also claimed it would provide a better educational experience for the students, and allow teachers time for professional development.

The notion of flexibility permeated the architects’ responses, but their articulation of the concept was so varied that the book’s introduction had to categorize them into “expansibility for exterior building changes,” “convertibility for interior changes,” and “versatility to accommodate a variety of functions.” For Bill Caudill, who was the most influential school architect of the preceding decade, Trump’s ideas finally spelled the death of the traditional classroom designed for 25 students and a teacher—what he called, a “box” that needed to be “busted”: “For years the teacher has owned her box and she is not going to like the ideas of giving it up.” When another respondent, Donald Barthelme remained unconvinced and rejected flexibility as “a myth, an expensive dream, a snare, a delusion,” Douglas Haskell—the editor of Architectural Forum—defended the concept, stressing its moral and economic dimensions: “because of competition from the Russians we will not be able to put unlimited resources into new buildings, and therefore convertibility (or flexibility) is a desirable quality.” The disagreement between Barthelme and Haskell show how architects internalized the inherent conflicts and contradictions of the reformist efforts. Increasingly, they would predominantly side with the managerial and efficiency-oriented position; and by the 1970s flexibility would come to be equated strictly with open-plan, at the expense of deliberate internal articulation.

From the beginning, American reformists searched for a deliberate relationship between their educational ideas and educational settings. For John Philbrick in Boston, the classrooms of Quincy school ensured a more efficient way to educate children based on their ability; for William Harris in St. Louis, the school environment was meant to initiate students into the industrial order and discipline; for John Dewey, the lab school was about exposing students to a carefully planned set of activities, for Jane Addams, in the immigrant quarters of Chicago, the school—or any public institution for that matter—was an instrument for reaching out and reforming communities; for William Wirt in Gary, Indiana, the school represented an efficient and massive civic monument that ensured a well-educated work force fit for the corporate industry; and finally for Trump, the school was a tool the maximize the agency of new learning technologies and the
professional teacher. Each of these figures predicated their provocations on the purported new needs of the education of their era, and capabilities afforded by the new organizational methods and technologies. Whether they were motivated by concepts of efficiency or pedagogy, each group based their arguments on cherry-picked scientific justifications that were shaky at best, and rendered highly problematic by conflating moral and pedagogic concerns. As the case of Henderson-Hopkins shows, school design debates are still plagued with such muddled conceptions, uncritically adopted by contemporary reformist movements.

Several education historians and scholars, understood the importance of unpacking the motivations behind the reformist movements. The critical revisionist historians of the 1960s and 70s—such as David Tyack, Michael Katz, and William Reese—noted the importance of the spatial-organizational assemblage for the progressives. The education sociologist Robert Dreeben, in his *On What is Learned in School* (1968) claimed that the organization and structure of public schooling conveyed “its most important messages.”²² Katz agreed and took the proposition further, that most of these provocations were based on teaching of attitudes as opposed to skills to children. While they differed on the levels and merits of control different progressives sought to exert on children, they agreed that reformers changed very little because they inherited the basic structures of public education as givens.²³ Education scholar Larry Cuban agreed with the broader point and proposed the notion of “dynamic conservatism,” where the reforms within the educational superstructure are neutralized through mechanisms of traditionalization inherent to the craft and ideology of teaching.²⁴ This is what he called “the black box of education,” and educators, administrators, and architects are recurrently asked to “crack” or “bust” it.

If architects are going to serve as participants in efforts to improve our educational settings, they need to critically position themselves instead of relying on stale fads. What should we make of the statement from the head of an international educational design firm, who, recently—six decades after Caudill’s declaration that the box was busted, declared that, “the classroom is obsolete”?²⁵ After a series of reformist critiques—counter-institutional, social justice and civil rights, technological, neoconservative, to count a few, and after a century and a half of trying, reformers still need time, and as the case of Henderson-Hopkins demonstrates, their attempts remain tenuous. To be sure, there are compelling attempts, and despite its bumpy start, Henderson-Hopkins is one. There is also an emerging consensus for the increased autonomy of schools, opening the door for new provocations. Nevertheless, as two recent examples of experimental public schools—Design39 School in San Diego, CA and Baltimore Design School—show, despite the calls for novelty and innovation, the new environments of education reflect the overall re-traditionalization of public education.

**CONCLUSION**

Asked about the impact of the building design on the day-to-day lives of the teachers and students, the past principal of Henderson-Hopkins declared, "there had to be a radical change in the way we do things, and this building forces us to take on that challenge." Nevertheless, ensuring overall student experience and achievement goals in a growing school proved difficult, prompting the operators to revise their strategies. It is true that a well-articulated building could serve as a marker of a school’s or district’s ambitions. But do we want those markers to be placed so out of reach that they turn to insurmountable hurdles? Architects need to build a better awareness of how certain material articulations can help institutions to take on and adapt to major changes and experimental schemes. I propose four points in support of endeavors to develop this body of design research.
Architects should document and recover compelling institutional design histories and provocations that have made meaningful differences, in order to “use” them as precedents or “justifying stories.”

Architects should embrace the agency of the teachers with empathy, as opposed to ignoring it while uncritically elevating top-down reform pressures as the only path to innovation.

If we are to follow urban sociologists’ classification of schools as “people-changing institutions,” why should we limit their publics to students? Why not understand the school as a transitional environment, where teachers and administrators are provided with generosity and resources to take on meaningful change through provisional and contingent arrangements, through multimodality as opposed to efficiency?

Every intervention and provocation will lead to a new set of reactionary behaviors. The configuration of schools should accommodate false starts, retreats, and adjustments of strategy, in order to avoid the problem of, what Richard Sennett called, the “brittle form,” where the building becomes operative on the basis of a singular, closed system.

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6 Several observers and researchers claimed that the new school campus idea emerged because the existing school building, Elmer A. Henderson School (closed in 2007), was severely vandalized by 2008. This is not the case; as early as 2004, EBDI was discussing the idea of a new school. See, for example, Simmons, Melody and Joan Jacobson. “The Education Solution.” The Daily Record, February 3, 2011.
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INTRODUCTION: OCCUPIED FUTURE
The plan is always an intention, a desire to be something else. Urban planning documents predict future activity distributions and physical forms according to fundamental assumptions and aspirations based on an idea of what the city is but mostly of what the city should be. With a very few exceptions, the city is treated as a highly responsive entity to create and manage in line with a publicly accepted logic of development. In such a case, even if they skillfully pretend to be neutral, statutory futures by articulating intentions bring into existence a distinctive normative universe. However, it is not only strict metes and bounds that find their way into legislative frameworks. We can see how the urban futures in the planning documents become loaded with fantasies, aspirations, and fears, persuasively designed visions and cultural imaginaries.¹ In this process, a system of rules and regulations develops into “the narratives that are the trajectories plotted upon material reality by our imaginations.”² Like a wise conversation partner, any plan reveals and conceals, but only if we are attentive enough to what it is saying in between the lines.

This article offers an alternative view of urban planning regulations. It explores the plan’s ambiguity and its mysterious strength that largely lies in the balance of its main components – empirical measurements based on anthropometric data, and aspirational visions of the city to come. Their seamless interdependence gives them both authority and plasticity. It is in the process of articulating feelings and intentions that plans come up with futures that can invite us for further exploration.

Using this perspective, we can notice urban legislation offering a glimpse into the future field of the settlement and making it present in the present. In this way, plans challenge a modern western perception of history and time based on the idea of separating the past, the present and the future, with occasional acknowledgement of their mutual reconfigurations. Plans have a unique relationship with time that allows them to avoid seeing and acting towards the future as outside. As they test a direction and a singularity of the temporal axis, they turn themselves into propositional feelings and start to exist outside time and space as “vibes towards the unattainable, a lure for feeling”³. On closer inspection, we see how valuable it is to have firm guidelines with spots of elasticity.

READING PLANS: THE CASE OF ØRESTAD CITY NORD NR. 309
Urban planning legislation describes intentions on several levels – national, regional and local (municipal or communal). The content of the latter one is the easiest to investigate when looking for the materialized intentions. In Denmark, for example, local level building policy instruments consist of Municipal Plans binding for the local authorities and Local Plans binding for landowners. A Local Plan acts as the regulatory framework for any spatial changes in the city; it provides optical guidelines for transformations taking place over a relatively lengthy period. With few exceptions, a real estate
developer with interest in a particular area initiates an update of Local Plans to make them coherent with already existing project design ideas. As a result, these guidelines get increasingly more detailed and prescriptive, acting more as a tool of legitimising development than a vision of a desirable future. The Local Plans of Ørestad and North Harbour areas in Copenhagen are strong examples of meticulous descriptions of numerous issues to consider: a colour palette of building materials, shapes and sizes of balconies, levels of facade transparency, ceiling heights, parking entrances, types of greenery to be used and many others. At the same time, they offer plenty of general and vaguely formulated visions for “good everyday life, knowledge, business and green growth.”

Eight Local Plans govern the Ørestad area; each describes relatively distinctive neighbourhoods. The first, not very prescriptive but infinitely promising, was drafted in 1995 right after the competition for an overall master plan. The place marketing of Ørestad was highly dependent on the image of a sustainable development with public transit, bicycle infrastructure and low parking provision to discourage an automobile ownership. Twenty-two years later it is of interest to practice and scholarship to see the points where professional values of the planners did not resonate with personal values of residents and business interests of investors. Have the “problems” and challenges identified by professionals been solved? This line of thoughts brings us to a question about the nature of results that qualify a specific planning document as a success or as a failure. Is the scrupulous materialization of initial ideas and visions a success? Or is it a failure in adapting to constantly shifting conditions of communal living?

To illustrate, it is worth taking a closer look at one of the Local Plans. Ørestad City Nord nr. 309 came into force in 2000; it covers planning for the majority of the part of Ørestad located between Vejlands Allé and The Øresund connection. This document introduces the future of the field as “an integrated urban area with high architectural quality that takes advantage of the optimal location in proximity to Metro, Øresund connection and the protected Amager” - swamp-like natural preservation territory currently used for recreation purposes. The Local Plan underlines that Ørestad’s identity must be built up around water and nature along with importance and possibility of limiting the use of private automobiles due to “a high-class public transport service provided by Metro.”  

Each section of the plan is dedicated to a variety of regulations that spatial elements must comply with, and comprises of:

- explicitly defined parameters (e.g. housing blocks width, height, ground floor area appearance and unit sizes);
- elaborate graphic sections (of thoroughfares, detailed layouts of vegetation arrangements, zoning diagrams) (Figure 1); and
- descriptions based predominantly on a judgment of taste. (e.g. “…lighting and other fixtures on the road, square or pedestrian areas…must contribute to giving the area a qualitative, urban and holistic appearance.”


For example, a paragraph dedicated to the exterior appearance of the building is concerned with “a contemporary form language” that helps each construction to reach an aim of a “high architectural quality level.” Materials used for building surfaces, signs, advertising, lighting along with sunshades “must be designed in a way to achieve a good overall effect in relation to the architectural expression.”

Vague, shifting and open to all sorts of interpretation, these goals load futures with expectations while simultaneously leaving enough room for all sorts of developments. The same logic of vague and precise applies to the provision of parking places described in §10. Undeveloped areas. Historically, cities required developers to provide a minimum amount of parking spaces per unit or per square meter of any new building. This strategy is believed to have created an over-supply of parking and, therefore, incentivised car usage. In response to this, many cities, especially in Europe, abolished parking minimums and instead established maximums to restrict the provision of new spaces. Looking back at the Øresad Lokalplan, precise restrictions on the maximum amount of places that could be provided (e.g. one parking space per 200 square meters of total floor area in the II, IV and V zones, and per 100 square meters of total floor area in the I and III zones are followed by a vague and open-ended statement about their possible locations and forms: surface lots, underground and over-ground garages.

These elements find no place in any of the accompanying visual descriptions (Figure 2). One might suspect that mundane asphalt surface lots and parking garages do not reflect the desirable future of the allocation of the public space. They lie safely concealed in a virtual field of the text, ready to be given a physical presence.
SPOTS OF ELASTICITY: TEXT AND GROUND COMPARISON

According to professional values of contemporary city planning in Western Europe, a private automobile is a manifestation of urban evils. It is believed to be almost solely responsible for congestion, pollution, and decentralisation. In the last decades, it turned from a symbol of freedom and independence to an invader of the “good“ city. But what about individual freedoms of deciding whether to own a car, ride a bicycle or be a dedicated user of a mass transit? Or shift between these categories and new ones that are increasingly by mobility service companies? How do these decisions alter the vision?

When turning our attention back to Ørestad, it comes as little surprise that automobile infrastructure finds its way into its built environment (Figure 3-5). Zone V, for instance, currently contains a courtyard asphalt surface lot and a spatially dominant white multi-story parking garage (Figure 3). Both are not mentioned in a narrative of a Local Plan. As an architectural habit of mind, the first reaction can be very critical of loopholes that allow such kind of changes to occur and produce a commonly agreed “undesirable” environment where cars are not safely hidden underground. It is common for urban designers and planners to describe these infrastructures as dull, monotonous and devoid of a character.
But when we pause before jumping to automatic conclusions and inspect this situation on the ground, an implemented solution for storing automobiles seems to be viable and appropriate, not devoid of common sense. Underground garages are several times more expensive to construct and maintain, with the costs consequently leading to raised prices for individual apartments. It is uncommon outside of Asian megacities to treat parking spaces as separate real estate items that can be sold to non-residents in such a way as to become an attractive investment. Additionally, once the need for
automobile storage significantly diminishes, it will be a painless process to take down a garage that possesses very little architectural value and is very unlikely to turn into a monument worthy of preservation and sparking a public opposition. The surface lots in their turn will transition into new construction sites corresponding to contemporary needs and desires.

We can even speculate on this way of parking provision being true to origins of it as temporary land use in American Downtowns when it has been seen as land banking. After rapidly rising car ownership allowed different commercial activities to move from the city centre to the suburban outskirts, for many landowners, it was more profitable to tear down the building and rent the space for parking usage. This solution met both short-term and long-term needs. Parking lots covered taxes and other property expenses, sometimes even generated a profit. At the same time, they were standing sanitised and ready for an immediate redevelopment – reserved opportunities for propositions, spots of guidelines’ plasticity. We can see them as chief instruments to remain attuned to our environment and to maintain a level of flexibility of an interconnected urban fabric of buildings, infrastructure and technologies. But what allows them to exist is an ambiguity of legislative narratives that we started our discussion with.

NEGOTIATION THROUGH SPECULATION: MEASUREMENTS AND VISIONS

Generally speaking, design as a discipline finds its basis in changing present conditions to preferred and more desirable ones. One of the easiest ways to communicate an alternative vision, as we have already seen, is through the narrative of the legislation. This is where the civil rights activist and scholar, Robert Cover, introduces law as a “bridge in normative space connecting (our understanding of) the “world-that-is” (including the norms that “govern” and the gap between those norms and the present behavior of all actors) with our projections of alternative “worlds-that-might-be” (including alternative norms that might “govern” and alternative juxtapositions of imagined actions with those imagined systems of norms).” In this way, legislative narratives that shape urban futures can hide professional values from explicit view. What is put into the spotlight instead is the system of measurable parameters? Bernardo Secchi underscores the two-sided nature of urban planning tales:

> Within this multitude of texts in fact I recognize two opposite phenomenae: the first is the tendency toward a progressive reduction of the urban planning tale, toward its coding and bureaucratization; the second is the unexpected appearance, in a specific circumstance or place in the tale, of an expansion, an increase of its thickness and density, and its ability to introduce new and more complex meanings than those readily apparent.

These two elements – measurements and visions - do not exist one without another; in their tension, they form a unique speculative device that operates between code and vision, fact and thought, reason and imagination. In other words, planning legislation is both vague and precise, prescriptive and propositional. However, these binaries should not divide the image of the world and instead allow those who are affected by plans to work constructively on matters of mutual interest. If crafted thoughtfully, they can produce seemingly small disturbances that alter complex systems of decision making. Together they form a speculative device of urban planning that facilitates the practical investigation of the social world. As a well-functioning device, they can not operate in isolation. By definition the device is “always in relations that are themselves always being reconfigured.” What exactly does this discussion have to do with a planning document? At a fundamental level, regulatory framework can be seen as a repository of all sorts of relations that thicken possibilities and
invite speculation. Luciana Parisi in her writing illuminates how a speculative method coincides with both - the notion of abduction coined by Charles Sanders Peirce and further developed by Alfred North Whitehead; and radical empiricism of William James. According to her, the experience of these relations involves the transition between given potentials and unknown events. This speculative transition, however, is not straightforward. Alfred North Whitehead illustrates the method of speculation with the flight of an airplane which starts from the observation and lands for the observation and in a process is “rendered acute” in the “air of imaginative generalization.” Ideally, a planning guideline prescribes fundamental building parameters and simultaneously offers a description of the new social realities to imagine, accept or decline and transform initially defined rules accordingly. It becomes an intricate thought experiment that opens to view the complicated variables of the future urban fields. These plausible futures do not even need to be realized to influence expectations. Their value lies in permitting to imagine opportunities and come to terms with previously not experienced reality.

CONCLUDING REMARKS: LEGISLATIVE NARRATIVE AND PROFESSIONAL VALUES
Coming back to an idea previously pointed out, a narrative might act as a bridge for the transformation of professional values into a plurality of individual futures. In this way, individuals turn from variables in formulas of the planning legislation to active negotiators in the process of speculation that brings virtue to standards and guidelines. Current residents of Ørestad chose to make it their home and have a right to alter its planning vision. This article suggests that a successful regulatory framework has to be both – prescriptive and propositional. Its argument is based on the assumption that alterations made to initial guidelines inevitably strengthen the legislation. A discussed example of the Ørestad development in Copenhagen exposes how a perceived “failure” to deliver a vibrant urban setting might be a professional “habit of mind”. The presumed low-quality urban space is seen by academia and practice as the result of a series of unfortunate local decisions, like the construction - against planning guidelines - of the largest shopping centre in Scandinavia, the lack of connections between developments, homogeneity of user groups and many others. These professional judgements of taste illuminate the challenges in accepting the regulatory framework as a speculative device and a thought experiment.

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CRITICAL PRACTICE IN A LOST ARCHITECTURAL CULTURE

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INTRODUCTION
The new campus of the Ukrainian Catholic University (UCU) in Lviv, western Ukraine, presents a challenge to build a revived university in the context of a lost urban design and architectural culture. Ukraine’s urban and architectural traditions were suspended for over 50 years when the country was annexed to the former Soviet Union following World War. With the advent of Ukrainian independence in 1992, it was necessary for the country to “start over” to re-think its future challenges as a new independent republic. Both architectural practice and the academy had been consumed by the Soviet system of architectural bureaus and centralized university control of education.

Design of the master plan for UCU’s new campus presented challenges to re-consider urbanism in Lviv and develop a new architectural language in a lost architectural culture. UCU is the first Catholic University on the territory of the former Soviet Union. During six years of engagement with university faculty, staff and sponsors, the master plan for the 13-acre campus and initial building designs were developed. Four new buildings and one of three quadrangles have been completed. One residence hall is currently in design. Several additional buildings are planned during the next 10 to15 years.

The master plan concept builds on city and church history, the spatial heritage of monasteries in the region, and carefully-selected precedents from other universities in the world. The “object building” emphasis of modern university campuses in western Europe and the Americas was rejected in favor of the spatially defined place-form examples of universities such as Heidelberg, Oxford, Cambridge, the University of Virginia and Stanford University. Organized by three major quadrangles, the campus design focuses inward to create a university community while reaching outward to engage the city and regional landscape.

Challenges in the campus design process, both in the master plan and architecture, were: The “education” of faculty and staff who initially relied exclusively on historical references; The architectural expression and symbolism of the future of the Church and University in the relatively new and struggling nation of Ukraine; Adjustment to changing methods of learning and teaching; and the design of environmentally-efficient concepts of energy conservation, climate response and materials selection.

Western Ukraine Context and History
Ukraine has historically been a crossroads between East and West. Although a part of Eastern Europe, its 1,200 km east-west dimension extending from Poland to the west and Russia to the east has historically been a zone on contention between nations and cultures. The gathering of tribes that formed the Russian nation was centered near Kiev. The country has historically been in and out of control by Russia. The eastern half of the country is surrounded by the Russian Federation, which recently annexed the Crimean
peninsula to the south. Much of eastern Ukraine orients to Russia. Western Ukraine, including Lviv, orients to Poland and western Europe for its identity and cultural influence.

Figure 1. Map of Ukraine. 2017. Nations Online Project.

Less than 100 km from the Polish border, Lviv and most of western Ukraine were part of Poland under the rule of Austria and the Hapsburgs through World War I with several periods of fighting between Russian and Austrian armies waging war over its territory.

History of the Ukrainian Catholic University (UCU)
The Ukrainian Catholic University was founded in 1928 by Metropolitan Andrey Sheptytsky under the auspices of the Greek Catholic Church, a church of approximately four million members centered in western Ukraine. Following the closure of the University and forced merger of the Church with the Russian Orthodox Church at the conclusion of World War II, the Ukrainian Catholic University in Rome was established in 1963 in exile by Metropolitan Josyf Slipyj. Following Ukrainian independence in 1991-92 the University was re-established in Lviv in 1994 as the Lviv Theological Academy and later assumed the name of the Ukrainian Catholic University in 2002, building on the foundation of the Academy. UCU became the first Catholic University on the territory of the former Soviet Union.

University Mission and Philosophy
UCU is a secular university led by its first Rector and now President Bishop Borys Gudziak, a Ukrainian-American PhD educated at the Harvard Divinity School. At its inception, Father Borys defined the University as “a center for cultural thought and formation of the new Ukrainian society based on human dignity”. Father Borys’ commitment has attracted a remarkably dedicated faculty, staff, students and
supporters who are drawn to the University’s humanism and academic freedom. The University has served as a “shining light” in a new Ukraine that still struggles to break away from traditions of its Soviet past, including government domination of the country’s system of higher education. Ukraine’s record of government corruption and recent turmoil that ousted the former national President serves as a stark contrast with an ethical University that seems unaffected by the national instability.

Social and educational initiatives to recruit disabled students and young adults to the University to study and live in the residence halls, the hosting of students from war-torn zones of eastern Ukraine and the “open door” policy of campus facilities to the Lviv public combine to illustrate the University’s outreach. The University has rapidly expanded in its brief history. It recently grown to eight undergraduate programs, sixteen masters and two doctoral programs. The University currently hosts 1,500 full-time students and 500 part-time and short course students.

Master Plan Organization and Initiation

The University was granted an undeveloped parcel of land of approximately twelve acres by the City of Lviv in 2007. Located at the edge of historic Striyskiy Park and fronting Striyskiy Street, the new campus location was a potentially-beautiful setting adjacent to the park with high public visibility on Striyskiy Street. The University named the new development as its “Striyskiy Park Campus”, envisioned as the main campus of three locations in Lviv. The existing main campus was a former high school building north of Striyskiy Park with a second campus approximately two kilometers away to the southwest.

A 20-year development plan and building program were prepared in 2007-2008 by Professor Jeffrey Wills and Mr John Lucero, the latter a volunteer from the United States with real estate economics and education experience. Shortly after completion of the development plan Mr. Lucero met with this author to discuss the need for a physical Master Plan to guide the University’s development. The author volunteered to lead the Master Plan on a pro bono basis with the assistance of a team of graduate architecture students from the University of Oregon in the United States. Planning and design studies were initiated in Fall 2008 with a campus site visit and meetings with University officials and staff. At this time the dialogue between designers and clients began.

In contemplating the months and potentially years ahead, the work of the late urban planner and UCLA Professor John Friedmann, especially his book *Retracking America: A Theory of Transactive Planning*, became influential. Friedman celebrates “the life of dialogue” in urban planning, firmly suggesting the importance of the quality of dialogue as the critical ingredient of effective planning. Although Friedmann does not negate data-driven planning he views the planning discipline as a humanistic and “transactive” process of mutual learning through high quality dialogue.

Given the multi-year challenge to design and build a new university campus and the Master Plan team’s location afar in the United States, it appeared that an extra effort was needed to connect with the University community on a personal basis. The relatively small size of the team of the UCU officials and faculty, the fact that most were fluent in English and the mutual professional respect between designers and clients eased the communications and trust. There is often a dilemma in accepting pro bono work. One opinion suggests that if clients do not pay they are less serious in following pro bono guidance. Another opinion suggests the opposite – that pro bono work generates trust and removes the monetary business motivation. In this case, the clients (the University) sponsored the design team’s travel to Lviv.
In the initial site and University visit the design team and University representatives met for workshops, visited the acclaimed Lviv City Centre together and took a day trip to visit the historic monasteries of the region. A close personal and working relationship was developed in an extremely short time due to the personal connections of Mr Lucero with each party - designers and clients. This relationship has remained for nearly ten years during the early critical stages of the University’s development.

Studies for the Master Plan
The conceptual Master Plan studies were initiated in late 2008 under a tight schedule. The University was eager to gain City approvals, raise private funds and begin costly infrastructure work. The UCU officials first encountered a dilemma on the future of a half-built but massive Soviet cultural centre at the middle of the site. Some officials thought it should be saved, modified and completed for University use. This would have limited Master Plan options on the site and, more importantly, communicated a horrific symbolism of the former Soviet building shell being re-used to accommodate a new Catholic University. Following a short period of debate it was decided to demolish the structure despite the high cost. Design Studies for the Master Plan on an unencumbered site could now proceed.

The Search for Culturally Relevant Precedents
After reviewing historical and recent university precedents from around the world the design team and University representatives embraced the concept of the defined and enclosed place form as the spatial model for the new campus. With the knowledge the campus would be built over a period of twenty or more years, there was acknowledgement that different architects, sponsors and future University officials would adopt differing architectural languages over time. The intent was for the Master Plan to draw the University campus into a tight spatial composition as a memorable and meaningful arrangement of buildings and quadrangles. Influences came from the Lviv historic center, the ancient monasteries of Univ and Krekhiv in western Ukraine and university campus precedents from abroad. There was a nearly unanimous preference to avoid a plan of singular object-buildings similar to most new campus plans in Europe and North America. The dense plan with its enclosed outdoor spaces had the added advantage of using the site maximum advantage. There were no “left over” or “undefined” spatial typologies.

Master Plan Concepts
The campus is designed as a procession of quadrangles and courtyards. The University campus simultaneously focuses inward and outward. The inward-focused quadrangles define a religious community within the surrounding city of Lviv. The quadrangles plan create a serene and contemplative environment protected from the distractions of the city and outside world.
Simultaneously the campus spaces and buildings reach outward to engage the city, communicating the University’s presence and importance to the outside world. The “Park Quadrangle”, formed by buildings of the first construction phase, opens northward to a long allee of trees in adjacent Stryiskyi Park, integrating the historic park with the new campus. Further east, the final quadrangle in the sequence is defined by the student residences.
The Church is the centerpiece of the central quadrangle, “The Sacred Cloister”, and of the campus as a whole.
The main pedestrian campus entry on Stryiskyi Street is a small memorial plaza, Chapel and garden dedicated to Pope John Paul II, who visited the site in 2001 to bless the new campus. Several smaller courtyards and indoor winter gardens permeate the campus, extending the character of Stryiskyi Park into the interior.

The Evolution of Architectural Character
When the University was re-constituted in 2002, the two most influential figures in the physical development of the new campus were Jeffrey Wills, a former Classics professor and PhD from Harvard, and the first Rector, Father Borys Gudziak (now Bishop), a Harvard Divinity School PhD. Both initially favored an historical approach to the architecture of the new buildings, relying on their backgrounds in Classicism, the Harvard campus and travel experiences of throughout the world. Neither were comfortable with modern architecture although they remained open-minded to possibilities. When modern architecture were discussed at one meeting, Father Guziak firmly exclaims “NOT Budapest Postmodern!” It’s not clear what he was referring to! It was apparent that an architectural education process was needed to acquaint the two leaders, officials and faculty with relevant high quality modern architectural examples.

The First Buildings: The Collegium
The first two buildings to be designed and built were the main residence hall, The Collegium, and a companion mixed-use building that included a large dining hall and event space, coffeehouse and upper floor classroom suites. After a two-stage selection process with finalist interviews the firm of Kallmann McKinnell and Wood (KMD) of Boston were selected to design the two buildings. KMD had extensive experience designing buildings on university campuses in the United States, including Ivy League universities and the highly-acclaimed American Academy of Arts and Letters building near Boston. The
firm was a perfect fit to design the first buildings. While being firmly committed to modern architecture they understood the contextual influences of place in response to local conditions, materials and culture. Without being historicist, the Collegium has a well-scaled and gentle relationship to neighboring architecture in Lviv. More important was the firm’s passionate interest and commitment to the project. At the beginning, before the interviews, the design team visited the campus site and talked with UCU officials despite the long distance from Boston. After securing the commission, the firm was actively involved beyond what would be expected in a professional relationship. By all reports the quality of dialogue between designers and clients was exceptionally high. The success of the dialogue and quality of the completed buildings warmed University officials to modern architecture, at least an architecture that was sensitive to context and place.

Desire for a Traditional Church
After completion of the Collegium the central Church (Church of St. Sophia) was the next building to be funded, designed and built. Although Kallmann, McKinnell and Wood were commissioned for early design studies, it was clear that the University Rector, Father Borys Gudziak, wanted a traditional Ukrainian church. In this case, modern architecture was not considered. With architectural assistance and only limited design guidance from the architects, Father Borys was the de facto designer of the Church. Dialogue between architects and clergy was limited to technical issues and details. In this instance, the dialogue between designer and client was limited due to the strong will of the client to draw from historical examples to build a traditional Ukrainian Church.
New Architectural Language of the Library – The Sheptytsky Center

The new Library, the Sheptytsky Center, was commissioned shortly after the completion of the Church. For this building a shortlist of distinguished architects and firms from Europe and North America was considered. Behnisch Architekten of Stuttgart, who had been passed over in the previous competition for the Collegium, was commissioned to design the building. Behnisch offered experience in a wide range of campus buildings and a commitment to environmentally-sustainable design and construction. The latter emphasis appeared to make the difference in selection among several well-qualified firms. At this stage of architectural selection, the University was still reluctant to consider Ukrainian firms due to their lack of comparable experience. Many of the best new Ukrainian firms were relatively young and untested. The Behnisch office proceeded with design studies that were unapologetically modern with few, if any, contextual influences. Although the building interior is full of light, movement and well-designed functional spaces, its exterior exhibits almost no relationship to its urban, campus or environmental context. Its location next to the traditional Church presents a stark contrast, almost as if it were a space ship that landed on the new campus. The University officials were impressed with the communications and client service of the Behnisch firm. By all accounts, a high quality dialogue was maintained throughout the design process. Although the building is located precisely on its designated site in the Master Plan, the jarring juxtaposition with the Church is, in this author’s opinion, a problem. Time and nature will likely heal the contrast as the trees fill in the spaces between the two buildings.

The evolution of architectural understanding among University officials and staff during the period of time between the design of the Collegium and Library is striking. Although one cannot be certain of the reasons it appears that, except in the design of the Church, the quality of dialogue between designers and clients was exceptionally high despite the physical distance between the parties. Although the ease of travel and internet communications helped, the quality of communications and interpersonal relationships appear to be the key.
Second Residence Hall Competition: New Confidence in Ukrainian Architects

The University initiated design studies of the second residence hall in 2016. For this building a design competition was held among five talented and relatively young Ukrainian firms. The University’s new confidence that local and national design talent could be trusted was a remarkable step forward in the evolution of its architectural thinking. The new residence hall will complete the third quadrangle (the eastern quadrangle) at the eastern end of the campus. The building will be sited almost exactly on its Master Plan location. All of the finalists exhibited strikingly modern buildings. Unlike the Library, the architectural language of each made reference to the Collegium located on the opposite side of the new quadrangle. The building is in the process of detailed design at the time of this paper.

CONCLUSION

The lessons of critical practice derived from the Ukrainian Catholic University project are three-fold. First, during the period of lost architectural culture following the absorption of Ukraine into the Soviet Union, the impact of the cultural-architectural void created by disconnecting people and institutions from their long-held historic traditions led to a period of uncertainty and loss of confidence. University officials, faculty and staff were partial to historical and pre-Soviet architectural precedents. The historical beauty of the Lviv city centre added to this desire to reference the past for architectural inspiration. Early modern architecture never took hold in Ukraine. The 1930’s and 1940’s were consumed by economic depression and World War II. When building eventually resumed after World War II, first Stalinist neo Classicism and later Soviet “modernism” became firmly entrenched as the favored language of architecture throughout the USSR. Soviet “modernism” continued until the collapse of the Soviet Union and subsequent Ukrainian independence.

University officials and faculty had no appetite to continue the language of Soviet era architecture. This attitude extended to the University’s reluctance to commission local and national Ukrainian architects and planners who were educated and practiced under the former Soviet system. There was a nearly complete lack of confidence in the local and national profession.

Second, there was a significant difference between attitudes toward the campus Master Plan and the first buildings. The campus Master Plan was inspired by spatial precedents of the Lviv historic city centre, the enclosed quadrangles of monasteries in the region and university campus plans from other places (Oxford, Cambridge, Stanford and the University of Virginia) that emphasized spatial enclosure and experiential sequence. These examples were known and understood by University officials, supporters and faculty.

Attitudes toward the architecture of future buildings were different and more subjective. In this unexplored realm, choices were unclear. The officials and faculty knew what languages they did not want (Soviet “modernism” and “Budapest postmodern”), but unfamiliarity with modern architecture, particularly high...
quality thoughtful design, created a void of understanding. The University community knew they wanted an historical Church, but the architectural language of the other buildings was more confusing and open-ended in terms of possibilities.

Third, the quality of dialogue was essential to the education process in guiding the evolution of attitudes toward the architectural languages of the newly-developing campus. John Friedmann’s “life of dialogue” was relevant to the process. Every experienced architect and urban designer understands that the most successful projects are those with high quality personal rapport between designers, client and community. In this case, there was a learning process that began with the Master Plan, continued through the design of the first contextually-sensitive buildings by Kallman McKinnell Wood and finally reached a more emboldened level in the aggressively modern new University Library by Behnisch Architects. The architecture of the Library have been unthinkable during the period of the Master Plan preparation and first buildings. The evolution of architectural thought evolved through the communication ability and commitment of the architects toward their projects and the University’s mission. The Behnisch firm received particularly good marks in client communication.

The “flattened world” described by Thomas L Friedman in his acclaimed book *The World Is Flat: A Brief History of the 21st Century* suggests the opening of new opportunities for global commerce and cultural exchange by small actors, including individuals, small companies, professional teams and institutions such as universities. In this case, contemporary internet communications, ease of international travel and regular but limited personal meetings were effective to facilitate a Western network of participants. While not remarkable in large-scale corporate and government interactions, in this case was an unexpected success with a cast of smaller actors and limited resources. John Friedmann’s “transactive planning” provided a relevant inspiration and reference point for the Ukrainian Catholic University’s challenge to create a new campus in the context of a lost architectural culture.

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RE-VISITING UTOPIA: DIGITALITY TO AUGMENT MOMENTS OF THE IDEAL

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INTRODUCTION
This paper is a re-reading of Lewis Mumford’s *utopias of reconstruction*, and John Olin’s individual standard as a means to consider contemporary utopian speculations. With a hybrid of critical and projective theories it aims to take a middle road to speculate on alternative practices, one that aims to counter technological enframedment and societal spectacle to carve out spaces for new, non-representational, open-ended, and operative expressions of the ideal.

Simplified, the shift of critical theory to projective practice disperses architecture in seemingly paradoxical directions at once diagrammatic, open-ended, and contingent, within a managerial framework of innovation as a means to improve praxis. Innovation, and its purpose of improvement are inherently enframed within the economic and political conditions of the market. But the appropriation of new technology falls within a larger, explorative social context. These developments have the potential to reinforce market conditions, or carve out new spaces for alternative practices. It is within this alternative practice that utopian speculations might once again project novel social practices.

This is where an expanded definition of innovation is necessary, one that does not degrade our social connections for the minute technological improvement of efficiency. Culture, too, can innovate, and it is this human-focused development that should strive forward the purpose of utopia.

How might digital architecture express new utopian speculations from *utopias of reconstruction*, and a more nuanced individual standard? It is by continuously re-visiting utopia that we might actualize its larger intent of open-ended, iterative, progressive change.

How digital technology addresses utopian speculation in the future requires architecture to come to grips with this amorphous nebula of needs and desires.

How architects actualize utopian moments in spatial terms requires new modes of expression.
To understand this new utopian condition this paper uses past authors such as Lewis Mumford, Edward Surtz and John Olin, and re-contextualizes their thoughts in light of new project theory. It is from this position that we examine how we might reconstruct utopia to define new habits, values and institutions, and how a new individual standard might better frame the diversity in present-day utopias to better express the needs of our contemporary condition.

Reconstruction

Lewis Mumford writes that that we live two concurrent lives, the world within, and that a world without, and that these ideas, beliefs and superstitions are regulated through the *idolum*. The *idolum* is a ‘house of refuge’ a substitute for the external world to give us space to internalize the external forces that bear down on our daily lives. It is a contemporary re-reading of the *idolum* as concurrently a virtual, digital and real space that offers space for utopian speculation. It encapsulates the multiple understandings of constructs such as real and imaginary. As Mumford states: “So in looking at our utopias. We need not abandon the real world in order to enter these realizable worlds; for it is out of the first that the second are always coming.” What is critical of these realizable ‘imaginary’ worlds is that they become real if acted upon, and like any virtuality they migrate across the threshold forming hybrid moments that are indivisible between there imagined and experienced condition.

Mumford divides the utopian effects of the *idolum* into two distinct constructs: utopias of escape: one that formulate the conventional notion of utopias which have been formally established, and utopias of reconstruction: utopias that allow us to cope with the world. It would be easy to conceive of a digital utopia based on utopias of escape, and for many people existing digital programs and apps already form an important vehicle of escape. The anecdotes of an
avatar that is faster, stronger and more sociable than our physical selves play a common theme of the parallel playground that might constitute part of our ‘digital selves’.

It is the utopia of reconstruction that offers more potent spatial development and immersion as it seamlessly augments digital virtualities with our daily lives.

There are a number of reasons why utopias of escape do not offer the requisite conditions for contemporary utopian speculations. For an escape, the place must be immediate and existing. Within this immediacy it must have a fixed, or limited representation, a singularity that lets one know that they have arrived – that their escape has begun. Utopias of escape are a removal; once we enter back into the real world our view re-aligns to our less-than-ideal condition. For escape to convince it has to trade on the desire of the material object, or illusions of power. It is these very conditions from which utopia attempts to escape.

Utropias of reconstruction on the other hand develop new habits, values, relationships, and institutions\(^{10}\) that solidify the new foundations of an evolving society. They layer onto the present to build off existing practices through continual realization. This reconstruction can either maintain existing social, political, or economic conditions or way-find to build alternative practices. This incremental understanding of utopia does not understand utopia as a fixed, regimented construct, but a variable, evolving condition bridging the virtual, digital and real simultaneously - individually as part of an animated collective.

Digital discourse, through social media and other modes of digital communication offers the place for individuals to find a gradient and multiplicity of collective forums. Where a critique at social media is lodged is its facility to both support and suppress enfranchisement. This paper takes the optimistic view that recent movements, even those not initially successful at lasting change, have planted the seed of empowerment for historically marginalized groups, and that, in time, these individuals and collectives can build to gain legitimate agency and representation.

Moving forward this paper argues that new utopian ideas develop as part of reconstructions, and that awareness grows from individuals and groups of people that question existent habits, relationships, and institutions. What remains key for exploration is how architecture might contribute to this discourse?

To tackle utopias of reconstruction in relation to architecture it is critical to consider the difference between virtual, digital and computational as they focus on different modes of architectural ideation.

As Elizabeth Grosz writes: “Virtuality has been with us a remarkably long time. It is a coherent and functional idea already in Plato’s writings, where both ideas and simulacra exist in some state of virtuality. Instead of too closely identifying it with the invention of new technologies as is the current obsession - we must realize that since there has been writing, there has been some idea of the virtual.”\(^{11}\) What is imperative about Grosz’s statement is to maintain the multiplicity inherent in virtualities. Collectively, we can approach utopian speculations in a number of disparate ways, but what remains key is that they evolve both the individual and group simultaneously, and that they facilitate the widest breadth of participation.

In relation to architecture, it is design’s potential for new methods of place making. Present day virtualities contain many of the same attributes and intentions of those from the past. It is the method by which we actualize them that offers greater potential for their realization. In this condition the digital plays a critical role in forming a parallel world that augments the real.

In principle the digital is a system of discrete units, defined through binary logic. In practice, however, it is simultaneously a place, a tool and a technology; an interface that mediates between one space and another. These mediated spaces are real, or virtualized, but through this multifaceted system we can
actualize utopian moments that would otherwise have remained passive through more conventional means. The digital concurrently facilitates individual and collective pursuits, connection and isolation. The augmentation of digital onto the real offers new opportunities for understanding and engaging the city. While information and data are new technological means to enframe, they can also be positive means to enfranchise. With this hybridized condition comes the critique that the interface is never innocent, but as a virtuality no medium is innocent, and speculative practice must come to rectify and position digital media in terms that it is able to leverage its remarkable design capacity, while acknowledging its position within an existing social, political and economic milieu.

Computation is a method of notation, a code that offers the opportunity to personalize, spatialize, and actualize our utopian virtualities. In lazy architectural discourse, computation is limited to optimizing form finding techniques, but if we expand our understanding of computation to include other modes of notation, those linked with experience and engagement, its potential is greatly increased, and made more compelling as a potential site of reconstruction and open-ended speculation. It is therefore not the separation, but the integration of these three related concepts that facilitates new utopic moments. These speculations examine current building practices and overlay historically disparate knowledge systems to find a richer, more engaging lens by which to view the physical city. In practice this might describe improved environmental causation, and improved understanding of the complex interwoven relationships of our urban environment. Culturally, it might offer additional layers to contextualize complex social networks, and how they might empower, restructure and build equity. It is this form of social formation and innovation that most aligns with the progressive intent of past utopian expressions, away from the purely technological, and embedded with the social, cultural, political and economic agency that compels other adjacent fields to engage in digital and computational practices.

As Grosz writes: "If virtuality resides in the real...this is because the real is always in fact open to the future, open to the potentialities other than those now actualized." This future is a digital one, one that interfaces with the real, and provides a home for many varied virtualities. It is a place where a fragmentary moment of utopia might reside. As a process, place, and technology the digital offers a fully developed kit for actualizing virtualities, for actualizing utopias.

**Individual Standard**

These systems are not conceived from scratch, in isolation, or without time. The construction of a sustained, permanent utopia, therefore, is an unattainable ideal. But lingering moments of utopia, and the reconstruction of habits, values and institutions can offer respite from an otherwise imperfect world.

John Olin states that utopia is deeply embedded in our historic consciousness. Whether it is a social construct for an ideal society or more personally based as an individual standard remain open to interpretation. Here, however, I consider both simultaneously while privileging the individual.

In the Introduction to More’s Utopia, Edward Surtz states the reason for utopias recurring significance is its humanism and that the “social problems which appear in it are common and perennially recurrent.” These social problems are not only collectively recurrent, but individually recurrent as well, and in environments where marginalized groups are passively ignored, it is this individual recurrence that prevents sustained collective progress. As Elizabeth Grosz writes: “No utopia has been framed to take account of the diversity not only of subjects but also of their utopian visions, that is, to the way in which visions of the ideal are themselves reflections of the specific positions occupied in the present.” It is within this varied position of recurrence that necessitates the expression of individual
need and desire, and the collective evolution of progress, not as a fixed representation, but as a continual, on-going process.

In George M. Logan’s analysis of Utopia he writes that many regarded regimentation as an indication of the ‘good life’. More, however, was not convinced. Without diversity the totalizing construct of utopia, even when expressing techno-induced freedom, can become remarkably stifling. More recently Constant Nieuwenhuys noted the destructive part of his New Babylon project noting that this total automation could ultimately be repressive. Therefore, while technology offers the opportunity to enter moments of the ideal, utopian life might actually miss what some people conceive of being meaningful – the obstacles that counter the fluid leisure of the *homo ludens*.

Therefore the ‘ideal’ is not a simple perfection, but rather a communal reflection. A network that is both isolated and connected. It is New Babylon with an off switch. It facilitates moments of leisure and social connection without the continual necessity to participate. It offers the underlying framework without the regimentation of daily life. The digital is a diverse individual interface connected to ‘everybody else’; a window staring out at the communal world.

If we simultaneously consider Surtz’s recurrent social problems with Olin’s ‘individual standard’ and ‘collective ideal’ we describe a contemporary space that strives for agency and change to perennial issues not through a geographically collective body but a socially collective body (which may or may not be in the same place). One were the voice of the individual is expressed within a larger pool defined by ideas over proximity. This is an evolution of inhabitation away from place towards purpose; where the individual body might be isolated within a virtual body is active and engaged.

Here projective theory must tread carefully. Open-ended, operative, iterations offer a compelling way forward, as does the prototypical making in the workshop as initial mode of ideation. But its cool notions of lifestyle and desire, its managerial framework of design as economic output, and the technophilia of variation, and optimization can very quickly define an image of the ideal, the object-
desire that pulls us collectively away from addressing the recurring social ills, and enfranchising individuals that have been marginalized in the past. Innovation in this instance is not about expressing a fixed representation of emerging technique, but a sustained, open-ended process of engagement, and continual actualization of equity.

Figure 3. Migrants in Djibouti straining to capture a mobile phone signal from Somalia, by John Stanmeyer © National Geographic Creative, illustrates the inequity and hope of a better future.

This does not render buildings obsolete, but it does concede that buildings are too totalizing, and static to successfully develop the fixed utopias of the past. Fragmentary and temporal utopias within buildings and the city are a more sustained practice for creating moments of the ideal augmented with the real. These intersecting points give flexible moments that evolve our relationship with architecture and the city in (real) time. This becomes more pervasive as people carry with them the very interface that allows them to experience utopias in fundamentally personal ways. How architects envision that intersection of experience and built environment might once more shift our contemporary understanding of materials, space and tectonics away from cold scientific metaphors towards human-centric understandings of need and the positive progression of social practices.

CONCLUDING REMARKS
There remain many critical reasons for utopian speculation, but more recently there are pragmatic reasons for pursuing utopia as well. The enfranchisement of marginalized groups, the equity among disparate populations has real positive social, political and economic purpose. Therefore questions of utopia invariably shift from sites that propose new visions of the modern city to sites that facilitate the improvement of our (virtual) world, and how those improvements might be
actualized in the contemporary city. This questions if present-day utopia is a fixed representation, or an ever-evolving augmentation of the virtual merged with the real.

It is difficult to define an oppositional stance to digital. While it is not an overt rejection of technology, it does isolate one outside our contemporary system of thought and action. In architecture, a critique of the digital might start by better defining the implications of variation, not only as the mode to diversify complex architectural form, but also as a means to enfranchise a broader social foundation. A foundation to substantiate resistance; oppositional positions to facilitate alternative practices. If the digital integrates and defines many facets of our contemporary culture without architecture making critical comment on how the digital has socio-political implication then the architectural use of digital technology falls merely as an incremental improvement, simulation and marketization of commercial workflow and practice.

Utopian speculation can not position people outside of technology or culture, but it can create, and possibly actualize experiential moments of alternative practice that question and comment on our current status quo. Social media may express an ideal through its virtual display of curating each individual victory and tragedy, but it currently constructs only utopias of escape, “reaffirm[ing] the hegemony of culture and help[ing] to assure its continuity.”

New utopias are operations that augment existing systems; they are reconstructions that disperse, like seeds in the wind. Utopias are no longer a fixed place, a heaven here on earth. It is a perpetual present, a place to aspire to, but one that is already present. It is an individual condition of fragmentary moments that augment and actualize a multiplicity of ideal real. To re-visit utopia is not to an act of construction, but one of uncovering.

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1 I use the term projective practice loosely to encompass a number of theoretical writings that emerged from 2000-2010. Somol and Whiting see project practice as “an alternative genealogy… linked to the diagrammatic, the atmospheric and cool performance.” Robert Somol and Sarah Whiting, “Notes Around the Doppler Effect and Other Moods of Modernism”. Perspecta 33 (2002): 72-77.


George Baird called a number of these writers and practitioners Post-Critical – a term not recognized by Michael Speaks. I recognize that the use of projective practice as an umbrella term might be equally problematic.

2 This is different from the managerial, innovative approach of Michael Speaks as expressed in a number of articles including:

Michael Speaks, “After Theory: debate in architectural schools rages about the value of theory and its effect on innovation in design” Architectural Record 193, no.6 (June 2005): 72-75.


3 Leon Cruickshank describes a more nuanced reading of innovation when he writes “These converging activities have highlighted the complex, overlapping, inconsistent, and incompletely understood relationship of innovation as used in design and innovation in the broader literature of innovations studies.” Within the text he describes four types of innovation: Product, Process, Marketing, Organizational, which describes the multi-dimensional aspects of innovation, expanding innovation’s simple capitalist intent or Speak’s implementation of managerial practices in architecture.

4 Heidegger writes extensively about enframement in *The Question Concerning Technology*. Neil Leach counters Heidegger’s position in his chapter *Forget Heidegger*, but for this paper, Heidegger’s argument to the essence of modern (digital) technology remains important. Our relationship to modern and digital technology remains enframed, and only through our ability to lift out, or dissolve enframement might we experience temporary moment of the ideal.


7 Lewis Mumford, *The Story of Utopias* (New York: Peter Smith, 1941): 25

8 ibid, 24

9 ibid, 21-23

10 ibid, 21


12 A critique of public space, and of the personal interface of digital technology as ‘passive’ are articulated by Antoine Picon where he asks if architecture: “[can] be free from any violent dimension? Can it be totally innocent?” This paper acknowledges that the answer is invariably “no”, but aims to mitigate the most contentious and overt expressions of violence, through projective practices that attempt to enable and enfranchise.


19 Diller and Scofidio’s rhetoric of “newness” and “loss” as paraphrased in:


DRAWING POLITICAL SPACE: REASSEMBLING CIVIC APPARATUSES IN MONTRÉAL, 1992 TO 2017

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INTRODUCTION
On April 14, 2014, the City of Montréal’s municipal court’s new South service point opened at 7777 boulevard Newman in the neighborhood of LaSalle. The court moved in the renovated space of the former Bella Vista Buffet, a venue favored for fund raising events and weddings and attended, over the years, by various political figures including former Mayor of Montréal Gérald Tremblay and the current Premier of the province, Philippe Couillard. When the City moved in, the buffet and dance hall were subdivided into the “public” program of the court including reception desks, waiting area, audience chamber, meeting rooms and toilets. The City does not own the building and leases the space from owners of the entire strip mall (twenty-nine commercial spaces available for rent). The service point is now one of four serving the territory of the City of Montréal, formalizing the way relations between the municipal association and the occupants of the city are organized – not as singular buildings, but as distributed field.

This paper reports on the initial stages of a three-year research by design project on the political space and public-private interfaces of Montréal, Canada (like the south service point), that spans the last twenty-five years. By focusing on interfaces and distributed fields, the research seeks to understand how political space is produced in the city in a way that displaces and complements the traditional understanding of spaces of representation (like the town hall, or the square). The research is based on fieldwork observations, inventory and analysis that eventually take the form of exploratory drawings. These explorations are developed as a way to investigate where, when and how drawing turns analysis into critical spatial practice. What follows traces the outlines of the project, offers some initials hypotheses and presents some of the first drawing explorations.

MONTRÉAL, A CARICATURE
Last year marked the 375th anniversary of the founding of the City of Montréal on an island in the St Lawrence River. The timeframe for the present study was chosen to span the 350th and 375th, both symbolic markers of the way in which the City, as a loose administrative and cultural assemblage, ends up being defined. One of the most significant events of the period has been the transformation of the city’s political space. In 2002, the island’s twenty-three distinct municipalities were amalgamated under the centralized Ville de Montréal. In 2006, fifteen municipalities seceded from the Ville de Montréal, so that now there are sixteen distinct municipalities on the island (Fig.1). This is part of what can be unpacked by the Municipal Court’s new south service point. With the amalgamation and de-amalgamation, the City restructured the management of its services and infrastructures, directly affecting its constellation of civic equipment from municipal offices to recycling centers and urban artefacts. The City’s spatial distribution and disposition shifted, transforming the assemblage of the city itself. With the Municipal Court, the City closed down local service points and opened new ones. In
2001, there were twenty-three municipals courts on the island. After 2002, there were eight service points. Since 2006, the reshuffle went on bringing the number, for the City of Montréal, down to four plus its head office. The service points are devised as regional nodes for multiple districts: giving the Court the spatial form of a distributed field of points and counters (comptoirs) with the advertised payment channels of credit, money order, debit and cash.  

![Figure 1. Municipal division of the island of Montréal, 2001, 2002 and 2006.](image)

During the same period, the reputation of the City’s politics took a downturn with, in 2011, the launch of a public inquiry into the awarding and management of public contracts in the construction industry.  
The inquiry was to have significant impact on Montréal’s politics, with the Mayor since 2001, Gérald Tremblay, stepping down in 2012 amid suspicion of collusion, bribery and fraud within his party and administration, and Interim Mayor Michael Applebaum, who was arrested by the Anti-corruption unit of the provincial police in 2013, and immediately stepped down from his post after just seven months in office.  

In parallel to a weakened political administration, however, the period is also marked by the institutionalization of design culture at City level. Starting in 1991, a year prior to the 350th celebrations, the City appointed its first design commissioner. In 2006, the City was named as one of UNESCO’s design cities and the Design Office was created. This paralleled an expansion in the place taken by event design and landscape architecture in the city, which developed a reputation for this work within Canada.  

This was evidenced in the activities for the 375th, with events, streets and squares prominent as “legacy” projects.  

**POLITICAL SPACE AS APPARATUS**

As a snapshot of the city, these three points (structural transformation, political accountability and public realm design) are relevant for this study because the initial idea was to trace these points through celebrated design projects of the period; projects officially labelled as “public space”. The study, however, looks beyond the intuitive public spaces of the city and works out what political space could be starting from the assumption that this one emerges from the practice of public-private interfaces that each connect the individual to the collective.  

This assumption draws from assemblage theory and actor-network theory as well as recent research on dialogism and public space. Succinctly, the project is interested in the architectural and urban dispositions that support the tendency of public things or spaces to become political.  

This is a recurring problem with public space, as Ash Amin points out, that saying something is public does not make it so.  

We have to look toward performance and practice as well as to the overall distribution of potential moments or in other words, to the assemblage of the city as multiple (town hall included with networks, protocols, norms, services, time and deviant practices).
As Doreen Massey suggests, the political emerges at various times and in various places from a negotiation between humans and non-humans that share a common territory. It would be difficult, in this sense, to narrow our understanding to traditional spaces of representation, for example, like the street or the Town Hall in North-American culture. The narratives that parallel and produce the political space of the city need to be formulated according to this understanding for any critical position to be possible: to act explicitly, as Keller Easterling writes, on the discrepancy of official rhetoric with respect to what is actually taking place. This is why, while recognizing the significance of tactics and citizen actions that pull away from civic infrastructure to reveal what Pascal Nicolas Le Strat calls “new ontologies of the city,” we should not disregard the apparent banality of what the City builds up over time as interfaces with its occupants. Doing so recognizes a countervailing tendency for the distributed city to re-territorialize itself with, as we saw, service points, counters, network nodes, in the form of a paradoxical distributed centralization.

We limited our search to the physical equipment deployed by a municipal association on its territory and from which, in interaction with its occupants, the city’s political space can be inferred. Without fixed scale or type, this equipment is a version of what Dovey and Wood have described as “typical forms of connectivity between private and public networks... pattern of repetition of formal configurations incorporating a deeper connection to social and economic functions.” At the moment this includes town halls, municipal offices, permit counters, citizen information desks, accessible recycling facilities (écocentres), recycling bins, municipal courts, police stations, libraries, community centers, urban artefacts and furniture. Giorgio Agamben, in *What is an apparatus?*, defines the apparatus (*dispositif*) as “literally anything that has in some way the capacity to capture, orient, determine, intercept, model, control, or secure the gestures, behaviors, opinions, or discourses of living beings.” Agamben’s definition, meant to explain and supplement Michel Foucault’s use of *dispositif*, is quite capacious, comprising anything, from the cell phone to language, that acts as an intermediary in the management of life. The apparatus manages and governs from the point of economics, without politics or a foundation in being: things, places and processes that regulate and confront, experienced and used without explicitly offering a potential reframing of the subject. Reinhold Martin’s recent use of the apparatus, although differing from
Agamben’s, confirms the extensive reach of the concept and its significance for understanding the city as a sociotechnical assemblage. Broadly speaking, the apparatus allows a transversal reading of the city across scales, so that biopolitical and technopolitical mechanisms can be better located and dissected.

A reading of these projects as apparatuses reveals their non-neutral disposition, even in the most mundane and everyday manifestation of civic equipment: the waiting room of the municipal court, for example, down to the machine from which you retrieve your place in the queue. What is a stake here, it would appear, is a process of reconfiguring the subject along specific lines that pull in and out and follow the tendencies of municipal centralization and decentralization. Gilles Deleuze wrote that apparatuses are “composed of lines of visibility, utterance, lines of force, lines of subjectivation, lines of cracking, breaking and ruptures that all intertwine and mix together and where some augment the others or elicit others through variations and even mutations of the assemblage.” This entanglement of lines suggests that there is, indeed, nothing banal nor uncritical, for the city and the subject, in the appearance of individual recycling bins, for example, as connectors between private individuals, municipal flows of matter, city administration and good behavioral expectations on hygiene and morality. Or about interior municipal architecture with its rows of chairs, potted plants, queuing systems, leaflets and various counters that separate bodies.
DRAWING POLITICAL SPACE

Drawings, to extend Nicholas de Monchaux’s argument for maps, are at their most powerful “when used not as instruments of unattended action or procedure, but rather as devices to change our perception of the world and our understanding of its possibilities.” Drawing, in this sense, is a form of investigative analysis directed toward transformation. While drawing the apparatuses and tracing their lines, we are drawing out their politics and testing them. The explorations that follow are an initial exercise in investigative drawing. They are the point at which inventory turns to invention. By tracing and drawing from the field of apparatuses, they play the role of field drawings, visual constructions that, like the fieldnotes and texts of ethnography, bear the messiness of their production, interpretations and inventions.

Cutting across the field of equipment, common themes emerge that tell the story of how the association presents itself. This initial exercise focuses on time, procedures, practices, connections and delimitations. These five lines are traced through the individual components of apparatuses (Fig. 5), each component becoming an “actor.”
There are five drawings. Each follows one of the lines identified, tracing it through the overall family of components. The drawings are composed of a score layer – the logical dimension of the assemblage – and a combined layer of actors and play – the material and expressive dimensions of the assemblage (Table 1). The result is then assembled as a three-dimensional glass plate.

**Table 1. Logical structure of drawings and variables**

<table>
<thead>
<tr>
<th>Lines</th>
<th>Layers</th>
<th>Variables of play</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Procedures</td>
<td>Coding (logical score)</td>
<td>Visibility</td>
</tr>
<tr>
<td>Practices</td>
<td>Components (human and non-human actors)</td>
<td>Intensity</td>
</tr>
<tr>
<td>Connections</td>
<td>Disposition (play on variables)</td>
<td>Density</td>
</tr>
<tr>
<td>Delimitations</td>
<td></td>
<td>Repetition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Distance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Etc.</td>
</tr>
</tbody>
</table>

The following paragraphs, while looking at the results, offer a reflection on the ties between drawing, political space and critical spatial practice. Each photograph is accompanied by a long caption that summarizes the analysis. The project, by reassembling the components of individual apparatuses has two principal tasks. The first is documentation and revelation: revealing the construction of interface architecture so that its potential role in the political project of the city can better be understood and acted upon.

The second task is reconfiguration: reconfiguring the narratives that are tied to these apparatuses so that action may be projected in the future. This task more clearly opens up the possibility for drawing to be tied to critical practice by offering a potential reassembly. There is much to be inferred and teased out in exploring the surfaces and recesses of the drawings, finding out how each line produces its own spatial qualities that can then be transposed to a larger common narrative.
Each apparatus comes with its user manual and prescription, the rules that have to be followed in order for the interaction with the city to take place, which does not mean that the encounter is either successful or satisfactory for either party.

In *Reassembling the Social*, Bruno Latour writes that the political project of actor-network theory is to illustrate how actors can be assembled into a collective, rather than show how they were assembled. “Once you extend the range of entities, the new associations do not form a livable assemblage. This is where politics again enters the scene if we care to define it as the intuition that associations are not enough, that they should also be composed in order to design one common world.”

If design’s main paradigm is to see the environment not as a given but as a project, then Latour’s position would suggest that the political project of observation and documentation of “the social” is found in design.
Some practices take place opposite procedures. Some are not requisite to the completion of the interaction and do not hinder its carrying out, some are deviant and do affect the outcome of the interaction or explicitly attempt to circumvent the rules and create short-circuits.

The tracing of associations, therefore, culminates with their re-assembly. The drawings presented here are a first step toward this notion, so that the research project offers a different assembly of apparatuses by design and, in doing so, participates, at a small scale, in the potential reframing of political space.

Figure 9. Connections (reverse lighting)

Each apparatus is multiscalar, running down the lines of the assemblage from single object to field of distribution. Similarly, each apparatus is made possible by the array of systems to which it connects and that ensure its functioning, the infrastructure, utilities, piping, tubing, cabling, protocols.

The position taken, here, is that the political emerges from the encounter between the civic apparatus and the individual in the formation of the collective: encounters with other people, objects and systems. In doing this, the project presented here investigates how this type of work on the built environment can complement the work (in Montréal and elsewhere) of tactics, interstitial experiments, occupation, citizen action and counter-publics that do not explicitly seek or have a direct encounter with the civic apparatus. As a result, these actions for political space would not be abstracted from the City but anchored to it.
Reinhold Martin’s definition of the apparatus as an “assemblage of mediators, of difference engines, that pry things apart so that order reigns” explicitly underscores the political significance of what this project sets out. The definition invites us to “take apart” and redistribute, acting directly on what philosopher Jacques Rancière has called the “distribution of the sensible” in order to reveal and transform what takes part in the production of political space and, conversely, what does not take part. Documenting apparatuses, dissecting them and drawing out from their mechanisms potential counter-narratives helps us see beyond the banality of municipal architecture and design toward the complexity of urban assemblages. Their reassembly may have, as Agamben suggested, the potential to reconnect administration, politics and the subject. In Montréal, the studied transformations to the urban apparatus do not form a coherent political project, but a loose collection of intentions that rarely align. It is because of this, and not in spite, that they demand our attention. We should not forget that apparatuses are instruments of power and order, and that power is perhaps at its most insidious when it is rendered invisible, disconnected from accountability, or, to paraphrase Foucault, incorporated into the sociotechnical body.
EPILOGUE

A city representative we met to discuss upcoming changes to a district’s information and permit counters was happy to let us know they were moving toward the commercial model of an open floor plan without clear demarcations. The City’s version of the Apple Store. This followed a rhetorical tendency toward transparency and boundary-less administration without increasing the agency of the people involved, and severely reducing the agency of the laminate-veneered counters in, to paraphrase Hannah Arendt, joining and separating us simultaneously. The counter’s role in the assemblage, we suspect, just transposes somewhere less tangible or visible.

With this in mind, we should look differently at the trend of our study period (accelerating now), for interfaces to move completely online without a concrete physical presence. Montréal’s new Bureau for the Integration of New Residents is an online platform, a bureau without a desk or phone number, a connector to the municipal association with no explicit or shared physical address. While the service is necessary and laudable – a sort of degree-zero for people first orienting themselves – its interface excludes both presence and situated or embodied social responsibility. It makes you appreciate the physical presence of the City, whatever its form and even when it finds its way into strip malls and old buffets.

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AMPS, Architecture_MPS; University of Arizona
22—23 February, 2018

5 Depending on the source and methodology, the estimated costs of projects tied or justified by the 375th anniversary oscillates between 200 million and 1 billion CAD. While not all funded projects have relevance to political space, the investment made and discourses surrounding these celebrations directly tie them to the representation of the City. See for example Graeme Hamilton, “Montreal’s $200M Birthday Spending Spree: Bridge Lights, Granite Stumps among ‘Legacy Projects,’” National Post (blog), August 5, 2016, http://nationalpost.com/news/canada/montreal-200m-birthday-spending-spree-bridge-lights-granite-stumps-among-legacy-projects; “La Vérif: un milliard de dollars pour le 375e de Montréal,” Radio-Canada.ca, accessed April 17, 2018, https://ici.radio-canada.ca/nouvelle/1033942/anniversaire-montreal-cout-festivite-fete-milliard.
6 Ville de Montréal. https://ville.montreal.qc.ca Accessed February 2018
10 For a related study of how interfaces can be used to infer public space, see Kim Dovey and Stephen Wood, “Public/Private Urban Interfaces: Type, Adaptation, Assemblage,” Journal of Urbanism: International Research on Placemaking and Urban Sustainability 8, no. 1 (January 2015): 1–16.
20 Reinhold Martin, The Urban Apparatus: Mediapolitics and the City (Minneapolis: U of Minnesota Press, 2016). Martin defines the apparatus as an assemblage of infrastructures, whereas in this article and in my reading of Agamben, the term is applicable across scales: each interface is an apparatus and one apparatus can be composed of others. This also has to do with the French dispositif, more frequently used with respect to device, or equipment, than its English counterpart.
At the moment, the range of actors is limited, but, eventually, the project will tease out these lines and relationships from a range of sources including on site observations, interviews, construction and legal documents. The material used for the drawings is the result of a two-month investigation in the summer of 2017. The drawings were produced subsequently and finished in December 2017.


28 Reinhold Martin, The Urban Apparatus, 2.


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THE SPATIAL IMPACT OF IMMIGRATION

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IMMIGRATION AND THE CITY

*Diversity represents a vital asset that opens up new possibilities, better solutions, and innovations.*

- Jane Jacobs

The relatively permanent movement of people across national and international boundaries is referred to as immigration. International immigrants are further classified as legal immigrants (those who moved with the permission of the receiver nation), illegal immigrants (those who moved without permission), and refugees (those crossing an international boundary to escape persecution). Jay Weinstein and Vijayan Pillai, in their book *Demography: The Science of Population* (2001), denote another classification: forced immigrants, those who move against their will (slaves or victims of natural disaster or civil war).

Other people leave their countries of birth in search of new lives abroad. This migratory phenomenon is called the Push-Pull factor, in which something bad about where someone lives pushes them away from where they currently live. When immigrating, people often believe that the country they are moving to will offer plenty of new opportunities, including more and better-paying jobs and improved living conditions and educational opportunities. Yet, whatever the motivation, crossing borders always involves challenges in the new country: meeting administrative requirements and expenses, difficulties in obtaining employment and accessing state services, learning a new language and new customs.

*Figure 1. A Tide of Return | Alex Majoli*

The greatest Western misunderstanding about immigration is that the newcomers are “other people,” that “we are not all immigrants.” In fact, as former World Bank administrator Ian Goldin suggests, the
whole world – or, at least, “the greatest civilizations” – established themselves as a result of immigration.18  
Ironically, while the issue of immigration – both legal and illegal – garners considerable domestic press coverage, the United States is actually experiencing a lower rate of immigration now than at any time in history.19  
The Western world has become exclusive, almost a fortress, living under the illusion that one country can be a “community” without strangers. It appears that the West today is inhabited by a strong desire for apartheid, separateness. Our world is more divided then ever and the militarization of boundaries, where our borders become war zones against foreigners, contradicts all the democratic ideas upon which the Western world claims to be founded.20

IDENTIFYING URBAN “IN-BETWEENESS”
In spite of the resistance to immigration, the world is becoming more mixed and diverse. Due to a dramatic decline in the working age population over the next 35 years, it is anticipated that immigration will sustain current population growth and drive world economic development.21  
As philosopher Achille Mbembe affirms, the stage has been set in which we have, on the one hand, the West which, due to its conservative approach to immigration, is a dormant, complacent and nostalgic society worried about where it used to be and not really knowing where it wants to go.22

Figure 2. Life Along the Border Wall | David Bacon

Figure 2. Life Along the Border Wall | David Bacon

Figure 2. Life Along the Border Wall | David Bacon
On the other hand, there are dynamic regions with emergent societies, like China, Brazil, India, and Africa, where people are in motion and tolerate immigrants within their midst. In an interview with VPRO in 2013, Professor Mbembe goes on to say that the West needs to understand that the world we live in now is a totally different one and that the future sustainability of our economies more and more won’t be solely decided at this end of the planet.

At the same time, experiences of discrimination toward immigrants are increasing worldwide. Socially and economically, discrimination is tied to negative narratives fueling fear of stolen jobs, radical ideologies, crime, and poverty. Discrimination against new immigrant groups may be a "natural aspect of our psychology". According to Steven Neuberg, a professor of psychology at Arizona State University, human development made us highly dependent on people in our own groups. Therefore, we tend to believe that people who are foreign to us are more likely to pose certain kinds of threats, such as taking our resources, violating our norms and values, taking more than their fair share, and the like. These perceptions are false narratives that chip away at the spirit of community by limiting a welcoming attitude and increasing suspicion.

Literature on transnationality highlights the ambivalent nature of immigrant lives “in-between” their country of origin and the host country. The “in-betweenness” experienced by immigrants refers primarily to their cultural/social existence. They live in one country while being linked to the cultures and traditions of their country of origin and, sometimes, these may not even be compatible. The ways in which one negotiates with the new culture and manages to maintain the traditions of one’s country of origin illustrates the concept of “in-betweenness.” It is here that we get the opportunity to explore the interrelationships between immigrant groups (globals) and their occupation and inhabitation of the local urban public space. This “in-between” space is almost always unfashionable, dangerous, undesirable, geographically unsuitable, and has poor infrastructure. It is located on the outskirts of the metropolis, alienated and low in density, a place where immigrants cannot express their best due to the lack of commercial spaces and access to public transportation. Yet, this space remains the only interface between their country of origin and the host city, and it serves as the place where people start to speculate about their future as individuals, as families and as whole urban communities.

![Figure 3. Superkilen | BIG](image-url)
The continuing connection to their country of origin is partly what creates the ambivalent, in-between position of urban immigrants. They belong to an ethnic community that acts as both a safety net and as the main means of socialization and support. At the same time, they are operating at the margins of a structured society, which creates the need to find a balance between the old and the new. Ultimately, one must be able to function in two often completely different, realities, and adjust to two parallel ways of life that need to be experienced as a single, coherent one. When trying to understand the immigrants’ position, we must have the concept of the in-between space at the focus of our attention.\footnote{iv}

In these spaces, global and local ideas contribute to a learning process based on acceptance, respect, and integration. Three factors prevent the in-between space from succeeding:

1. **Physical barriers**, caused by long distances between city centers, limited public transportation, residential buildings lacking suitable commercial spaces.

2. **Institutional barriers**, caused by regulations, which may be obsolete. Strict rules on hygiene and education, for instance, make it impossible for immigrants to open their own businesses.

3. **Citizenship barriers**, caused by complicated and possible unfeasible paths to citizenship. These barriers discourage investment by immigrants with little chance of successful integration.

Addressing these barriers require both design-based and policy-based solutions. To do so, XCOOP Rotterdam and the Centros Urbanos Javeriana, Bogota' (XCOOP+UC) have studied ways to accommodate the foreigners within the traditional urban grid by proposing a “hypothetical sustainable multi-cultural city,” conceived to promote the robust inclusion of immigrants. Through a vision for the “in-between” spaces, these designers’ proposals improve integration among immigrants and the communities in which they settle.

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Figure 4. Urban Centers A + U Lab
The in-between space first incubates immigrant success. “[It is here] that serious and sustained investments from governments and agencies are most likely to create lasting and incorruptible benefit.”

It is here, too, where the transition from "outsider" occurs, where the next middle class is forged, and where the next generation's dreams, movements, and governments are created. Accordingly, among the proposals by XCOOP+UC are the following:
- building public spaces designed for positive encounters among different groups;
- identifying and implementing new architectural typologies;
- improved methods of participatory design.

XCOOP+UC plan to achieve these and other objectives by collaborating with native and foreign communities, professionals such as urban planners and social behaviorists, and colleges and universities.

CHALLENGING THE DIVISION BETWEEN “INSIDE” AND “OUTSIDE.”

XCOOP+UC’s hypothetical sustainable multi-cultural city is equipped with tools that encourage growth and support the possibility for everyone to develop and live dignified lives. Moreover, it is fundamental to allow immigrants to shape the space around them and fill the economic gap when opportunities arise. This more we can bridge between local and global communities, the more the neighborhoods will continue to be revitalized. The key is to focus on quality of life for both the people who live in the city already and people who are interested in moving there.

In order to make the city a welcoming place, governance needs to plan for inclusiveness, open the city to the outer world, sponsor growth and revitalization, maintain parks and public places, provide strong schools, and create a safe and welcoming downtown that is pedestrian-friendly and full of services.

When newcomers look for places to live, they value safety, political stability, an affordable lifestyle, economic opportunity, family-friendliness, healthcare, culture, recreation, public transportation, immigrant-friendly policies, and diversity. Immigrant parents place great importance on high-quality and affordable education for their children. Good education provides future opportunities to children that the parents might not otherwise have access to. Without these fundamental assets, who would want to live there? Doug Saunders, author of Arrival Cities, says that arrival cities are “where the new creative and commercial class will be born, or where the next wave of tension and violence will erupt.” The difference, he cautions, “depends on how we approach these districts both organizationally and politically, and, crucially, in terms of physical structures and built form.” It is important to keep the locals in and welcome globals from the outside to participate to the growth and redevelopment of cities.

According to the German sociologist and philosopher Georg Simmel, “Spatial relations are not only determining conditions of relationships among human beings, but are also symbolic of those relations,” (1971: 143). Simmel continues by clarifying that “The stranger will thus not be considered here in the usual sense of term, as a wanderer who comes today and goes tomorrow, but rather as the man who comes today and stays tomorrow.” This realization that the place in-between actually translates into the public space is fundamental for the team (XCOOP+UC) that starts looking at the design of a sustainable multi-cultural city as an open public space rather than a neighborhood within a neighborhood (Saunders' Arrival City). The new city is an open source environment where people meet, interact and exchange of ideas.
Public space can be seen as the “stage upon which the drama of communal life unfolds” (Carr et al. 199 2: 3). Public space is the juncture of the different elements that comprise society. It is the physical place where the manifestation of the political meets individual habitation and it may shed light on questions about democracy and participation. Projects like BIG Superkilen in Copenhagen are of major importance to the immigrant population. A mile-long urban park wedged into one of the most ethnically diverse and socially challenged neighborhoods in Denmark, the Superkilen is a giant collection of found objects from the 60 different nationalities of the people inhabiting the area surrounding it. The objective was to upgrade a neighborhood to a high standard of urban redevelopment that celebrated diversity and would be likely to inspire other cities. It is fundamental for immigrants to feel part of the design project and finally, to design the spaces they will inhabit. Ultimately, what we're looking at is “how to create healthy, high performance communities, and how do we take advantage of all the systems related to how people live and work...to create places that are much more livable and healthy.” The goal is a community that collectively and efficiently uses its resources to facilitate growth and inclusion. (Zanghi, A. 2016)

**DESIGNING CITIES WHERE EVERYONE CAN THRIVE**

In times of economic uncertainty and rapid demographic change, how can urban policymakers ensure and maintain equity among all citizens?
Cities organize and regulate many of the activities of daily life that are crucial to the social and economic inclusion of residents. Cities can encourage two-way integration between immigrants and receiving communities revolving around opportunities for positive access of public spaces and goods.\textsuperscript{xxii} Within this dynamic and culturally smart urban environment, immigrants play a key role. It is a myth that immigrants take more than they give back to society. On average, immigrants (both skilled and unskilled) contribute much more than they take.\textsuperscript{xxiii}

Referring to a study done by the Center for American Entrepreneurship, Richard Florida points out that cities with high immigrant diversity are better off economically in the short, medium, and long term.\textsuperscript{xxiv} The study describes the role that immigrants have played in creating America’s largest and best-performing companies. The study points out that 43 percent of today’s Fortune 500 had a first- or second-generation immigrant among their founders. Nearly a fifth (18.4 percent) of these companies were founded by first-generation immigrants, and another quarter (24.8 percent) were founded by their children. All together this accounted for $5.3 trillion in global revenue in 2016 and the employment of more than 12 million workers worldwide.\textsuperscript{xxv} Immigrants of all skill levels, therefore, are not only creating and sustaining big companies, they are building thriving urban economies. Ian Goldin’s interview with VPRO in 2013 reports that we see this most acutely in Silicon Valley, where half of the start-ups (all the greatest iconic firms we can think of, including Google, Yahoo, and Apple), were founded by very recent immigrants.\textsuperscript{xxvi}

Figure 6. Baltimore | XCOOP
At a time when some countries are facing a dramatic decline in the size of the working age population, some cities are actively trying to lure immigrants as a strategy for economic and population growth. In Baltimore, Maryland, Mayor Stephanie Rawlings-Blake said that she was counting on immigrants to help Baltimore gain 10,000 families within a decade. In Pittsburgh, Pennsylvania, immigrants have helped boost housing markets in otherwise neglected neighbourhoods, fostering new opportunities for affordable development. Welcoming immigrants is a logical tactic for cities trying to repopulate their neighbourhoods. Immigration must be encouraged, therefore, to contribute towards the shaping of urban space. Accordingly, it is now the designer’s challenge to plan for sustainable cities by including the multi-cultural aspect in the new urban landscape. Key for doing so is to understand, rethink, and challenge implicit divisions between “inside” and “outside.”

CONCLUSION: MOVING BEYOND “WELCOMING”

Multi-culturalism is a fact, and we are responsible for planning sustainable cities that are open and accessible to all. What will likely be remembered about this century, more than anything except perhaps changes to the climate, is the shift of populations from the South to the West, from agricultural life to cities.

Western nations that in the past have had relatively homogeneous populations are experiencing an influx of immigrants from the South, (Fuchs, l.h. 1990). Immigration will continue: we cannot stop it because there are always powerful forces leading people to move from place to place in search of better lives. People living in the West cannot develop and move forward alone: we need immigrants and we need to come up with a strategy that allows us to grow, together. We need to start looking at the global citizen as one who shares a common and collective intention to develop and embrace a new direction to take.

In his book, Arrival Cities, Doug Saunders makes clear that the cities and nations that see the opportunity offered by immigrants stand to gain the most. By providing citizenship, a chance to own property, education, public transportation, and safety, such cities and host nations succeed in integrating their new arrivals, ultimately benefiting as the immigrant class evolves into a middle class. The “in-between” places are not a static condition but a point of interchange, a place where some of the most important and surprising changes of the 21st century are taking place.

For urban designers, the key question raised by immigration is how to acknowledge, respect, and accommodate diversity through the built environment. As urban designers, our responsibility is to provide citizens with the opportunity for positive encounters among different groups in public spaces, equal accesses to public services and goods, implementation of new typologies, and improved methods of participatory design. We can achieve this only if all interested parties are involved in the discussion about experiences, knowledge and funding.

Spatially speaking, the influx of immigrants helps blighted neighborhoods come back to life. In Baltimore, the mayor’s office is offering immigrant-friendly services such as translation, interpretation and document preparation to attract immigrants to the city. Baltimore was built for 900,000 inhabitants, but as manufacturing jobs left, and crime increased, the city’s population has shrunk to about 600,000. When cities invest in dynamic transformations and the number of abandoned buildings decreases, that provides room for individual and societal growth.

One of the most striking examples of a city embracing diversity is New York City. Projects like nARCHITECTS’ Carmel Place represent an interesting example of the successful interaction between architecture and city policy. Their proposal for micro-apartments in downtown Manhattan as a way of
providing cost-effective, single-occupancy dwellings is largely about preserving and encouraging the diversity of the city.

"It’s incredibly important to keep [the cores of the cities] as diverse as possible," explains Mimi Hoang, principal of nARCHITECTS. "I think the warning signs are in Paris, where they tend to put immigrants in this kind of immigrant belt. This obviously creates feelings of ostracization and marginalization for some in society. We have our own problems in the States of course, but the reality is that if the working class is in the periphery of the city, that is creating a hotbed of resentment." xxxi. XCOOP+UC’s sustainable city creates spaces that would be points of interchange, in which people could thrive as individuals and families, and in healthy communities. It is here that the most important and surprising changes take place.

The global community is at the forefront of a major trend that will determine the economic and political development of the first half of the 21st century: the rate of immigration that flows from low wage countries is moving forward and if the West does not take advantage of this opportunity, it will have disastrous consequences for its economy, and thus for the future of its citizens. Globalization is where we are and the whole question of immigration allows designers to rethink what cities should look like in the future.
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THE ARCHITECTURE EXHIBITION AS AN ENVIRONMENT FOR A RADICAL REDESIGN OF THE BUILT ENVIRONMENT

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INTRODUCTION
The rise and professionalization, around the 1960s, of the figure of the “curator” marked an important point in the configuration of an exhibition’s authorship and process, restaging or reframing of art and architecture exhibitions, and questioning processes of instruction versus creation. Such broader shifts in architecture exhibition practices coincided with the emergence of exhibitions conceived as, or concerned with, environments. These changes contributed to the transformation of the very idea of the exhibition, from a display of discrete and primarily representational objects to more immersive and experiential environments. For example, the work of the Belgian architects’ collective Rotor represents a new kind of inventive practice in architecture which is part of an expanded notion of curating the built environment. This paper interrogates the radicalization of creative practices related to curation of architecture exhibitions as environment and discusses the strategy of appropriation by analyzing two exhibitions by Rotor as case studies. Two curated and designed architecture exhibitions by Rotor, first Usus/Usses, presented at the Belgium Pavilion at the 2010 Venice Bienalle and the Bomel Cultural Center in Namur 2015, Belgium will be analyzed and discussed with reference to statements by the authors in order to explore the nature of curating radical practices when associated with reusability, sustainability and the built environment.

CURATING THE ARCHITECT’S ROLE AND RESPONSIBILITY FOR THE BUILT ENVIRONMENT
The work of the Belgian architects’ collective Rotor displays a valuable understanding of the designer’s role in society, the material world, and the environment. And by directly addressing or challenging the architectural dimension on the notion of environment, the exhibitions suggested new terms on which architecture and design could be practiced, prepared and presented. Architecture is no longer just the object of the exhibition. Instead, the exhibition itself has emerged as an important site for reframing and representing the discipline of architecture.

Through their work as curators and makers of several exhibitions, Rotor raises the question: how can the design profession reinvent its discourse around responsibility? Hence, the work of Rotor explores the notion of wear, that is, materials, objects and building structures in relation to use. Use is not to be conflated with program or function, but rather the social aspect of occupation and inhabitation of architecture during the life-span of a building, which allows Rotor to approach critical questions of reusability and sustainability. Rotor focuses on modernist and contemporary buildings slated for demolition in order to reuse their material components for radical redesign. This obsession with the worn-out and wearing out of architecture is
intended to question the standard approach of demolition to create a tabula rasa situation for new projects, not only to save materials (and energy) from the landfill, but also to introduce a social point of view, to keep the qualities that are already there, to improve on the existing, and to remember the people and events that took place. Material re-use encourages one to consider buildings as repositories, not just of the materials, but also of knowledge and past practices of crafting buildings. These past practices are also given as raw material—in this case, of knowledge—that might find new applications and contribute to new value systems.

REUSABILITY, SUSTAINABILITY OF THE BUILT ENVIRONMENT AS A PART OF A POLITICAL PROJECT
Rotor’s design approach addresses reusability and sustainability as part of a political project. It formulates a critique of throwaway consumer culture and highlights how outsourcing products to global supply chains conceals labor conditions, resulting in depoliticization of both working conditions and environmental costs. To counter this, Rotor developed guidelines, protocols and regulatory work for the reclamation of reusable materials and the integration of “waste” into the current building process. Transgressing the disciplinary limits of architecture, they research, design and exhibit work in response to industrial production, consumption and waste fabrication. Rotor’s national survey of existing second-hand building material dealers in 2013 showed the lack of firms working with large scale industrial materials of the twentieth century, out of which Rotor DC (Deconstruction/Consulting) in Brussels developed as independent wing of Rotor’s design activity. In 2015, Rotor developed a vade mecum for off-site reuse: a model of legal and practical guidelines for the reclamation of reusable materials from public buildings in Belgium. In cooperation with a lawyer, they are also working on policies to re-introduce salvaged building material into the construction process of buildings within the European market. Here, the client is the European Union in Brussels because waste legislation, rules on public tendering, and product norms are subject to EU policy. Rotor hopes to dissect and redesign the material economy and its underlying (legal and processual) conditions which could be understood as a political project.

CASE STUDY 1: USUS/USURES – THE ARCHITECTURE EXHIBITION AN ENVIRONMENT FOR RE-USE STRATEGIES
As a relatively young office, the work of Rotor represents a new kind of emerging practice in architecture, in which various disciplines are combined: from research and exhibition making to material studies and re-use strategies. Rotor is interested in material flows in industry and construction, particularly in relation to resources, waste, use and re-use which challenge historical conceptualizations of building culture, heritage and social value. They deconstruct buildings into elements (construction, materials) and re-assemble them in new ways. This is an approach about material and knowledge of past practices of crafting buildings and interiors. They aim for both new applications and new value systems around materials and assemblies. Rotor undermines the typical professional divisions of responsibilities between clients, contractors, workers, designers, users and other stakeholders.
This distinct interdisciplinary approach of Rotor—which can be described as deconstruction, relocation and assemblage—has been at the center of their exhibition Usus/Usures for the Belgian Pavilion at the Venice Biennale in 2010. At the international architecture exhibition, they displayed mundane materials and products salvaged from Belgian social housing projects as abstract art. The selection and framing of used materials and architectural elements of a social housing complex is neither a purely aesthetic nor neutral
act, but points to the social problematic of disappearing low income housing in Belgium and other Western countries.

Usus/Usures was entirely made from salvaged building components that are usually overlooked and treated as waste (*deconstruction*), such as carpet, stairs, railings, etc., exhibiting them in a denaturalized way (*assemblage*) in the Belgian Pavilion at the Venice Biennale (*relocation*).
Unlike common architectural practice, where thinking about material and making means the design of new objects, description through specifications, and ordering through product catalogs, with Usus/Usures there is an entirely different process in place: thinking of materials as something physical and tangible to be identified, transported from one place to another, and then reframed. A red carpet, for example, was taken from one apartment of a social housing block (relocation) and mounted to the wall of the exhibition as floor plan of this apartment (assemblage). The red industrial carpet, already depreciated as waste, becomes a kind of manual of use, a diagram of wear created by the occupant representing the processes of habit and inhabitation. Instead of being a deficiency, the traces of wear lead to reflections on use, users, and construction practices through the new context of the art exhibition. In a similar fashion, an extracted banal industrial staircase shown in the Belgian Pavilion could be read as a map of human movements walking up and down this stair. These works create an understanding of the human body as a performative tool that leaves distinct material traces of everyday human activity. The building components were exhibited in an isolated manner as to draw closer attention to their own intrinsic qualities, despite—or perhaps exactly because of—their anonymous and ordinary appearance. Though minimalist in its appearance, the exhibition Usus/Usures resulted from Rotor’s extended research into and analysis of the use and wear of buildings and building materials.

Rotor underscores the fact that sustainability cannot fully be defined in a scientific way; it is also a political matter, because it emerges from a multifaceted process with many contributors. The stakes for architecture are aesthetic, economic, environmental, and social. Rotor’s intention for Usus/Usures was to bring the subject of materiality into the arena of the Venice Biennale opposing the glorification of “the New” that is implicit in this kind of exhibition format. They intended the subject of wear to draw attention to the reaction of buildings to longtime use, and more, to challenge architects to anticipate this process. Looking at buildings through the lens of wear leads to reflections on use, users, and construction practices. Rotor encourages the public to change their attitude towards building materials, but also in a more general sense, towards all objects around us. Wear is largely a taboo topic in architectural circles because it contrasts fundamentally with the value of purgation, but also with the construction cycles which become shorter and shorter: “in the 20th century, under the combined influence of increased real-estate pressure, an obsession for speed in demolition, the availability of power-machines and explosives and fiscal constructions had encouraged accelerated building obsolescence.”

The exhibition catalog Usus/Usures- How Things Stand – Wear make us act
Parallel to the exhibition Usus / Usures, the collective produced a catalog How Things Stand, which brings together perspectives from different professional fields on the theme of “wear”. Instead of understanding it as a defect, Rotor reframes it as informative for their practice: wear is approached not as a problem in itself, a testimony to an error of design to be avoided at all costs, but as an inevitable and potentially creative process. In the chapter titled “Wear Makes us Act,” Rotor divided a collection of images of everyday situations of the built environment (of wear) with 28 theses exploring materials in relation to the social aspect of use. Rotor discusses the opposition between pragmatically engaging with materiality as an object of study, on the one hand, and as a resource for the Venice exhibition on the other—engaging in a critical discourse on architecture. In the catalogue, Rotor presents alternative readings of material structures and objects to challenge established architectural discourses on novelty, perfection, and pristine finishes versus wear, use and users, acting and performance, all the way to reading material traces as an additional layer of
information, and hence as added value instead of consumption, thereby questioning the social and ecological consequences of current conventions and value systems.\(^4\)

**Redefining of materials, material practices and social relations in architecture**

Rotor’s work displays a different understanding of the architect’s role in the material world. To consider material practices is not only to be interested in techniques of making, but it is also to understand “things”—be they chairs, buildings or entire cities—as socially constructed and situated artifacts. This approach demands the viewer to ask: how have they been produced, and who has made them? What kind of knowledge and information do they display? What does their making and the materials employed tell us about the users and uses they have been made for? Materials are essential to this inquiry; their role in crafting buildings and the environment is not less significant than that of architects and designers. Materials demand attention not only in an aesthetic sense, but also in a cultural, social, and environmental sense. Rotor understands materials as the trace of social relationships. Materials and their traces, from source to processing to use, hold economic, social and political information, especially with regard to power, class, race, and gender. Seen from Rotor’s discursive frame, creative practices operate in a comparable arena shaped by material and social relations. This relationality means that materials and material practices—such as materials and construction—are connected to different parts of society. For example, we usually assume that gypsum board used as wall and ceiling finish is a universally standardized and neutral material, but as Rotor reminds us, gypsum today is primarily a byproduct of energy production. In order to protect the environment from sulfur dioxide produced by coal- and oil-firing, which contributes to acid rain, it has become common practice to wash out the harmful gas with calcium oxide to form gypsum.

In a similar vein, Maarten Gielen, one of the founding members of Rotor, considers the monument for the Flemish Catholic priest Adolf Daens in Aalst, Belgium. Daens (1839–1907) became known for his socio-political involvement and as pioneer for the emancipation of the working class, especially the textile laborers of his hometown of Aalst who suffered from inhuman production practices in the late nineteenth century. Gielen points out, however, that the flooring around the statue of Daens from the mid-twentieth century is not the local blue limestone locally, but rather a similar-looking material made in Vietnam and notoriously produced under exploitative circumstances. The result is a heroic statue celebrating the workers’ emancipation of Aalst standing on a sea of stones that are very questionable.\(^5\)

If this sculpture had been created by a contemporary artist, it would be considered controversial, if not cynical. Yet when architects are involved in similar practices and material choices, the audience tends not to see it.

**CASE STUDY 2: BOMEL CULTURAL CENTER: THE EXHIBITION OF A BUILDING – A BUILDING ASSEMBLAGE**

Another example of how to make this reframing of material practice productive within the frame of architecture is Rotor’s Bomel Cultural Center in Namur, Belgium in 2014. Again, they identify building parts and materials for re-use, relocation and assemblage and re-integrate re-used objects and worn-out materials into their design strategy. Yet the work with reused materials and building elements is more than just recycling, that is, an economic and ecological “functional” assemblage. In this work, Rotor employs a strategy where building parts and interior objects are interpreted through partial integration into several sometimes-conflicting layers of narratives. The Bomel Cultural Center is an adaptive re-use of a former slaughterhouse built in the 1940s in an underprivileged neighborhood of Namur, which was renovated and transformed into a cultural center by BAEB architects in 2014. Here Rotor was asked to provide equipment
and interior design, but also to reflect upon how this place would be used and operated. The former interior of the slaughterhouse had been lost in the newly finished renovation, leaving little historical context as reference.

Given the white box situation of a generic, abstract “designed” space, Rotor decided to add a number of new narratives to the building in the form of a “building assemblage.” For example, they reused decommissioned interiors acquired from financial institutions as a new functional interior for the Bomel Cultural Center and as part of a permanent exhibition together with guided tours by the curators. They translocated and re-used a cappuccino bar from a former CEO’s office of the headquarters of the BNP/Paribas Bank in Paris, France. Of course, this was not just a neutral or opportunistic move of acquiring parts of a random interior to serve a cultural center, but rather the former state bank BNP/Paribas-Fortis, which had been transformed into a private institution in 1987 and was saved in the global financial crisis of 2008/09 by the state, with public money. Rotor wanted to point to the fact that European taxpayers helped save this private financial institution, and hence also that the people using the Bomel Cultural Center in Namur had already “paid” for the former CEO’s cappuccino bar, at least indirectly.

Rotor’s strategy of reuse, relocation, and assemblage is a critical voice against the context of public support for lopsided private financial institutions, which leads to austerity politics in the public realms of education, culture and public housing. In addition, this intervention has to be read as a critical comment on the disparity of the built environment and current practices of heritage preservation. Rather than pure conservation and renovation, Rotor’s engagement with heritage and public interest moves in an entirely different direction: “Looking at a building as an assemblage of elements that can be dismantled and reassembled again, possibly into totally new configurations forces us to reassess our understanding of architectural heritage.”

6
CONCLUDING REMARKS

Both exhibitions by Rotor use technique, material, process and the spaces of the art world (museum, galleries, Biennale) as realms for political commentary that are critical of the current global economic regime. Not only do their distinct yet comparable approaches entail urgent questions of sustainability, re-use, and appropriation, they also imply a need for a different view on history and the historical production: they recharge the critical aspect of curating (as already present in the 60’s and 70’s with architects’ collectives like Superstudio, Archizoom, UFO and Gruppo 9999, Global Tools) and expand it to the problem of re-use: the re-use of materials and of building elements, but also the re-use of ideas, the re-use of knowledge, of archives and memory. They deconstruct existing value systems in art and architecture and open room for exhibitions as environments to initiate a radical redesign of the built environment. Rotor continued its critical investigations in sustainability issues in architecture by curating and designing various exhibitions, including the Oslo Triennale 2013 “Behind the green door” and the 2016 exhibition “Constellations” in Bordeaux.
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TIMELY MONUMENTS AND PERSISTENT CAMPS: A CALL FOR EXCEPTION

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“There is no such thing as a universal architecture of resistance. It is always particular, responding to the specifics of a place and time. To write about it, to advocate it, and especially to create it, one must choose the precise point of its pressure on a given situation. For this reason, an architecture of resistance is transient, impermanent, even ephemeral, because situations change, and with them the very need for resistance.”
- Lebbeus Woods

INTRODUCTION

Today in the face of growing uncertainty, a reactionary preoccupation with permanence verges on a crisis. This crisis is evident in recent disputes over the alteration of existing structures, from the angry response to the proposed renovation of iconic buildings such as Philip Johnson’s AT&T tower to the debate over whether Confederate statues should endure despite their flawed meaning. This crisis of permanence calls into question the concept of a monument, and casts doubt on the feasibility of cultural, social, and physical adaptation amidst an impassioned concern for history. Relatedly, these questions suggest that historical meaning, artistic value, and cultural progress are at odds in ways that demand a reconsideration how monumentality could be productive for society today. Concurrently, the Trump administration has established as standard practice the reversal of progressive initiatives essential to the future of the country, from the pledge to meet global carbon-reducing goals to state-supported paths to citizenship for undocumented Americans. Broadly speaking, there seems to be a pattern of regression toward the past that is taking influence on collective attitudes towards cultural identities and values, preferring sovereignty and steadfastness over the relevance to present demands and future needs.

One problem with permanence is that it is a nonviable goal. Expand the time horizon far enough, and everything on the planet evolves, degrades, dies, transforms, or becomes obsolete. More significant is the dangerous proximity of permanence to stagnation, or the lack of progressive development due to an inability to change. To avoid stagnation, “permanent” systems develop and advance by the means of exceptions, or disruptions of existing norms that produce a demand for change. Organisms evolve, ecosystems adapt to environmental shifts, and truly democratic governments amend their constitutions in response to the present demands and values of the people. Exception is a necessary means for progress.

The notion of exception offers a critical, untapped potential for architecture. Spaces of exception insert a strategic deviation (formal, political, social or otherwise) into their context, introducing transformative shifts within the existing conditions that resist the status quo. When distributed throughout the built environment, spaces of exception have the potential to foster dynamic pluralism against static homogeneity, encouraging adaptation, collective participation and the possibility of alternate futures. Recent uncertainty has spurred a recoiling towards impossible absolutes - fostering scarce middle ground between regressive stagnation and rapid, shortsighted development that exceeds the pace of critical
practice. Against the vast, neutral homogeneity of the constructed environment, exception holds the potential to act as an architectural form of resistance.

Legal exception occurs in spaces distinguished by a condition of extraterritoriality, or the “exemption from the application or jurisdiction of local law.” This applies to airports and international trade zones whose internal organization is exceptional from the immediate external context. While these typologies have discrete borders and walls, unbounded spaces of exception exist in places such as sanctuary cities and university campuses, that seek to protect their residents by not enforcing federal laws. Exception also occurs informally throughout the built environment in areas of heightened publicness, sites of civic symbolism, and temporary, event-based occupations that affect the spatial composition of the city and one’s experience of it. These distinctive conditions contribute to an territory of dynamic pluralism rather than static homogeneity, and introduce disruptions within the smooth continuity of contemporary urban development. This diverse territory becomes a platform for a more vivid public realm that supports productive difference, inclusive agonism, and change over time.

Architecture participates in the formation of spaces of exception within the built environment. These architectures of exception range between typological poles: the monument and the camp. While the monument imparts its exception through qualities of iconism, singularity, and permanence, the camp operates as a framework that is systematic, adaptive, and transient. If the monument acts as timeless symbol, the camp is an ephemeral and emergent system, often constructed in response to timely conditions (i.e. event, disaster, political turmoil etc.). However, these assumed distinctions are not necessarily constant—the cultural meaning and value of a monument may change over time, and camps often persist as an indefinite state of alienation for their residents.

Three Examples of Exception: Agamben, Aureli, America

Giorgio Agamben’s concept of the state of exception describes the transcendence of the rule of law at times of political crisis in which a nation’s sovereignty is perceived to be threatened. This state simultaneously enables authoritarian systems of power and in turn the oppression of specific groups within the population. In such cases, the exception becomes a prolonged state in which societal norms are suspended and governmental control extended beyond established limits. Agamben cites Hitler’s suspension of the Weimer Constitution during WWII and George W. Bush’s Patriot Act post-9/11 as examples of the means by which democracies readily transform into authoritarian states. In such cases, the state of exception becomes an indefinite condition, in which typical sociopolitical relations are suspended, and specific groups severely oppressed.

Agamben’s underlying critique is of the inclination of western governments to readily inflict states of exception. Within such political circumstances, the spaces of concentration camps, prison camps, or immigration detainment centers form bounded zones of exception, in which the temporary suspension of law becomes a permanent condition of existence for the population confined to these spaces. Residents of these camps are stripped of their legal status (reduced to “bare life” in Agamben’s terms), simultaneously submitting them to and exempting them from their citizenship under the power of the state. This presents a paradox in which the camp is a space that exists both within and outside of the legal system. As a space of exception, the camp is both temporary and permanent, and the ground zero of alternative political logics.

Architect Pier Vittorio Aureli describes a space of exception as inflicted by autonomous objects within the built environment, which produce a legible and experiential difference from their immediate context. If Agamben’s camps enclose the most dire exceptional circumstances, Aureli’s autonomous objects
employ exception as liberation from the urban context that surrounds them. He gives the example of Étienne Boullée’s unbuilt civic monuments, describing their austere geometric volumes as a deliberate departure from and critique of their context, and their vast interiors as bounded public spaces that are distinct from the continuous urban territory of the city. Depicted as singular objects devoid of surrounding buildings, Boullée’s series of unbuilt monuments stand in stark contrast to the infinite homogeneity of urban space, “an archipelago of architectural states of exception that counter a metropolitan space dominated by the extensive management of production”. The exception here is simultaneously the architectural object as distinguished from its exterior environment, as well as its confined interior as an extraterritorial public realm.

The final application of exception to be considered is the popular notion of “American Exceptionalism”. The added suffixes (“-al”, “-ism”) shift the concept of exception towards an ideological characterization of uniqueness. America derives its exceptionalism from seeing itself as not like the rest of the world, defining its identity in contrast to other nations. Depending on the context of its use, this can communicate a positive advantage or a negative form of self-glorification and regressive clinging to the past. Whereas President Obama used the term American Exceptionalism to describe the inclusive diversity of the country as a means of encouraging and reinforcing dynamism, Trump’s exceptionalism is based on backward-looking ideals of righteousness and God-given supremacy. In these dissimilar applications the exception performs in opposite ways: in the former, as a pluralistic society which supports opportunity and progress for many, and in the later, as a condition of social regression and cultural stagnation in the interest of few. While both interpretations describe an exception, only that of inclusive diversity promotes a liberal society that accommodates and encourages change over time, for the benefit of the whole population.

In each of the aforementioned applications of exception, there is an inherent duality. In Agamben’s view, exception operates as both a means of oppression by and exemption from the legal authority. For Aureli, exception is an urban construct that is simultaneously autonomous and participatory. In the case of American Exceptionalism, exclusive sovereignty and inclusive diversity are two sides of the same coin. As a critical project, the transformative potential of exception draws from the productive qualities of each: exemption, participation, inclusivity. A space of exception, when inserted into a context produces a productive difference, and in so doing reveals the limits of the normative conditions surrounding it, enabling alternative futures. Unlike the absolute, the exception derives from its context, becoming a form of resistance when its use defies a norm. Unlike the autonomous, the exception participates within the existing conditions from which it deviates. With this understanding of the ways in which exception performs, it is critical to investigate the typologies of its implementation – the monument and the camp.

The Monument

Architecture has for centuries been preoccupied with monumentality; continually seeking the qualities of a built form that produce enduring stature and meaning. As objects, monuments are formally distinguished from their context, and as symbols, they commemorate significant histories, events or people. This historical value contributes to an assumption of permanence and timelessness. Nineteenth century art historian Alois Riegl contended that the perceived art-value and age-value of a work (its uniqueness and its historical significance) contributes to cultural belief systems which shape collective perceptions of history. Still, historical value is often in tension with “newness” when comparing various works from different periods of time.
Architectural critic Sigfried Giedion described monumentality as “an eternal need of people to own symbols which reveal their inner life, their actions and their social conceptions. Every period has the impulse to create symbols in the form of monuments…things to be transmitted to later generations.”

For him, the purpose of a monument is both to produce material artifact for the future and to support collective social and political action in the present. Writing during the mid-twentieth century, he saw this an ambition which the project of Modernism had abandoned in its pursuit of economy, utility, transparency, and honesty. For Giedion, the project of monumentality demanded a formal language, an “architectural imagination” which modern buildings lacked.

Giedion’s call for a new monumentality was a call for spaces of exception—civic centers that would instigate new forms of collective awareness and participation. Recently, this call has been revived in Alexander D’Hooghe’s “Liberal Monument”. Like Giedion, D’Hooghe’s monumentality is a formal project with cultural and political goals, emphasizing the performance of contrasting form as a means of producing difference within an otherwise ubiquitous urban context. The monument need not be a singular object, but rather a framework—“not fabric, but figure, not object but assembled complex”—to support public life. The Liberal Monument is “a template for discrete interventions, to be multiplied and distributed in the sprawl as centers of resistance against this homogenizing field, and in stark contrast to it.”

As a generator of spaces of exception, it performs as complex of multiple parts operating as a distributed network or field of figures. In this way, the Liberal Monument is both finite and distributed, embodying qualities of both the monument and camp.

These notions of monumentality highlight a capacity to respond to and adapt with social and cultural evolution over a condition of permanence. As critical mediums and registers of societal progress, such monuments would be venues for public expression. They would impose exception as a deviation from and form of resistance against their circumstances. Rather than static symbolism, the identity of a monument would change over time, evading permanence in favor of the participatory aesthetics of publicness.

The Camp

While the monument has persisted for centuries as a fixation of architectural discourse, the camp has been mostly unacknowledged within the discipline. Perhaps this is due its inherent duality which evades conventional architectural solutions: it is simultaneously open and closed, public and private, temporary and eternal, physical and political. In his book, *Camps: A Guide to 21st-Century Space*, Architect Charlie Hailey gives this description:

“The camp can be understood as an engraved field, etched, layered, and ordered by diverse objects and programs. Remote and near, enduring and fleeting, recollected and direct, events activate and qualify the camping field. Combining field and event, camp is in effect spatial practice. Camp spaces also lie at the confluence of mental and social space. As a spatial production, whether at the scale of the individual or a city, camp is both field of research and a kind of contemporary field research.”

The global population today is more transient, mobile, and event-centric than ever before. In 2016, the UNHCR reported that global displaced populations have exceed 65 million, while the growing global middle class is traveling with greater frequency and duration. An increasing number of catastrophic
natural disasters has created a constant need for temporary housing for evacuees, and popular cultural events such as music festivals draw tens of millions of attendees to temporary spectacles annually. We are a camp-based, global society.

Paradoxically, the public spaces of our cities are becoming increasing static, controlled, and non-participatory. The pervasiveness of privately-owned public spaces (POPS) in cities like New York, as well as the lingering influence of New Urbanism’s reductive prescription of greenery, walkable streets, and commercial corridors, has stagnated public space as an active participant in the evolution of the city. Publicness is an emergent, temporary-yet-permanent, condition of the built environment involving multiple actors - people, place, time, event - to form spaces of exception within the city that are socially pluralistic and political agonistic. As political theorist Chantal Mouffe describes, “too much emphasis on consensus together with an aversion toward confrontation leads to apathy and disaffection.”

A well-functioning public space encourages debate and exchange by increasing one’s awareness of their environment, rather than placating them. To do so demands new hybrids of the formerly discrete monument and camp.

Such hybrids already exist by necessity as in twenty-first century monument, the sports stadium. Within its structure, populations equivalent of small cities are accommodated for short-term spectacles, such as a concert or sporting event. This capacity also makes them suitable to hold large groups of displaced people, as did the Houston Astrodome which housed 25,000 New Orleans evacuees after Hurricane Katrina in 2005. With the ability to accommodate mass spectacle as well as mass shelter, the stadium becomes an adaptable megastructure in response to current needs, capable of forming a space of exception for either purpose. This dynamic quality of the stadium demonstrates the potential of scalable and adaptive venues that perform as both monument and camp in response to societal needs. Despite this, cultural organizations continue to prioritize static preservation over dynamism in the built environment. In 2017, the Astrodome was declared a State Antiquities Landmark by the Texas Historical Commission, despite years of disuse.

**Timely Monuments and Persistent Camps**

Against increasing uncertainty and political backsliding, new cultural mediums and forms of collective participation are necessary. When broken systems endure despite their stagnation, exception acts as a means of disruption, an instigator of progress that reveals the limits of formerly accepted norms. New and necessary typologies of exception could be called “timely monuments” and “persistent camps”, typologies which enable new and radical forms of assembly, collective participation, and inclusive social accommodation.

Timely monuments subvert permanence by their qualities of ephemerality and adaptability. They may be temporary or indefinite, autonomous objects or distributed networks. Their mutable meaning is derived from their context and by their users. Recent examples include Ai Weiwei’s “Good Fences Make Good Neighbors”, a series of installations throughout New York City as a visual and spatial critique of fences, borders, and geopolitical division, and Assemble Studio’s Cineroleum, which transformed an abandoned petrol station in London into a pop-up theater, encouraging new forms of activation and occupation of formerly stagnant spaces in the built environment. Frida Escobedo’s participatory Eco Pavilion, and Bryony Roberts and the South Shore Drill Team’s 2015 “We Know How To Order” performance in Chicago’s Federal Plaza produced temporary adaptations of otherwise static spatial contexts. And Raumlabor’s temporary structures, such as their inflatable Spacebuster, affect the urban surroundings.
through their deployment and use. In such cases, monumentality is achieved by collective participation and shared aesthetic experience, rather than by permanent object. Persistent camps are unbounded, flexible, and adaptive, and produce long-lasting social and cultural effects. They are infrastructural, supporting various agencies and multiple populations. They produce territories of exception that challenge and resist their context, exposing the shortfalls of static, normative structures and hierarchies. Examples include Occupy Wall Street’s subversion of a privately-owned public park in Manhattan’s financial district, and the endurance of the anarchist squatter neighborhood of Christiania in Copenhagen. Elemental Architects’ Villa Verde incremental houses provide a partially constructed residential framework to be continuously built out and adapted by their owners. Persistent camps anticipate their continued occupation over time by design, as in the renovation of a former factory for open and pluralistic civic use in Lina Bo Bardi’s SESC Pompeia, as well as the central free space of Faculty of Architecture and Urbanism at the University of São Paulo by João Vilanova Artigas and Carlos Cascaldi. As flexible platforms for cultural evolution, persistent camps promote radical inclusivity and vibrant publicness.

Timely monuments and persistent camps form spaces of exception within the built environment that perform within and outside of their context. They respond to multimodal site conditions, exposing the limitations of current circumstances, and enabling radical, agonistic publicness. While they do not seek to erase history, they intervene in the present and support alternative futures. As adaptable structures, their identity is constantly shifting in response to cultural demands.

Americans are increasingly aware of the fragile nature of institutions once thought of as infallible, so permanent that they fade into the background of our collective culture. Though unsettling, this shift has also produced heightened critical awareness of our shared environment and one’s relationship to it and their fellow occupants. More than ever, a radical, participatory publicness within the built environment is necessary. Responding to these existing conditions by their exception, timely monuments and persistent camps are critical architectures of resistance, “because situations change, and with them the very need for resistance”.

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INTRODUCTION
The social life of cities and its consolidated neighbourhoods’ is endless, the mixed land use, the centrality and connectivity are their main attributes. However, for a Mexican family, living in a downtown neighbourhood of the consolidated city seems to be an issue of increasingly complexity.

During the sixties and seventies, the movements that question functionalist urbanism and conventional planning based on the Athens charter, present special consideration to Europe and America. From there, the significance of the traditional historical city and its urban fabric composed of its streets, squares, blocks and the significant physical elements of the urban scene. In the case of the city of Hermosillo, in North Western Mexico, a city highly influenced by the American lifestyle, the policies of the significance of the historic downtown have omitted the integration in the social context.

This paper explores the feasibility of the inclusion of the basic family unit as a tool in the processes of urban rehabilitation and densification of the historic downtown, where we find tangible values such as the architectures of past eras and the urban spaces that defined the actual city. Furthermore, we attempt to identify which are the elements that would make this urban sector attractive to the social segments, so they become interested in returning to the centre of the city.

Lifestyle and population flows
New lifestyles drive the production and demand of urban spaces, which generate new peripheries far from the city downtown. These urban models try to respond to the increasing demand of new places, new environments, and new ways of social relations among other issues. They focus on a high housing demand, security and provision of higher quality goods and services. These trends reflect in the high consumption of soil and a development of infrastructure and endowment of services, meant to meet the requirements of these new lifestyles. While the consolidated city and its most central neighborhoods, the previous generations’ dwellings, including its infrastructure and services, are abandoned. This implies that the traditional city model does not respond to the new proposals and demands of the different sectors woven in social fabric, who claim a new urbanism.

The success or failure of both models, prompts to raise the question of what are the Demands Urban and housing that the new generations claim? In addition, what is the foundation for the new
peripheries success against the failure of the traditional neighborhoods? Indeed, the new peripheries offer alternatives, its success translates into the construction of large urbanizations built outside the city limits; nonetheless, can traditional neighborhoods respond to these new demands? Is it possible to slow down the exodus trends that generate rupture and fragmentation into the city and its central neighborhoods?

This exodus has a pernicious effect that leads to an atmosphere of uncertainties at the consolidated neighborhoods of the city, with the degradation of its buildings and houses that in many cases are of patrimonial architecture. Meanwhile, the new urbanized territory has residential areas, shopping malls, exhibition halls, service stations, parks, playrooms, sports spaces, and entertainment centers. Essential elements of the equipment for the new forms of social relationships emphasized by the continuous disordered displacement by car.

This new form of urban life mixes its daily activities among the traditional urban model and the new peripheries, marked by the constant flows; where the spatial dynamics are ordered by the presence of main communication highways between the city downtown and the new urban system. In this way, traditional neighborhoods keep activities that concentrate great amount of population into certain hours of the day, and activities with a decrease of population mainly at night; with consequent oscillations in the use and function of urban spaces. Hereafter, we do not face a phenomenon of homogeneous distribution, but one of diversified directions; whose values and implications in the territorial and urban sphere are determined by the permanent population flows between the city center and the new suburbs. Such way of downtown use transforms it into a physical container with urban spaces of high demographic and economic concentration during the day, but dispersion and emptiness during the night; where the population flows, are who determine the final city organization, which is capable to house the influx of people and then their exit.

In contradiction, the new urban model located on the periphery, requires essential use of the urban downtown to fulfill its functioning, without considering the possibility of rehabilitation of urban space in the traditional array of the downtown. Due to the population preferences of locating their dwellings far of the sites where their daily lives takes place; we raise the questions: First, what are the new demands for housing, which the new families claim? Second, what are the demands related to urban space usage? Third, what opportunities have traditional downtowns of meeting these new demands in relation to housing and the use of urban space?

For the analysis of urban tissue issues, several authors emphasize the substantial value of the social links, however, a mostly dismissed factor when undertaking proposals or projects for the rehabilitation or urban renewal. These social links are usually associated with topics to the social tissue segments, along with their interests as inhabitants of a neighborhood or community whose efforts are aimed at finding a better quality in the urban sectors where inhabit.

North Western Mexico context

While speaking about historic downtowns of Mexico, prevails the image of the most renowned tourist cities, as Guadalajara, Puebla, Mexico City and Zacatecas, located at the central region of the country, however northern Mexico offers a different context, from weather, geography, economy among others, producing different architecture and urbanism.

Sonora State belongs to the northwestern area of the country; in consequence, its development has been object of different perspectives when the human settlements formed. According to Loredo, the cities of northern Mexico, have their origin in the campaign for securing the territory known as el Septentrión de la Nueva España—the Septentrión of the New Spain—, campaign that began with the
first explorations of the XIV century. In Sonora, due to its semi-desert characteristics, and the diversity of nomadic ethnic groups, the conquest went through a different schema: the system of missions, promoted by the Spanish Crown during the seventeenth and eighteenth centuries. Sonora is located more than 2,000 kilometers from Mexico City, while Mexican identity prevails, at the same time, society many historical and cultural elements shared with the United States more than a large border of 370 miles.

At the initial stage of the development of this massive territory, there were common elements with the northern neighbor: the first inhabitants of the two countries have the same origin, where they shared the geography and the culture. Sonora also shares with the United States many aspects of the western culture since the late nineteenth century: at the time when the boom of livestock exports, when agriproducts dominates the market in the United States. It was the time in history when there was not a defined frontier line, walls, neither gates to cross between both countries, at that time farmers from northern Mexico sold widely their cattle in the southern United States markets. Two forms of land use were established at that period, forms which still give identity of the Society of the north of the Mexico: hauling of livestock from ranches, and the great production of livestock in Feed-Lots System: cattle parked in small pens.

Regional identity factors developed from the conditions of the regional geography, its arid climate, the weak hydrologic resources, but also to the mineral richness of its soil. To produce an ordering and urban development possibilities draft, we could summarize that Sonora State is a semi-desert territory, with restricted resources, but indeed well located.

Today, the population of this vast territory has risen almost ten times in a century, from 222,000 to the beginning of the century XX to 2,217,000 in the year 2000. According to Ramírez, the population growth in the region is defined in three stages: (i) the first occurs in the first four decades of the twentieth century, where the growth rate is of the order of 2%, this small increase is due to the specificity of an arid region and precarious infrastructure, with low economic development; (ii) the second stage, from 1940 to 1980, recorded rapid growth linked to increased agricultural infrastructure and industrial investment, which improved living conditions; and (iii) the third stage corresponds to the demographic transition phase, as the birth control policies throughout the country have reduced fertility among other factors.

City of Hermosillo's downtown
Hermosillo has 812,229 inhabitants according to the Instituto Nacional de Estadística, Geografía e Informática. It has been the state capital for 139 years, located 278 kilometers south of the U.S. border—Arizona. The city has witnessed several periods since the buildings of the urban center reflected the historical value of the region progress. Today, Hermosillo is a city with a services vocation in the field of agribusiness, manufacturing, and automotive industry. The city divides itself into 9 sectors of urban planning, where the historic area is located in the Sector Centro—Center Sector. At Figure 1 we can see the official delimitation of the historic downtown as declared by the H. Ayuntamiento de Hermosillo in 2008. The historic downtown is delimited to the north by the central North District, to the south by the Cerro de la Campana (Madero District), to the west by the Civic Center and to the east by the Parque Madero. It stays as one of the busiest areas in the capital of the state and covers the historical and commercial part between the Blvd. Luis Encinas Johnson to the north, effective suffrage and No re-election to the south, Calle Jesús García to the East and Blvd. Rosales to the west.
It is a sensitively flat area, with slope oriented mainly to the Sonora River (south); It has an approximate perimeter of 3,600 m. and an area of almost 800,000.00 m², from which 30% are public streets. The population within the polygon 853 inhabitants total. It is still possible to appreciate the diverse architecture’s expressions, form nineteenth century colonial style, to modern movement buildings from the forties, or other contemporary buildings, as shown in Figure 2 to Figure 5. Within the polygon, there is a mix of uses; most buildings have commercial and service use; also, some abandoned buildings—by natural city growth—transformed in spaces detached from the daily life and urban economy.
The number of 523 dwellings\textsuperscript{3} within the Hermosillo historic downtown polygon, from which 162 are inhabited becomes the initial data for departure of analysis. Despite of the real estate dynamics who govern cities, and the new urbanism researcher’s enquiry, it is undeniable that the cities’ historic downtown transcendent and historical significance. While the residential use is still current in this area, the lure to leave, in search of life quality improvement, is ubiquitous; furthermore, for those few families that remain in the downtown area, the real estate market delivers a negative impact on their properties.
APPROACH TO RESEARCH
The approach of this research goes beyond the analysis of the urban form, and the organization of the territory that allows population flows throughout the day and night. We study the problem raised, analyzing the population flows, the expulsion of the downtown resident population, including and the way of alternating daily life, with the constant flow of those commuting to the downtown; with special attention on the downtown expelled population that opts for the habitability promised for the new periphery.

We look at the structure of the social fabric, focusing on the basic family unit, including its needs for housing and urban spaces at the periphery; with the goal of generate processes of transformation at the traditional downtown neighborhoods encouraging exchange of knowledge in an innovative rehabilitation process. The main hypothesis raises the feasibility of determining the new styles of families and their urban behaviors through the analysis of their demands for housing and urban spaces; fostering the regeneration of Hermosillo’s downtown neighborhoods trough the revitalization of dynamics currently needed by the basic family unit.

The reason of using this segment basic family unit, instead the rest of livelihoods that demand housing, is its broad interrelation in the urban system. This segment dynamically incorporates all the aspects that link together, form an indissoluble link between civil society and the primary system constituted by the basic family unit.

Basic Family Unit
The social segment basic family unit (BFU), is tied to the term core family, which has been used as the elementary unit within family structures, since it originates from family relationships and its structure is based in social and demographic continuity of the social fabric itself. From this definition we establish four basic types of core families: Couple without children, couple with children, father alone with children and mother alone with children, as shown in Figure 6.

![Figure 6. Social segment analyzed](image)

The basic family unit builds a series of interrelationships between each of its fundamental components of the system: the social fabric, the economic fabric and the same urban fabric; hence its ideal incorporation as an object of analysis in the research's approaches.

Data Inquires
It is in the periphery of the city where the largest recruitment of this migrant population is concentrated and where it is appropriate to outline the new urban and housing demands, as well as the sociocultural behaviors of the social segment that has been called basic family unit. The research
involves determining the styles of families that inhabit the new urbanizations, the main behaviors surrounding their leisure activities and use of free time, forms of food consumption and mobility. Data collection will be carried out through the design and application of a questionnaire, for a pre-defined population segment whose age range is among the 13 and 15 years old. This conglomerate of preadolescent children belongs to consolidated families and that possibly have solved their need for housing. To meet this objective, there is a selection of secondary schools to use the technique of "Cluster sampling"; such selection takes into consideration the schools location into the urban area, is distance to major residential developments of high purchasing power. Another important factor is directly linked to the economic power winch endeavors families with the power of autonomous decision in the selection of the location of their main dwelling, so that their decision does not depend on the offer of institutional nor government support.

CONCLUDING REMARKS
The search for solutions between the rehabilitation of the built-up fabric and the urban fabric, requires taking into consideration and contribute to the processes of social tissue regeneration, in the face of the loss and expulsion of the population of origin of the urban downtowns; with approaches of retention and permanence of various segments of population. When the BFU select the ideal place for the development of the family, it will satisfy all the conditions demanded by the members of the BFU; consequently, it is essential to identify what are their demands for a family home. From there, it is feasible to identify the opportunities that downtown neighborhoods can offer in the field of primary family residence; in order to give birth to a process of urban revitalization and regeneration of the social tissue. After the demands of the BFU towards housing and their urban contexts are satisfied by the offer at the downtown area, then the BFU can consider the downtown district as an alternative for settlement instead of the peripheries, only then, we will have the opportunity for urban revitalization of the Hermosillo historical downtown.

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ARCHITECTURE FOR YOU, ME, & THE BEES

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INTRODUCTION

Bees are dying. The dwindling bee populations all over the world is a cause for concern, with some species of bee now officially marked as endangered. Not only is another organism at risk of loss, but bees are a vital part of the earth’s ecosystem, pollinating one third of the food humans eat. At the same time, bees living in cities have been found to be healthier than those in the country. These findings triggered thoughts of how living intimately with bees could be a response to this ecological problem.

To explore the material vitality of the bee this speculative design was structured around three different scales of exploration. We tested the proposition of how the agency of non-human elements can be enhanced or expanded through design, specifically via the design of a: gallery installation which responds to the scale of the body, a home for one of the author’s and the bees, and a public space which shifts up a scale with a concern to include people within the community. First, this sequence of design activity allowed critical reflection to be gathered and entertained throughout each successive design; each scale informed the next, to refine the proposition, process and methods. Second, the client (the bee) created a scale of occupation different from usual human-scaled environments, which provided an opportunity to look critically at architecture’s insistent privileging of the large over the small, the exterior over the interior, and the human over the non-human.

The visual essay first considers a new materialist perspective, which takes seriously the capacity of things; the second part of the essay is structured around the progressive scales of the project, starting with the installation before moving to the domestic space, and finishing with the public building-intervention.

NEW MATERIALISM

The project looked to voices and positions from a number of different sources exemplified by, but not limited to: theorist and philosopher Donna Haraway, architectural theory and historian Katie Llyod Thomas, feminist theorist Karan Barad and political theorist Jane Bennett. This array of voices pointed to new materialism, in particular the work of Jane Bennett and Karen Barad, which served as supportive guides in this project’s aim to question anthropocentric arrogance. Bennett’s approach to new materialism offers for this project “a more radical sense of material connectedness and a more radical critique of anthropocentrism.” Bennett explains that such species-narcissism is perpetuated by two governing ideas. The first is the separation of “brute matter” and “spirited life”. This expresses the idea that living organisms are “radically other to matter”, where life remains “special”. Its second idea is that among those with “special” life, humans are the “most special”, i.e. “man has the most life” compared to the material world around us. For Bennett, the task of ending the contrast of “brute matter” vs. “spirited life”, and instead acknowledging the spirited vitality of the non-human around us is an important and powerful way to undercut societal hierarchies.
What happens if we explore these new materialist principles through design? What happens if agency in shaping design is shared between human and non-human entities, especially material elements? Bennett’s account of matter as vibrant resonates with Karen Barad’s understanding of matter as having an active force as “agential intra-activity in its becoming.” Barad describes matter as a “substance in its intra-active becoming—not a thing, but a doing, a congealing of agency. Matter is a stabilizing and destabilizing process of iterative intra-activity.” Similar to Bennett, agency is understood as distributed, entangled and inseparable elements that do not privilege human agency over the world around us. To shift how we use matter, she suggests we think of “intra-activity” where we do not think of the objects as separate from us from the outset, but rather, how we become with the object world around us. Intra-activity, thus, is necessarily composed of ‘other’ matter through varying relations and entanglements of the “material, discursive, human more than-than-human, corporeal and technological”, where subjects and objects only emerge through this “entangled intra-relating.” This means that matter can have complex relations and it can be productive through its own agency. And when we take this into consideration it allows us to question architectural design as bounded by identities and territories, and rather to see design as a vibrant assemblage of varying elements, which have an impact on each other, even if only temporarily.

Drawing on the work of Bennett, and Barad the design practice and performance focused on the material agency of bees as having a force on the design process. This also included critically exploring the universalizing and disembodied ambitions of architecture, and architectural conventions, as a mechanism which act to silence and marginalise bodies, which don’t fit within the disciplines typical understanding. And, thus the project also operates as a ‘critical spatial practice’ to question the role that design plays, and in this case speculates, on the status quo. However, as a speculative project, it might not change conditions – nor can it completely make conditions we operate in transparent; but, it does make us think and explore what could be. And, in this respect the disjunction with reality, following Lim, actually offers a freedom “to consider changes in spatial practices that could be truly transformative.”

Figure 1.
INSTALLATION

As already alluded to this project asks what it means to have a bee as a client. Alongside the more literary research to start this project, the design process included attending bee seminars, following bees around, and asking constantly how does a bee view or experience the world?

For the process of translating how a bee might view the world, we looked to scientific information about bees’ ways of seeing and experimented with overlays of magnifying sheets and kaleidoscope glasses. UV paint was used because bees can see what humans call yellow, blue-green, blue and ultraviolet. These explorations informed the process of building up pre-spatial marks and notions, such as dotted lines, an architectural drawing convention that could now also be read as lines of bee flight, and repetitive circles, which also allowed flexible interpretation. The different marks and notions were extracted, collapsed onto a single sheet of paper which formed the basis of the installation – drawn in conjunction with our imagined apian collaborator.

The final installation consists of two versions of the same drawing; shown above is one of these. This version is a single large pencil drawing on paper, measuring 270 cm x 71 cm. The drawing explores the flight of a bee, and incorporates both creative and scientific understandings of the bee’s path within the drawing. When installed, the drawing is composed for linear observation from left to right, positioned vertically, face to face with the viewer. (The viewer is not part of the original drawing, but present to allow an understanding of the scale of the drawing).

The above drawing is a copy of the original, which was then cut up into 300 21 cm x 3.5 cm pieces. The copy is presented to viewers as a manipulable pile with which they can engage. While the original was drawn by a single human at a human scale and was presented on the wall in a familiar fashion, in contrast the copy is scattered and disjointed and invites participation. The replicated version of the drawing is also reconfigured, dispersed to an appropriate scale for an audience of bees. The reconfigured
drawing creates a different pace of viewing, focal points, and scale of viewing in comparison to the original, while consisting of exactly the same visual information. Viewing the copy and the original in relationship to each other adds another layer to the project. Because neither version is positioned as the correct version, they created a small shift in our approach to design where we started to question assumptions about drawings as conveyors of a simple truth, rather than something that is multiple. This created a line of questioning we continued to explore at the domestic and the public scale. We also continued to pursue further in the domestic and the public scale the design method of scaling up and down to design for humans as well as for bees.

**Figure 3.**

DOMESTIC SPACE
Developing the domestic design focused first on research for design. We looked to case studies where bees successfully occupied the urban environment. From this precedent research we started the design process by first generating a narrative, or brief, around the characters of a single women and her companion bees. In this imagined scenario the narrative is interesting as, unlike humans, bees live in a matriarchal society, where the queen bee is central and essential to the livelihood of an entire hive. Unlike a bachelor, there is a stigma in most human societies to women who live alone – spinster, crazy cat lady, sheng nu (Chinese for ‘leftover women’); all label the single woman as a social outsider who is pitied rather than celebrated. Challenging this the design for the apartment seeks to re-appropriate the term ‘queen bee’ positively, to have the freedom to imagine, and speculate on a place that celebrates an ‘alien’ sisterhood between bee and woman.

The above image is a still from an animation. Underlying this animation is a process where the plan, elevation and cross sections of the apartment (pencil on paper) and the installation drawing were superimposed, then pulled and twisted into perspective drawings which provided hints of occupiable spaces. The drawings were then animated. Adding the animation enabled a way to explore the space
further as an event where the actions of those that occupy the space (the two queen bees) have more influence on shaping the design process.

![Figure 4.](image-url)

The above image, drawn with pencil, ink and water colour on light card, shows the final drawing of the domestic scale. It measures 594x841mm. Here the development drawings and animations are stilled, to a degree, to form a dialogue with plan and section drawings. The drawing is both plan and section, as a finding from the proceeding development drawings was that we were interested in the events which occur in the space between plan and section.

The drawing shows the events of eating and laying an egg. In the drawing these events spill out and have a force on the plan and section to make the plan jut out, and the section sink below – in response to the events. In this speculative design, a home arises accordingly to what is happening at that point in the day.
THE PUBLIC BUILDING

The public scale building started with a sourdough drawing. This starting point reflects one of the programmes we were exploring at the public scale which was a sourdough hotel, the other programme was a bee hive as part of an extension to Wellington Airport. Sourdough bread was selected given its semi “alive” culture; the sourdough hotel provides a place for sourdough cultures to be fed and looked after during a traveller’s time away from home.

Bread also gives another opportunity to consider how humans are interconnected with the world around us. Through the process of digestion, the difference between bread and eater vanishes altogether, for “in the eating encounter, all bodies are shown to be but temporary congealment of a materiality that is a process of becoming … hustle and flow punctuated by sedimentation and substance.”

So, in the hustle and flow of the airport itself, the sourdough hotel gives place and time to the alien vitality of the non-human, even becoming part bee and part bread through the act of eating, the border between inside and outside becomes blurry “you both are and are not what you eat.”
The drawing above shows the initial drawing that started this stage of the design, a collaboration between dough and co-author, x x. The drawing is ink on paper and measures 297 x 420mm. The lines represent the traces of the sourdough left on the paper, and their increased density indicates the strength of interaction between, dough, paper and person. Similar to the domestic scale the next stage of the design process was to superimpose these drawings onto the wellington airport.

There were a number of stages that built up to the models, shown above. These stages were not linear in development, but rather fed into each other and evolved. But for the purpose of clarity we discuss these in a more linear manner. One of the lines of explorations was animating drawings that considered the arrival and departure of the queen bees (and other bees) and bread. The animation sequences were explored to consider the many different elements and clients that contribute to this collaborative fiction. These event drawings were then explored in relationship to the superimposition of the sourdough drawings, the domestic drawings and the plans of the airport. The process of exploration sought, once more, to push and pull these drawings to find occupiable spaces. In the public space these animations were pushed further by physically modelling the spaces – to imagine different interactions between the different clients. The above two images show models of spaces of interaction between all the clients: people travelling, the bees and the sourdough hotel. The models are made out of paper and then photographed. Then the models are explored through animation, testing how events would intertwine and unfold. The model on the left is trying to gage the overall spatial relationships between the hive, the sourdough hotel and people moving through the airport. The model on the right zooms into one of these spaces to try and develop a ‘stage’ for interaction.

The models were then collaged together, in the final stage of design development, one example is shown on the following page. These images also become a resting point for this design project, rather than an end point. Much like the domestic space, a conventional grounded design in plan and section was not the intended end point. Rather, the aim was to convey the experience of human and non-human ‘intra-actions’ through a series of spatial moments.
CONCLUDING COMMENTS

As a final design, the animated ‘moments’ show an assemblage of human and non-human elements that is less convincing in pragmatic resolve but more so, in the alien spirit by which the project renders possible. The project provides insights into how we might explore our relationship with others, which is not designed with identity in mind. But it seeks to consider how we connect with others, momentarily, temporarily. Making connections with humans and non-humans based on the situation rather than on identity politics. We still acknowledge an anthropocentric bias; we cannot know what it is like to be a bee. But it has allowed a way to question how we consider design. In the case of this design project the bee acted as client and collaborator across installation, domestic, and public scales, interrupting spaces that usually only account for human use. Drawing, models and animations were used to question our tendency to retreat into anthropocentric, exclusionary practice by incorporating instead non-human agency. Conventions of plan and section were questioned through fluid collages and animation that demand an imaginative reading. The project is critical through its speculative intent – to ask questions about how we draw lines around objects and people – as a standard practice. This project is a reminder, a humbling and important one – we shouldn’t laud ourselves over anything else, or each other. And perhaps by saving the bees, we may save ourselves. The essay concludes, in a hopeful way, where design orientates us towards non-human agency, and a becoming – with others – in the possibility of a flourishing world.

REFERENCES

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11 Bennett, *Vibrant Matter*, 49.
12 Bennett, *Vibrant Matter*, 49.
13 Barad, *Meeting the Universe Halfway*, 89.

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THE SLIDING PUZZLE MODEL FOR SCALING-UP CITIES: HOW CONTINUOUS CYCLES OF DEVELOPMENT AND GROWTH CAN BE ENABLED BY INTRODUCING STATE-ENFORCED QUOTAS OF EMPTY URBAN SPACES

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INTRODUCTION:
More than half of the world’s population live in cities, and this is projected to increase to 60% by 2030. Currently there are 512 cities around the world with a population of a million or more, 45 cities with between 5 to 10 million residents, and 31 with more than 10 million inhabitants, while the share of urban populations is expected to rise across all regions. Accommodating for urban population growth, especially in the megacities of the developing world, remains a key concern (United Nations, 2016). It must also be noted that overall global housing prices continue to rise (IMF, 2017). In short, the future is urban and the benefits and problems arising from urban densification will likely intensify in the near future. Naturally, the number of tall and supertall buildings is increasing steadily (Figure 1). The manner in which urban centres deal with strains resulting from the upsurge in population depends to a large degree on how well Local Administration structures are equipped, with scaling-up representing both a challenge and an opportunity.

Urban Sprawl- an environmental and mental health hazard:
Uncontrolled urban sprawl has placed a considerable strain on the environment and transportation systems alike. An estimated 60-80% of electricity production and CO² emissions emanate from cities and urban sprawl is a considerable factor in augmenting these rates, particularly because of the increased need to transport large amounts of people across vast areas (Kamal-Chaoui and Robert, 2009). A study of Manila found that urban sprawl augments CO² emissions due in great part to factors such as the
greater distances that inhabitants need to travel and the lack of affordability of housing near the centres of employment (Fontanilla Andong and Sajor, 2015). Many other studies argue that minimizing urban sprawl and promoting urban densification reduces transportation costs, energy use and CO₂ emissions (see Bart, 2010, Jones and Kammtn, 2014, Møhafy, 2015, Güneralp et al., 2017) though some argue that specificities and nuances must be taken into account (Gately et al, 2015) or that reductions in CO₂ emissions would be limited (Transportation Research Board and National Research Council, 2009).

Some studies have questioned the role of urban form on travel patterns and habits, attributing the main differentiating factor to “white collar” lifestyles or the lack thereof, as well as rates of population growth (Echenique et al, 2012), while others have found that compact urban development does indeed reduce driving, however at relatively small rates (Stevens, 2016). However some studies (Gordon and Richardson, 2007) argue that compact cities are not a desirable planning goal when considering factors
such as pressure on agricultural land, residential density preferences, transit use patterns, costs and benefits of suburbanization, efficiency gains, rent-seeking, social equity and competitiveness. It must be noted that all of these three studies must be considered within the great context of the existence of anti-Agenda 21 coalitions as well as overarching opposing attitudes to State intervention overall in the fields of urban planning and sustainable development in the United States of America (Trapenberg Frick, 2014).

But urban sprawl has not only become an important issue because of its effects on sustainability. Increasingly, many are studying the societal results of the drive for suburbanization that marked post-II World War urban development in industrialized nations. While some are asking questions such as ‘Is Bad Urban Design is Making Us Lonely?’ (Berg, 2012), many go further and claim that suburban living can be deemed as ‘bad urban planning’ which leads to more loneliness and social atomization.

Studies have shown that having complex and social relationships is as much, or more of a factor in decreasing mortality rates as quitting smoking and drinking alcohol (Holt-Lunstad, Smith, Layton, 2010, 14, Figure 4).

And though living in a dense urban spaces might does not necessarily result in stronger and healthier social relationships, it does increase their probability and occurrence (Kelly et al, 2012). For this reason, the same report proposes building “social cities” as a priority. A study relating to the study of Turin, Italy, found that “good accessibility to public transport, as well as a dense urban structure (versus urban sprawl), could contribute to reduced risk of depression, especially for women and the elderly, by increasing opportunities to move around and have an active social life” (Melis et al, 2015)—urban living and the overall effect of cities might indeed, as argued by Glaeser (2011), be the key to making us “Richer, Smarter, Greener, Healthier, and Happier”.

**Scaling-Up, Land and Economic Value:**
A lot of the negative impacts usually associated with high-rise buildings, such as the lowering of the value of nearby housing when high-rise office buildings are introduced, are often based on preconceived notions rather than facts, while in some cases they may affect house prices positively (Thibodeau, 1990). It has also been noted that during the period which coincided with the spread of high-rise buildings in the main cities across the developed world, during the 1930’s, cities with higher populations did not
necessarily have the highest land values—there was however a strict correlation between restrictions to building height and limitations in land value. When comparing London and New York, “the impact of building height restriction is obvious. Even though the population in London was 1.27 million larger than New York, its most expensive prices of land was just 1/5 of New York’s priciest real estate” (Sun, 2016, 147), while even other, less populous and important cities in the United States with no height restrictions reached land values higher than those in London.

Table 1 - Sun, 2016, 146

<table>
<thead>
<tr>
<th>City</th>
<th>Most expensive land value per mu (Tls)</th>
<th>Exchange Rate</th>
<th>Population</th>
<th>Population Ranking</th>
<th>Land Value Ranking</th>
</tr>
</thead>
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<td>16,900,000</td>
<td>1</td>
<td>6,800,000</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
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<td>3,630,000</td>
<td>31</td>
<td>3,500,000</td>
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<td>2</td>
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<tr>
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<td>11,700,000</td>
<td>31</td>
<td>1,500,000</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Boston</td>
<td>11,700,000</td>
<td>31</td>
<td>1,500,000</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Indianapolis</td>
<td>4,900,000</td>
<td>31</td>
<td>781,188</td>
<td>17</td>
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</tr>
<tr>
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<td>31</td>
<td>681,000</td>
<td>19</td>
<td>6</td>
</tr>
<tr>
<td>Los Angeles</td>
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<td>31</td>
<td>1,238,004</td>
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<td>6</td>
</tr>
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<td>Liverpool</td>
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<td>12/2</td>
<td>804,000</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>London</td>
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<td>12/2</td>
<td>8,202,815</td>
<td>1</td>
<td>9</td>
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<td>Tokyo</td>
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<td>160</td>
<td>2,204,000</td>
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<td>10</td>
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<tr>
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<td>2,140,000</td>
<td>785</td>
<td>2,204,000</td>
<td>6</td>
<td>11</td>
</tr>
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<td>Sydney</td>
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<td>15/4</td>
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<tr>
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<td>324,522</td>
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<td>Marseilles</td>
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<td>785</td>
<td>647,000</td>
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<td>12/1</td>
<td>297,000</td>
<td>24</td>
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<td>Bombay</td>
<td>765,000</td>
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<td>710,000</td>
<td>13/4</td>
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<td>18</td>
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<td>Shanghai</td>
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<td>22</td>
</tr>
<tr>
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<td>78</td>
<td>852,952</td>
<td>15</td>
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<tr>
<td>Guangzhou</td>
<td>260,000</td>
<td>70</td>
<td>950,000</td>
<td>14</td>
<td>24</td>
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</table>


Table 2 - Sun, 2016, 146

<table>
<thead>
<tr>
<th>City</th>
<th>Most expensive land value per mu (Tls)</th>
<th>Population Ranking</th>
<th>Land Value Ranking</th>
<th>Limitation of Building Height</th>
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<td>New York</td>
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<td>2</td>
<td>1</td>
<td>Setback if more than 250 ft or 2.5 times Width of the adjacent streets</td>
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<tr>
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<td>2</td>
<td>264 ft</td>
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<td>Philadelphia</td>
<td>11,700,000</td>
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<td>3</td>
<td>No limitation</td>
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<td>Indiana</td>
<td>4,900,000</td>
<td>11</td>
<td>5</td>
<td>180 ft</td>
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<td>Los Angeles</td>
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<td>8</td>
<td>6</td>
<td>150 ft</td>
</tr>
<tr>
<td>London</td>
<td>3,430,000</td>
<td>1</td>
<td>7</td>
<td>80 ft</td>
</tr>
<tr>
<td>Paris</td>
<td>2,140,000</td>
<td>6</td>
<td>8</td>
<td>65.5 ft</td>
</tr>
<tr>
<td>Berlin</td>
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<td>3</td>
<td>9</td>
<td>72 ft</td>
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<td>Rome</td>
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<td>9</td>
<td>10</td>
<td>78.5 ft</td>
</tr>
<tr>
<td>Shanghai</td>
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<td>5</td>
<td>11</td>
<td>No more than 84 ft setback required if more than 1.5 times Width of adjacent streets</td>
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</tbody>
</table>


Dennis (2008, 280) asks “What then, was the relationship between building height and land values? The traditional argument is that scarcity of land in Lower Manhattan, or within the Loop in Chicago, drove up land values and hence necessitated high-rise buildings. [but] Rather than high land values resulting in the construction of skyscrapers, it might be argued that it was the desire of developers to build high,
increasing the income that could be derived per unit area, and their reluctance in venturing into the new districts, that made it possible for landowners to raise land values. Building skyscrapers led to higher land values, rather than the other way around.”

However the fact that scaling-up can, under the right circumstances, lead to higher land values, does not make it a desirable goal in and of itself. What is desirable, however, is making it possible for more people to live within walking distance of the areas which they find attractive, either for economic, social or cultural reasons. Increasing the housing stock within walking distance of Central Business Districts, cultural hubs and other places of interest can certainly be considered as a legitimate objective for urbanists desiring to make cities more attractive, prosperous and sustainable.

Another benefit of increased density is the synergy arising from the presence of high levels of expertise within relative proximity which also make cities excellent locations for the sharing of information and skills (Quigley, 2009) in particular because high levels of proximity often increase employment opportunities (Rosenthal and Strange, 2001).

Some authors have used the increasing tendency for some cities’ ever rising skylines as an analogy for the increasing socio-economic divisions of modernity (Graham, 2016), but less attention has been paid to how vertical development in areas of high economic interest can actually help to bridge class divisions and mitigate economic inequality.

SATE-ENFORCED QUOTAS OF URBAN EMPTY-SPACES: COUNTER-INTUITIVE, PARADOXICAL, AND INDISPENSABLE:

In an age of urban expansion, why should we build buildings, blocks, neighborhoods and cities as if they are the finished article? Perhaps the very specific challenges that urbanists are faced with would be best addressed by introducing designs that incorporate the capacity for future transformation, growth and scaling-up.

In places such as the Middle East, Maghreb, South America and the Mediterranean, it is common to see buildings that are purposefully left unfinished while at the same time being inhabited- some still have exposed vertical metal beams. This is often done so as to allow for the addition of another floor that will be used to accommodate the new members of the family if and when it expands.

![Figure 1 - An inhabited, unfinished building in Aswan, Egypt (Marla, 2010)](image-url)
If a city thrives, one of the most easily recognizable variables that demonstrates its success is an upsurge in its population as well as of those who wish to live there. However, the redevelopment that is often necessary to increase occupancy within already developed city centres, often referred to as ‘infill development’ (or ‘brownfield development’ in the case of derelict, abandoned or underdeveloped patches of urban land) is usually confronted with all kinds of barriers, not least spatial, political and planning difficulties (Farris, 2010). This is one, though not the only, of the factors that fuel urban sprawl. If a city possesses the elements necessary for growth and success, the need to transform its city centre will become an issue of increasing importance and the capacity to do so will decisively affects its capacity to accommodate growth. In cases such as that of Rotterdam, it was possible to reconstruct the city centre along modern lines due to the fire of 1940, which provided an unusual opportunity for redevelopment (Knuijt, 2008). In other cases, such as Lisbon, a considerable part of the city centre was redesigned due to the earthquake and tsunami of 1755 (see Image 8, da Silva, 1950).

Current growth models often depend on crisis and/or destruction in order to reach optimum levels. As such we have built our cities and economies in the image of the Phoenix, which must burn before it may rise again. The question is- why should cities have to depend on natural disasters, financial crises or a
high amount of abandoned or derelict buildings for large-scale and impactful redevelopment and scaling-up of its core to take place?

Orthodox urban planning theory would propose that vacant land is the pinnacle of inefficient land use. From the municipal perspective, taxes cannot be extracted from it. An empty plot is a plot that could and should be used for, for example, housing. The last thing one would desire in a high-value area is an empty space. Or is it?

This paper investigates the possibility that one way to scale-up might be a counter intuitive, somewhat paradoxical one- by making sure that urban areas always have an empty building space or even whole empty blocks within relative proximity, so as to allow for scaling-up. Just like a Sliding Puzzle, which can only be solved by making strategic use of the empty square, leaving no empty spaces in cities ultimately means lack of space for maneuvering. Scaling-up is made difficult without serious disruption to locals, and other solutions are preferred, such as building in empty spaces elsewhere, which enlarges cities’ perimeters and promotes urban sprawl, whilst often failing to build the necessary amount of housing where it is most needed and sought-after. In other situations, when the need for redevelopment becomes inevitable, forced evictions might take place, often entailing mistreatment of local communities and disruptions to the social fabric.

In the absence of instruments like the Sliding Puzzle Model, developers will often either be forced to wait for disasters and accidents, or even resort to underhand tactics in order to redevelop. They might force inhabitants out, or simply abstain from maintaining buildings so that they become vacant and derelict, enabling the demolishing of the buildings and only then, scaling-up. Most notably, forced relocation has been one of the most persistent scourges of the urban poor throughout history. In particular, the urban poor’s drive to live within relative proximity of city centres is a potent force entrenched in a dialectical relation with State-enforced evictions and relocation- this drive shapes both cities, political events and urban policy. Mike Davis’s book Planet of Slums serves as an extended deposition of this somewhat politically underestimated and highly academically overlooked motor of human history (2006, 32, 36-37, 51, 61-69, 98-108).

SO... HOW DOES IT WORK?

The Sliding Puzzle Model is a zoning practice which aims to incrementally increase density and optimize land use in highly sought-after urban areas. Most importantly, it aims to introduce a planning instrument that allows for the constant and incremental redevelopment of the built environment. By introducing a quota of State-enforced empty space into central urban areas, and thereafter expropriating derelict, low-quality or low-density buildings in high value areas whilst moving property rights onto the new, taller buildings erected in the empty space, it becomes possible to relocate inhabitants within relative proximity whilst increasing overall capacity. Demolishing the expropriated building generates a new empty space which allows for continuous cycles of redevelopment. Just like a Sliding Puzzle game, in which a single space can be used to move around every piece in the puzzle, over a long enough period of time a single empty space can allow for the redevelopment of large areas. Higher quotas of empty spaces used in this way can increase the rate of densification, whilst ensuring relocation within relative proximity for occupants.

Over a long enough time period, used in this manner, an empty space can be used to redevelop a whole city just as the single empty square in a Sliding Puzzle game can move every piece in the puzzle around. What follows is a visual simulation of what one Sliding Puzzle cycle, with a 25% quota of empty space, would look like- the light green represents low density occupation, and the dark green represent higher density. The initial empty space is top right.
In the beginning, there are three low density blocks, and one empty space.

For a short period, relative to the duration of the building of the new block, i.e., one Sliding Puzzle cycle, there is no empty space. Once the construction is finished, one block (or building) must have its property rights transferred to the new block. The gain in overall capacity depends on the height and capacity of the new block and its buildings. The old block (or building) must be demolished so that a new empty space, now in a different place, can be made available so as to allow for the next cycle. Just like the empty space that moves around the Sliding Puzzle, this empty space can be moved also, but in more ways than an actual Sliding Puzzle game- the empty space can be used to relocate occupants and owners within relative proximity and need not be limited to adjacent blocks and buildings. The relative proximity between the old and the new block is an important aspect of what differentiates the Sliding Puzzle Model as it disrupts the urban, economic and social fabric less drastically than orthodox expropriation processes.
In this simplified scenario, this process can be repeated three times until all three blocks are redeveloped, with one remaining empty, permitting the cycle to recommence, either for the redeveloped blocks to be redeveloped again, or so as to be used in the same way for other, formerly untouched blocks nearby.

Simulating Population Capacity Gains

The simulation that follows has been undertaken using measurements based on mid to high density cities in Europe. The total area is of 1 km², containing a total of 100 blocks used for housing. Each block has 8 buildings each, and each building starts with 3 floors, with each floor having 10 occupants. This sets the initial density at 24,000 per kilometer squared. The simulation does not use time but rather Sliding Puzzle cycles (as demonstrated in the previous section) as units to demonstrate potential capacity gains.

<table>
<thead>
<tr>
<th>Table 3 - Initial Simulation Conditions</th>
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<tr>
<td><strong>Total Area</strong></td>
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<tr>
<td><strong>Total Blocks/km²</strong></td>
</tr>
<tr>
<td><strong>Block Size (m²)</strong></td>
</tr>
<tr>
<td><strong>Buildings per Block</strong></td>
</tr>
<tr>
<td><strong>Floors per building</strong></td>
</tr>
<tr>
<td><strong>Occupants per Floor</strong></td>
</tr>
<tr>
<td><strong>Sidewalk + road width (m)</strong></td>
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<td><strong>Starting Population</strong></td>
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<table>
<thead>
<tr>
<th>Table 4 - Occupation capacity by number of floors</th>
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<tr>
<td><strong>Density per km² depending on floor numbers per building</strong></td>
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<tr>
<td><strong>Floors/Building</strong></td>
</tr>
<tr>
<td><strong>Population/km²</strong></td>
</tr>
<tr>
<td><strong>People/building</strong></td>
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<tr>
<td><strong>People/block</strong></td>
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</tbody>
</table>

The results are as follows:
### Table 5 - Simulation of capacity gains with new buildings at 6 floors

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<tr>
<th>% of Empty Blocks</th>
<th>1.00%</th>
<th>2.00%</th>
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<td>Initial Loss of Capacity</td>
<td>240</td>
<td>480</td>
<td>1200</td>
<td>2400</td>
<td>3600</td>
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<td>6000</td>
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<tr>
<td>Number of cycles until full reconstruction</td>
<td>99</td>
<td>49</td>
<td>19</td>
<td>9</td>
<td>5.66</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
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<td>23520</td>
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<td>21600</td>
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<td>Adjusted Population after Full Reconstruction (with empty blocks remaining)</td>
<td>47520</td>
<td>47040</td>
<td>45600</td>
<td>43200</td>
<td>40776</td>
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<td>22800</td>
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<td>2400</td>
<td>3600</td>
<td>4800</td>
<td>6000</td>
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<tr>
<td>Net Gain per cycle %</td>
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<td>2.04%</td>
<td>5.26%</td>
<td>11.11%</td>
<td>17.65%</td>
<td>25.00%</td>
<td>33.33%</td>
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### Table 6 - Simulation of capacity gains with new buildings at 9 floors

<table>
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<th>2.00%</th>
<th>5.00%</th>
<th>10.00%</th>
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<td>Number of empty blocks</td>
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<td>5</td>
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<td>15</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>Initial Loss of Capacity</td>
<td>240</td>
<td>480</td>
<td>1200</td>
<td>2400</td>
<td>3600</td>
<td>4800</td>
<td>6000</td>
</tr>
<tr>
<td>Number of cycles until full reconstruction</td>
<td>99</td>
<td>49</td>
<td>19</td>
<td>9</td>
<td>5.66</td>
<td>4</td>
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<td>Adjusted Population after Full Reconstruction (with empty blocks remaining)</td>
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<td>10.53%</td>
<td>22.22%</td>
<td>35.29%</td>
<td>50.00%</td>
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### Table 7 - Simulation of capacity gains with new buildings at 12 floors

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<th>2.00%</th>
<th>5.00%</th>
<th>10.00%</th>
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<td>2</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>Initial Loss of Capacity</td>
<td>240</td>
<td>480</td>
<td>1200</td>
<td>2400</td>
<td>3600</td>
<td>4800</td>
<td>6000</td>
</tr>
<tr>
<td>Number of cycles until full reconstruction</td>
<td>99</td>
<td>49</td>
<td>19</td>
<td>9</td>
<td>5.66</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Adjusted Population</td>
<td>23760</td>
<td>23520</td>
<td>22800</td>
<td>21600</td>
<td>20400</td>
<td>19200</td>
<td>18000</td>
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<tr>
<td>Adjusted Population after Full Reconstruction (with empty blocks remaining)</td>
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<td>86400</td>
<td>81528</td>
<td>76800</td>
<td>72000</td>
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<tr>
<td>Net Gain</td>
<td>71280</td>
<td>70560</td>
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<td>64800</td>
<td>61128</td>
<td>57600</td>
<td>54000</td>
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<tr>
<td>Net Gain per cycle</td>
<td>720</td>
<td>1440</td>
<td>3600</td>
<td>7200</td>
<td>10800</td>
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<td>18000</td>
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<tr>
<td>Net Gain per cycle %</td>
<td>3.03%</td>
<td>6.12%</td>
<td>15.79%</td>
<td>33.33%</td>
<td>52.94%</td>
<td>75.00%</td>
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Above one can see the projected rates of capacity gains (until full reconstruction). For example, scaling-up to nine floors starting with 2% of empty space virtually matches the rate of gains of scaling-up to fifteen floors with 1% empty space (4.08% and 4.04% per cycle respectively), while scaling-up to six floors with an initial 2% of empty space matches the rate of gains of scaling-up to nine floors at 1% (2.04% and 2.02%).

For example, if we predict that a certain city centre needs a sustained growth of 5% in occupation capacity per year, and it is also ascertained that one Sliding Puzzle cycle would take 2 years (relative to building the new block and administrative and legal tasks such as expropriation, transferring property rights proposal, etc.), then the combination can be of six floors with 10% empty space, nine floors with 5% empty space, twelve floors with 3-4% empty space or fifteen floors with 3% empty space.

We can use the projection above to understand what combination would be necessary to accommodate any desired capacity gain or projected population growth in a specific urban area or city.
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THE GUARDIAN. Empty half the Earth of its humans. It’s the only way to save the planet. (2018b)
THE GUARDIAN. Projections suggest cities will swell at an astonishing pace – but whether that means our salvation or an eco-disaster is by no means certain (2018c)
COPRODUCING HYBRID INFRASTRUCTURES

Author: MARANTHA DAWKINS

Institution: CARNEGIE MELLON UNIVERSITY

INTRODUCTION
Our landscapes are territorialized by the power relationships which move through them, configuring and refiguring material and movement. Anthropogenic articulations of space and procedure have engendered self-perpetuating power relationships which degrade biodiversity, exploit resources, and disempower voices of dissent. But ways of seeing space are not limited to making legible the indifferent ways in which these relationships unfold: simulated space can unfold forms of multiplicity which relate alterity to the everyday.
I contextualize ecological design thinking augmented by digital tools within a construction of power which describes a shift from understandings of subtractive and transferable power to a productive, ubiquitous power that is fast, continuous, and flexible. This work is interested in performance as a means to unsettle a way in; as a way of understanding, of transfiguring, and dispersing through normative urban patterns which represent material processes of social reproduction. I ground this notion of performance in an ongoing design project which works between urban ecology and robotic agency, in which a rover becomes a catalytic agent of mutant urban environments through autonomous planting behaviors.

Figure 1
POSITIONING THE URBAN BODY

Historical and Material Processes of Urban Reproduction

Urban form is codified by invisible procedures. Zoning laws, building code, traffic standards, financing mechanisms, management regimes, logistical norms, and development patterns inscribe codes and limits that shape public space, urban ecology, mobility networks, the design of buildings, and the rhythms of everyday life. This conditioning embeds and transmits information, structuring power relationships that rationalize dynamic spaces into objects of control. But just as power finds its way into space and life, life and space can find its way into the power relationships of this active form1; procedure can become the productive media through which designers engage the city.

Of particular significance to this work is the concept of blight, borrowed from agricultural science in the early 20th century by social reformers to describe perceived problems of the city2. This pseudo-scientific, ill-fitting ideological transference allowed for the obfuscation of intentions behind physical intervention, disguising a value-laden cultural construct as a natural phenomena that soon became a conceptual anchor for urban development.

Blight has a long history in Pittsburgh: the spatial pattern of resident displacement and neighborhood redevelopment is a refrain familiar to this urban landscape. Much of the recent demolition and replacement work has occurred in conjunction with the redevelopment of East Liberty, “one of the ten coolest neighborhoods in America right now”3. East Liberty has been written up in papers like the Wall Street Journal and New York Times for its revitalization with titles like “A Neighborhood's Comeback”4 and “Slumbering Pittsburgh Neighborhood Reawakens”5. Developers have leveraged each others successes to encourage further, more complex forms of development: big box stores quickly led to lifestyle strip malls, the demolition of existing housing in favor of luxury apartments, a 2009 real estate market value ranked healthiest in the nation, and a shift towards fro-yo, poke bowls, up-scale coffee, and an increasingly exclusive kind of urban palatability.

Figure 2. Pittsburgh vacancy shown in pink. Below, a close-up of Larimer.

It began with Home Depot opening up in 2000; Whole Foods followed in 2002 as a part of the ‘Eastside’ shopping center which has recently expanded to include the Eastside Bond luxury apartment complex; Google moved into the Bakery Square shopping center in 2010 and the Bakery Square luxury apartments soon followed; Target opened in 2011; in 2014, the public housing community of East Liberty Gardens (directly behind Target) was slated for demolition and redevelopment; and in 2015 the residents of Penn
Plaza received 90-day eviction notices as a plan for a new Whole Foods and upper-floor housing complex was revealed (one block away from the existing store). The plan was rejected by the Planning Commission but in 2017 the last of the Penn Plaza apartments were demolished with no further news on development to take place, underlining the insecurity of affordable housing in the neighborhood and relative value of speculation about the neighborhood to come.

And so the city is left with these contradictory but symbiotic urban forms of vacancy and development. They relate to one another at moments of intervention (demolition, sale, construction) but otherwise have very different rhythms, operating procedures, dispositions, and potentials. Vacant properties are usually left fallow before they are sold off. They are the ecologically inhospitable and infrastructurally inadequate spatial echoes of uneven urban development and social inequity, contributing very little to the experience of the urban landscape in both human and non-human terms. Nonprofits and government programs have started to encourage vacant lot maintenance, repurposing, and sale, but the rhetoric driving seemingly well-intentioned programs continues to be entrenched in concepts of blight which reify market value, continue to prepare ground for development interests in the city, and undermine the emancipatory and ultimately ecological potential of the vast network of land that stretches through the city. Repositioning vacant spaces, pulling them out of narratives of blight and considering them as part of the infrastructural, experiential, and ecosystemic networks of the city, uncovers latent conditions that are alternate points of engagement for design practice.

ECOLOGY AND REPRESENTATION

Simulation, Multiplicity, Alterity, Simultaneity

Thinking ecologically is a destabilizing practice of signification that unsettles ontological locales of urban truth and subjectivity. It changes the terms by which it is possible to consider urbanity and invites the consideration of different scales, materials, and rhythms; introducing alternative hierarchies and new regimes of authorship. Thinking in terms of active relationships rather than decoding a crystallized, permanent form of advanced capitalism keeps us from affirming representations of the market’s projection onto (what is assumed to be otherwise generic) urban form. The connective, ideological and material tissue between development and vacancy leads towards abstractions of urban scale operations, into questions of how else this land works, and what other kinds of production are staged there. Considering production rather than objects starts to blur between what is a part and what is a whole, what has agency, what has autonomy, and what acts and reacts. This blurring leads to a series of ecologies that are not stable, harmonious, closed loops but rather fluctuating compositions of agents which intersect, create unique meanings, and have different actors and effects. Framing space and ecology in this way enables design thinking that considers both material and relational intervention. Performance emerges as a medium through which it is possible to both define and maintain spatial relationships.

Working with performance entails uncovering, documenting, and interacting with urban process. This requires modes of practice which relate technological space to urban systems by collapsing traditional, deterministic media of space and power into malleable objects of design research that can shift and dissolve into one another. Creative mapping allows for the deconstruction and subsequent reassembly of space, disrupting embedded value systems and uncovering spatial conditions which can offer new modes of representation and understanding as well as new trajectories for practicing projective design.

The capacity to distill space into layers of information has led in many cases to a new determinism, or justificatory naturalizations of linear design logics, which have in turn given way to tropes of indeterminacy that often engender noncommittal design. But it has also enabled non-linear, ecological
unfolding that does not lead to an end state but rather builds “a cumulative directionality toward further becoming”9 — an engagement with ecology and environment as an indeterminate, connective, and self-organizing tissue. Existing spatial conditions must undergo both conceptual and representational transformation if they are to be productively engaged in a design process in which computational abstraction and figuration can uncover new avenues of composition and illuminate spatial contingencies. Contemporary digital methods enable us to understand and apply design imagination to complex dynamics which are multi-scalar, simultaneous, and temporally unbounded. The ability to work between scales enables fluidity between the intimate and the regional, between discipline and its effects, between organisms and their environments. Simulations are a design space in which it is possible to work with performative power and process through agent behavior, and investigate how practice can directly engage complex field behaviors which include subjectivity, the environment, and social relations10. Computation can be used to emphasize heterogeneity and difference in order to bring forth understandings of space and process which make way for non-linear and contingent life.

Choreographing Behavioral Landscapes11 is a project which negotiates Pittsburgh’s vacant lots through the behavioral practice of a robotic agent. The prototypical site is in Larimer, a neighborhood adjacent to East Liberty which has significant amounts of vacant land and is surrounded on nearly all sides by small valleys, its topography enabling strong potential participation in green infrastructure and stormwater management at the urban scale. The site is included in resident-led plans for urban agriculture and is well situated to connect existing woodland to urban plant communities.

CHOREOGRAPHING BEHAVIORAL LANDSCAPES

Choreographing Behavioral Landscapes proposes the automation of ecological participation in Pittsburgh’s vacant lots, and overlaps representational technique with urban ecology and robotic agency. The rover becomes a catalytic agent of mutant urban environments through autonomous planting behaviors. Incorporating multi-scalar activity into the design of new site processes reflects a conceptual and procedural hybridization of nonhuman ecologies, urban infrastructure, and human habitation that challenges the shortcomings of status-quo development practice.
We prototyped a framework that operates at four scales: a database categorizes plants and sets up grouping logics for successful ecological communities; a community interface invites participation to determine what kind of urban wilds will be welcomed by residents; the rover uses sensors to gauge environmental conditions and site use to act in real-time; and a networking simulation describes the materialization of urban-scale patterns, revealing the urban and ecological networks these landscapes create and how they potentially affect issues like stormwater management, habitat connectivity, and soil health. Each of these processes privileges open-ended and continuous design.

![Figure 4. Robotic Sowing Simulations](image)

The database organizes plants into communities using functional, morphological, aesthetic, logistical, and environmental classification. Conceptualizing planting in terms of interdependent communities allows for diverse, robust, low maintenance, functional, adaptive, and richly layered landscapes. We primarily define plant communities by their potential to participate at the urban scale, privileging connective, field-based form. Our primary categorizations for Pittsburgh are Stormwater & Erosion; Contiguity, Wildlife, & Habitat; Recreation; and Phytotechnology. The prototype site for the project is included in resident-led plans for urban agriculture, so the plant community is primarily defined by phytotechnological and pollinator-friendly plants which will build soil and strengthen pollinator populations. The interface refines the infrastructurally defined dataset into a plant community which accommodates resident preferences for particular moods, forms, colors, etc. The rover then sows the plant community’s seeds in sequential planting stages tied to the four plant typologies which take the form of behavioral schemas, and updated networks which reflect shifting urban ecologies. This process produces landscapes that are functional, resilient, and robust, but also emotional, engaging, and active.

This work is committed to a shift from landed value, or commodified space, to productive, creative, and connective urban field conditions and ecologies. Choreographing behavioral landscape intervention to reinvigorate vacant land reshapes the way value can be conceived and distributed in the city: sites are engaged as ecological tissue, urban infrastructure, and cultural medium. This project undermines the normative ontological structure of urban resources, challenging procedures of land acquisition, aggregation, development, and displacement with a communal coproduction of urban ecology.
CRITICAL PRACTICE IN AN AGE OF COMPLEXITY – AN INTERDISCIPLINARY CRITIQUE OF
THE BUILT ENVIRONMENT
AMPS, Architecture_MPS; University of Arizona
22—23 February, 2018

Figure 5. Projecting onto Larimer site

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INTRODUCTION

New frontiers for architectural production are emerging. Fueled by high levels of instability due to accelerated change and increased connectivity, these trajectories operate across multiple scales and domains. Architecture practice has had in the past the luxury of overlooking some of these parameters if they did not directly interfere with the physical implementation of built constructs. However, technological advances and pressing contextual realities are redefining proximities, tolerances, and realms of impact. As architects and global citizens, we are no longer afforded such privileges, as localized issues are continually becoming global concerns. The ubiquity enacted by technological advances demands addressing new complex settings and layered contextual parameters. Due to the intricacies of these conditions, the individualistic approach to architecture becomes ineffective. Collective design sensibilities facilitated by emerging patterns of collaborative practice that rely on unprecedented access to shared knowledge and making techniques have been an evolving trajectory for the past few years. Straddling the interface between the virtual and actual, such trajectories are redefining tolerances of authorship and singularity while advocating for collective voices and cumulative making. Aspects of our living are becoming increasingly dependent on hyper-data and our surroundings defined by binary codes. As a result, a liminal area is emerging where the stark distinction between the real and virtual ceases to exist. The overlap of those two contexts is giving way to hybridized settings where the interdependence of digital and analog is redefining the very politics of place and identity. Here and now, architecture’s premise and processes are being challenged to respond to fluctuating contexts and provide for transient occupancies.

The paradigm of Dynamic Landscapes and Emerging Territories is presented through the idea of landscapes impacted by technology and displacement; hence, becoming dynamic, supported by documentation and dissemination of data flows. Previously, proximity had defined territories. Now, within this dynamic modality, territories emerge based on common technological parameters and collective displacement patterns. The Syrian refugee crisis is a real-time example illustrating how displacement and technological channels redefine the physical and abstract parameters of a given region and give rise to territories whose commonality is not characterized by adjacencies, rather by virtual connectivity. Here, the definition of landscape is being questioned. It is no longer static, nor is it local. It can be both virtual and physical; it is dynamic. The human influence on the environment both physically and conceptually frame the dynamic landscape. This paper uses the Syrian Refugee Crisis as a case study for deciphering the implications inherent in displacement in the context of dynamic landscapes. Furthermore, it presents an opportunity to think of new architectural trajectories rooted and driven by the dynamism of such landscapes.

DYNAMIC LANDSCAPES BETWEEN TECHNOLOGY AND DISPLACEMENT

The Syrian refugee crisis has been one of many emerging territories where this dynamism is evident. The Syrian War engendered a massive population displacement, creating the world’s fifth largest
refugee camp¹, Al Zaartari Camp, in a matter of months (figure 1). The sudden shift induced by such an event has carried vast implications affecting social and political structures. In coming years, the massive population displacement of the Syrian people is bound to redefine the physical and abstract parameters of the region and beyond. However, unlike other previous relocations, the Syrian scenario involves new parameters (figure 2). Not only did the Syrian War engender a massive population displacement that occurred at an unprecedented rate, it also displayed a heavy virtual presence characterized by the constant circulation of raw footage on news feeds and social media outlets. The new era of technological connectivity facilitated common extensions to the localities of familiar refugee circuits while allowing for new patterns of migration to occur beyond the expected regional boundaries.

Not only did the technological connectivity demark a shift in the region’s power structure, but also uncovered a new overall narrative source. Traditional mainstream media outlets no longer control the dissemination of information and consequently no longer control the region’s global image. Thus, the narrative is shifting by the fact of refugees’ accounts being continually collected and disseminated on portable cellular devices carried by an overwhelming majority of them.² Penn State University research done by the College of Information Sciences and Technology surveyed the use of mobile devices in Al-Zaatari Refugee Camp, Jordan.³ A report of the findings stated “Increasingly, the lives of refugees are affected by the use of information and communication technologies (ICTs).”⁴ The
findings described that refugees, like many technologically literate individuals are more frequently arriving with mobile phones. Further, many are coming with computing and internet skills. The phones have provided an important lifeline of information and communication with loved ones. The ICTs catered to transient archival fragments of memories, information, and subjective maps (figure 3). These tokens of an ever-changing geopolitical and cultural landscape operate under continual shifts that will affect the regional and global narratives for years to come.

Within such reconfigured terrain where conventional notions of physical and abstract bearings no longer apply, what becomes of identity when associations with place/placement degrade? How will this affect modes of spatial production and landscape interventions? Can emerging architectural attitudes within the context of such extremes negotiate disputed limits and perform in such states of instability? Even though we are not able to immediately draw clear conclusions from the ambiguous implications of these reconfigured amalgamated settings, if assessed properly, and at times improperly, their survey will yield a peculiar premise for understanding emerging norms in a global culture where conventional notions of anchoring and even relevance are being redefined.

**DYNAMIC LANDSCAPES BETWEEN DOCUMENTATION AND DISSEMINATION**

In her article, “From Site to Territory”, Lola Sheppard, co-director of InfraNet Lab addresses the extensive human influence on the environment on both the physical and conceptual fronts and calls for the necessity of evaluating “site” as a “palimpsest of forces”. The Syrian refugee case study illustrates forces that are both abstract and physical. Examples of abstract forces are of political, cultural and technological nature, while physical forces are the physical location and access to resources, resources that are in fact not plentiful in Jordan. At the Al-Zaatari Refugee Camp itself, no such infrastructure for provisions exists. Water, like many other necessities, is brought in daily to supply the refugee population. Like most emerging territories, such forces tend to challenge the primary appropriations of site and their assumptions of exclusiveness and neutrality. Augmented by networks of information and communication, these forces acquire an accelerated level of dynamism that challenges the fundamentals of time and place. The notion of Dynamic Landscapes is exemplified specifically by the Al-Zaatari Refugee Camp. The identity of a refugee, once defined by their previous physical environment, is redefined by a landscape that is no longer static but dynamic. These Dynamic Landscapes are complex contextual settings that operate at multiple temporal and
spatial scales simultaneously, augmenting their operative patterns (both systemic and impetuous) and their often multi-locational physical presence. Situated against and within this fabric of incoherent landscapes, territories between phenomena and technology emerge imposing new contextual parameters, relevance, and impact. Herein geographical boundaries and manufactured borders are no longer the sole definitions of landscapes; landscapes are reacquiring presence in multiple locations simultaneously, rendering their parameters malleable and their presence ephemeral.

In his book, Militarizing the Environment: Climate Change and the Security State, Robert P. Marzec describes the human impact on the environment that developed in tandem with technological advances. Unprecedented access to computational power propelled a new era of enhanced visualization that is redefining our relationship to the landscape; surveillance and militarization are but a few issues of what he labels “technological domination” over the environment. Although Marzec paints a bleak picture of the impact of such dominion—or in the very least the aspiration for one—it is worthy to note that he makes it clear that driven by the allowances of technology, our modern day landscape is one of multiple definitions and to a large degree is overexposed both figuratively and literally. Under either scenarios; whether the effects ushered in by a reign of technological dependency are dubbed dynamic or overexposed, the reality remains as such: technology, its accessibility and dominance in the narrative of our living and resultant identity, is demarking an integral shift in our attitudes towards the landscape and built environment. As the realities and implications of this overlap are actively unfolding, documentation channels may have to deviate from the normal structures. The synthesis of both collected and projective data is essential to understanding the nature of such emerging contexts, particularly when the existence of many, hinges entirely on documentation and representation. The speed, duration, and complexity of these landscapes render traditional data agglomeration structures and documentation channels incompatible. This is due to not only registration inefficiency, but also a dissemination disjunction that limits the monitoring and

Figure 4. Preliminary proposal for a workflow diagram. Categories and connections are continuously subject to extension and modification based on predominant trends and emerging topics. (Image: by Paul Bamson, graduate research assistance, University of Tennessee, 2017)
assessment of such landscapes. Furthermore, parametric in nature, the documented and projected definitions of dynamic landscapes are sensitive to variances and mutations that develop upon their deployment into various venues. Representative of this research is a workflow diagram (figure 04) devising a documentation and dissemination matrix attempting to register the data - which is often the only remnant of these contextual phenomena - as well as its use and interpretation in various forms and different allocations. The workflow diagram will function on three platforms. Firstly, a conceptual platform that examines the dynamic forces integral to the formation (whether temporal, constant, or cyclical) of emerging landscapes. Second, a quasi-database that archives various projects that investigate similar issues and employ relevant workflows/processes (these could be digital, conceptual, or hybrid workflows). Last, a practical platform that suggests software interfaces and work logics specific to the scope of landscape dynamics.

This multilateral deployment and use of data, research, and design responses challenges current practice structures while eroding other common hierarchical design processes. It is an informative channel for assessing the impact of repetitive use and detecting subtle irregularities within the circulation of the documented content. Will such deployment yield tentative mutations in the research structure that are indicative of emergent landscape patterns and telling of implicit territorial logics? Does the processing of dynamic landscapes begin to provoke distinct jurisdictions that transcend proximity in favor of more novel commonalities? These interrogations formulate the speculative framework for understanding Emerging Territories. As such, Emerging Territories are subsystems that once established operate under a new derivative set of rules that are subject to physical properties and virtual handling.

*Figure 4A. Enlarged segment of the workflow diagram. This segment outlines common sources of documentation channels. These are subject to change as common information sources often shift based on technological trends and circumstances.*
Figure 4B+C (next page). Enlarged segments of the workflow diagram. Segment B (top) maps common design visualization streams and popular digital tools used in generating design responses. Segment C (bottom) shows a few examples of emerging territories such as refugee camps as it establishes a link to assess their impact and gauge paths to their documentation.
THE COLLECTIVE PATTERNS OF EMERGING PRACTICE

The shifting of contextual layers, their ambiguous boundaries and constantly emerging territories accelerated by technological advancements is progressively acquiring agency in everyday life. Previously, architectural practice has had the luxury of selectively responding to immediate site conditions. However, technological advances and pressing contextual realities are redefining proximities, tolerances, and realms of impact, demanding responses to new intricate settings and layered parameters. These parameters are challenging one of the most fundamental of architectural concepts: context, and in effect, demand renegotiating the processes of architectural practice. Until now, practice has been reliant on prescribed workflows and predictable channels that governed the making of space from its conception to actualization. In most instances, design tethers to computational logics. As a result, it often veers towards homogeneity, both in reaction to an impetuous context and in submission to the impact of technological accessibility and ease. The present computational trajectories of design and their impact on formal language are persistent. They are telling of trends that are likely to continue. Rather than accepting static workflows imposed by the commonality of tools and ease of access, it is imperative that we challenge those in response to the dynamic natures of contemporary settings and contextual criteria, while considering the collective patterns of emerging practice. These patterns of practice tend to rely on unprecedented access to
shared formal and analytical digital scripts and open-source information. They progressively evolve based on dissemination and use. Straddling the interface between the virtual and actual, such design trajectories are redefining tolerances of authorship and singularity while advocating for a collective voice and cumulative making (example in figure 8). Building on these patterns, the paradigm established by this workflow undergoes a significant transformation upon its deployment to the public stage. The transition from speculative structure to actual trajectories informed by robust user exchanges will be one of curious implications. Workflows that underlie current design interventions will devise a lucid computational ecology while highlighting underutilized paths that propel new investigations.

While the issue of such hybrid processes is still unknown, they are an attempt to begin employing digital technologies beyond tooling and advance a more contextually responsive and active approach to design. In the article titled “We Will Be Making Active Form”, architect and urbanist, Keller Easterling, advocates for the implementation of what she calls “active form”. According to Easterling, “active forms establish a set of parameters or capacities for what the organization will be doing over time. Active forms might describe the way that some alteration performs within a group, multiplies across a field, reconditions a population, or generates a network. The designer of active forms is designing not the field in its entirety, but rather the delta or the means by which the field changes – not only the shape or contour of the game piece, but also a repertoire for how it plays.”

It is precisely this activation as it relates to the dynamic formation of landscapes and their requisite active forms that this research seeks to enable. The aim here is to invoke a substantial shift in the narrative of rapidly emerging territories in the landscape and concurrently in practice; a shift that caters to the scale, pace and potential of this attendant overlap. Further, it questions the role of the designer in this process and makes the case for modification in the role she/he plays from that of a maker to activator. When the makers generate the result is a multiplication (even overpopulation) of form, while activators prompt an intensification of impact, an intensification that is at once reactive and accommodating to an evolving technological trajectory.

Using technology as a platform and medium to usher in big change is not new or unprecedented; we witnessed it happening in recent history in the Arab Spring movement, where data feeds played an integral role in the political power shift of the region. We are seeing it architecturally with a noted shift from a singularity of discipline to integration with areas such as film, virtual reality, and material science to name a few. Demonstrated by practitioners (albeit not in the old sense of the word) such as Liam Young, David Benjamin (the Living), Nataly Gattegno (Future City Labs), architectural practice is acquiring a multiplicity of concentrations. We see similar trends in education as well. Many leading architecture and design colleges are integrating multidisciplinary platforms and crossover trajectories into their curricula. For example, Sci-Arc recently established SCI-Arc EDGE, Center for Advanced Studies in Architecture, is currently offering a number of postgraduate degree programs “all devoted to investigations of architecture’s twenty-first-century frontiers”. For years tactical shifts existed tangential to the mainstreams of practice. However, it is only now that we are seeing this trajectory come to fruition and begin to formulate a strategic change in design education and inevitably in the profession.

CONCLUSION

The overlap of digital and analog realities is giving way to hybridized settings, redefining the very politics of place and identity, and in turn, architecture. As association with the physical place degrade and conventional notions of tangible bearings no longer apply, displacement (and/or multi-placement)
is steadily emerging as an operative contextual modality, demanding design responses that challenge one of the most fundamental parameters of architecture: context. The evolving relationship between place, technology, and occupancies formulates a complex and active structure that tends to have fluctuating levels of activity and impact, constituting emerging territories. Furthermore, the dynamic landscapes within which these territories exist have definitions and presence in multiple locations simultaneously, requiring new methods of documentation and assessment in order to conceive appropriate design responses. Under such circumstances, the conventional approaches towards architecture are in question. While some may see this as a loss of spatial agency when it comes to architecture, these conditions present an opportunity to think of new architectural trajectories that are rooted and driven by the dynamism of multilayered landscapes and the possibilities inherent in new approaches towards practice.

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A. INTRODUCTION

Urban environments struggle with aging water infrastructure, growing energy demands and escalating food insecurities during and post natural disasters. Simultaneously, today the food industry including agriculture faces many problems: increasing inefficiencies in conventional food supply chain leading to wastage of limited resources, low soil fertility and erosion, rising water contaminations due to overuse of fertilizers and pesticides, and production of low nutritional content in crops. Food System is a complete path from food production to food consumption and disposal. Increasing concerns on accessibility to nutritious food for the growing urban population have led to the Urban Food Systems Challenge. This is defined by the Foundation for Food and Agriculture Research as securing food for the urban populations from urban and peri-urban agriculture by augmenting the capacity of the current food system. This challenge is exacerbated due to existing gaps in policy frameworks of planning authorities that restrict the practice of urban farming in the area. Hence, this paper focuses on the theory and necessity of integrating an off-grid, self-sufficient building system(s) in urban areas for people to constantly maintain accessibility to Food, Energy, and Water (FEW). Building Integrated Food-Energy-Water (Bi-FEW) model is a scalable solution for food insecure urban areas prone to the Urban Food Systems Challenge and challenges to implementing food systems in the urban environment. The building is capacitated to secure management of food, energy and water within an off-grid, closed-loop and net-zero system that can be implemented in any existing building or urban neighborhood. Furthermore, this model can lay the foundation for new buildings to construct a self-sufficient architecture that reduces the burden on urban infrastructure. The Bi-FEW model is an applied combination of specialized data and a set of computational algorithms that assess the technological, political, economic, real estate and social impacts of urban agriculture. This set of computational algorithms lay the foundation of the Food Resilience Urban Infrastructure Tools (F.R.U.I.T’), a research and development Artificial Intelligence (AI) accelerator and food security incubator. FRUIT are a set of analytical instruments developed for improving food accessibility research to generate a self-sufficient net-zero food-energy-water solution for a specific site and/or target population.

The model is constantly in operation, balancing fluctuations and supporting gaps in the supply and demand of FEW within the individual building, particularly essential during and post natural disasters. When the model is distributed within the neighbourhood, they create a resilient closed-loop infrastructural network with an adaptive food response. In conclusion, the paper focuses on recommendations to address policy gaps in urban planning for cities that would aid in implementation...
of novel Bi-FEW systems to achieve an urban resilience by securing food, energy and water resources for residents living in the area.

B. NEED OF THE STUDY

The conventional food supply chain management has multiple risks and challenges. The key stages of the supply chain are production, processing, storage and distribution. One of the main issues of the *Urban Food Systems Challenge* is the food waste. In the United States, food waste estimates are as high as 50% of total production.2,3 It is estimated globally that 31% of all food (by mass) is wasted rather than consumed, representing a massive loss in embodied land, water, labour, and energetic resources.4 According to NOAA’s Land Cover Program, the United States’ agricultural land was reduced by 2116.48 square miles.5,6 Globally, soil degradation may affect 52% of the land used for agriculture moderately or severely.7 It is estimated that world food production may decrease by 30% in the next 50 years, due to soil erosion and fertility losses.8 About 70% of the planet’s accessible fresh water withdrawals are currently used for agricultural activities.9 Along with using majority of the freshwater resources, the food system also consumes 26% of final energy through the entire food life cycle.10,11 Irrigation systems are also highly energy intensive, some estimated to consume up to 15% of total energy in agriculture.12 Additionally, the production of fertilisers and pesticides alone accounts for 40% of the energy use in agriculture.13 A US-study suggests that transportation alone accounts for about 11% of food-related GHG emissions.14 The energy and fuel waste from this supply chain leads to more challenges of managing waste.

The challenges to implementing food systems in the urban environment include threats of urbanization or urban expansion that are imposed upon semi-urban agricultural areas, food deserts as identified by USDA due to their and labor. Research on future urban expansion in croplands have estimated a net 1.8-2.4% loss of global croplands by 2030 with regional variations.15 Half of the global workforce (1.3 billion people) are employed in agriculture, with an estimated 2.6 billion deriving their primary livelihoods from it (International Labour Organization).16 Globally, 60% of all child labourers in the age group of 5-17 work in agriculture representing 0.5% of the world’s child population, including farming, fishing, aquaculture, forestry, and livestock.17 This amounts to over 98 million girls and boys, or 0.5% of the world’s current population of 1.9 billion children. 67.5% of child labourers engaged in agriculture are unpaid members of the family.18

Cities are going to witness a global population shift from rural to urban areas of approximately 66% inhabitants by 2050 from 54% in 2014.19 Urban areas will require a consistent food supply along with energy and water resources and a robust waste recovery initiative in order to survive. Hence, the paradigm shift required in achieving urban resiliency is through the adaptation of the Bi-FEW model that ensure a resilient food supply and create a distributed network of resources without stressing the existing infrastructure. Moreover, urban farming essentially addresses the existing food insecurities in urban food deserts with low or no access to fresh and nutritious produce. However, the model does not project a solution to replace the need of current large-scale commercial farming practices.

C. BI-FEW

The building integrated nexus of food, energy and water systems is applied in the built and social environment to tackle the growing concerns of existing aging infrastructure, ecological imbalances and public health crisis in urban areas. In the wake of natural disasters, it is prudent to secure resilience using technology and capable infrastructure that allows reliable communication and management of these systems. Hence, Infrastructure, Technology, Real Estate, Economics, Labor in Production and Consumption are the key areas that the Bi-FEW model requires for implementation.
a. Infrastructure

The Bi-FEW model is based on the principle of Zero-Acreage farming that does not require additional land to conduct the farming practices.20 rooftops, balconies, exterior walls and interior spaces, open spaces are converted into intensive farming areas for this practice. Zero-acreage farming systems can be traditional soil based gardens but lighter soil-less vertical growing systems characterize this practice. These vertical systems can be intensively arranged indoors on a minimal footprint producing more frequent yields (lbs) with controlled environmental (lighting, air and water) conditions, also known as Controlled Environment Agriculture (CEA). However, they are not closed-loop systems and vary in application and management models.21 The building integration model combines these farming systems with water and energy management systems, to create a net-zero building system.

The Bi-FEW model encompasses a completely closed-loop self-sufficient system where all inflows and outflows of water, energy, biomass, nutrients, and soil are managed with CEA food production systems. These include variations of aeroponic, hydroponic and aquaponic systems, in which the nutrient delivery method is water based requiring an intensive water infrastructure. Hybrid Constructed Wetlands is the innovative water infrastructure feature of the Bi-FEW model. This was first introduced as a testing model in Building Integrated Wetland Agriculture for the city of Miami. The model was developed to overcome the challenges of water management through constructed wetland agriculture as it partakes natural water treatment of the harvested rainwater and greywater from the building. Simultaneously, the model was contextualised to address the vulnerabilities of coastal cities that are witnessing elevated threats from hurricanes, king tides, storm surges, saltwater intrusion and/or sea-level rise.

Hybrid Constructed Wetlands is an adaptation of an artificial wetland system, the living machine, and a photobioreactor for algae biofuel production. The system is then coupled with biomass energy production to supplement the energy and nutrient requirements of the CEA food production system. Hybrid Constructed Wetlands can be hybridized as a productive growing system with cattails (Typha Latifolia), shrimps and oysters. The plants used are harvested frequently for energy production and additionally, plants not used for wastewater treatment can be safely consumed as well.

b. Technology

The Bi-FEW model requires a technological framework to maximise its efficiency and make it an economically viable application. The Internet of Things (IoT) network connects and facilitates data exchange using hardware such as sensors, actuators and softwares within the physical devices, appliances and other objects. The embedded computing system configures a unique address that secures inter-operability within the existing ‘Internet infrastructure’.22,23,24 In CEA systems, various IoT frameworks monitor, manage and maintain all aspects of crop operations (i.e. automation of seeding, lighting controls, pH sampling, growth analytics etc) to maximize yields (lbs) and utilise resources. Additionally, ‘air moisture estimation, compliance monitoring for the entire system, precision farming, crop intensification, water content in crops determination, crop yield modelling and estimation and crop nutrient deficiency detection’ are important operations that exist due to IoT.25 IoT technology enables a distributed intelligence throughout the entire buildings water and energy infrastructure, where remote sensing can actuate grey-water and latent energy harvesting.
c. Economics

The current economics for CEA focuses upon high production yields (lbs) which encounter high operating costs for water and energy management for the controlled environment of the crops. It is important to note that the determining factor for the economic viability of CEA food production systems is often the factory scale production model, thus requiring immense capital investment. The BI-FEW model seeks to reduce the operating costs by maximising efficiency with a closed-loop system on a smaller scale production.

The viability of the BI-FEW model in urban environments is established on IoT enabled infrastructural system features. Building integration in urban areas is a major disruption to the conventional food supply chain as it embeds production, processing, storage and distribution directly at the same point with the consumer. This direct distribution from the grower to the consumer ensures enhanced food access, accountability, and quality control of the produce. It also fosters economic development and entrepreneurship of a more secure individual, retail and/or commercial provisioning of nutritional produce. Additionally, this creates a stronger social bond within the community and higher market value for the consumers because of a better quality product in some cases.

The decreased distance between producer and consumer also mitigates the cost and negative redundancies of transportation, energy consumption and associated water and air pollution.

d. Bi-FEW Real Estate Models

The conventional urban agriculture zones include ‘home vegetable gardens, orchards, community gardens, school gardens, roof gardens, market gardens, urban farms, aquaculture, greenhouses, animal husbandry as well as urban farm stands, Community Supported Agriculture (CSA) and farmers’ markets’. The land uses for urban agriculture are still developing with the increased viability of innovative Zero-Acreage farming technologies. Real estate developers are reacting to shifting cultural trends that cater to the demand of new ways of living together within the built environment. Together with progressive local planning departments and city councils, there is a dialogue to develop their communities around urban resiliency.

The current challenge of implementing conventional Zero-Acreage farming in urban areas is the base rent, operating costs and the net profit of the crops’ production value ($), which is regulated by the regional and local agro-markets. The higher the net profit from the production value for the farmer is, the more secure his business model is. However, the cost of yield ($) is inherently dependent upon net area used for production, vulnerability to associated risks on the proposed site and access to water and energy resources. There is government support by way of property tax incentives for innovative farming to offset the initial capital investment but ultimately spatial capacity constraints within the building will determine the viable real-estate model for implementation. Hence it is important to note that the overall Bi-FEW implementation strategy will be at a neighbourhood scale, a network of buildings symbiotically working together to move towards a more resilient urban environment.

Two shifting cultural trends in the way we inhabit and move around our urban cores promote unique opportunities for implementation of this Bi-FEW model, namely micro-unit housing developments and increased ride hailing / sharing services respectively. Rideshare services are growing at such a rapid pace there are estimates that car ownership will essentially drop by 80% by the year 2030. Drastic reductions in car ownership will render a large amount of public parking space (up to 20% of downtown land-area of some American cities) unnecessary, with empty parking garages already characterizing this trend. This has led municipal governments to reassess the minimum planning codes for parking mandated by the cities for conventional land-uses. This calls for Bi-FEW models to
retrofit unused and disused parking garages, stitching the urban fabric with a productive landscape at a neighborhood scale, and enhancing the livability quotient of urban core communities.

Simultaneously, emphasis on micro-unit housing development in urban cores have increased the demand for more communal activities in the building’s public areas. An increase in available net communal area provides the opportunity for the implementation of a Bi-FEW model, where residents could be simultaneously employed and collectively participate in their food production. This will foster a healthy communal living environment promoting urban resilience through a social lens at an individual building scale.

a. Labor
It has been established that the Bi-FEW model can be remotely managed by a minimal skilled workforce whilst, with all forms of agriculture, a substantial unskilled workforce is needed for harvesting, distribution and maintenance of the food production systems. The labor economics puts emphasis on creating jobs especially for marginalised populations i.e. at-risk youth, ex-convicts, homeless etc. Additionally, the entrepreneurial urban farmer is an emerging community leader leading this socially responsible labor environment. These new labor paradigms facilitated by the implementation of a Bi-FEW model are capable of engaging a variety of people while enhancing the social behaviour and civic pride of the community at large.

b. Public and Social Well-being
Globally, due to a combination of poverty, lack of education, and evolving commercial practices in the food industry, there is an increasing emergence of “double burden” families that have members who are both overweight and malnourished. Nearly 2.5 times as many people are overweight as undernourished, with cases of severe overweight (obesity) rising in parallel. There are a number of factors contributing to rising obesity rates, including food prices. Though the model assumes that global daily average calorie availability will rise significantly (to 3,050 calories per capita per day), 290 million people are still projected to be undernourished by 2050. The number of overweight people reached 1.9 billion, with over 600 million obese. In order to mitigate the adverse effects of the conventional food supply chain, Bi-FEW models factor in the crop selection based on the USDA dietary requirements of the building’s occupants and/or target population. These are categorically worked out according to the six food groups in the recommended USDA diet charts: vegetables, fruits, grains, dairy, proteins, and oils. Simultaneously encouraging the community to participate together in producing healthy food for themselves, establishing a cultural resilience towards a better access to nutritious food.

D. FOOD RESILIENCE URBAN INFRASTRUCTURE TOOLS (FRUIT)
FRUIT is the set of analytical instruments that generate a self-sufficient net-zero food-energy-water solution based on a target population. Bi-FEW model employs FRUIT to determine the required net area of a selected building, or network of buildings to meet the USDA dietary requirement of said population. There are three fundamental areas of focus for FRUIT to be activated: planning, people and crop selection. The planning requires the measure of requisite yield production (lbs) that is dependent upon the population understudy. The yield capacity (sqft) of the physical site is also regulated by planning policies that permit urban agriculture on specific locations within buildings or neighborhoods.
The build out of the FRUIT computational algorithm commences with a preliminary site identification using GIS. Demographic estimates are extracted from censusdata.org which include gender, age, and ethnicities. This data is then matched against USDA recommended calorie intakes (Kcal) with respect to food groups: vegetables, fruit, dairy, protein, grains and oils. This provides us with a total nutritional requirement of the target population which is correlated with a crop selection that is sensitive to site location, topography, climate and soil type. The final crop selection are then matched with the appropriate Zero-Acreage food production system that ensures the most efficient yield. FRUIT is comprised of a self-sufficient net-zero catalog of soilless CEA (Aeroponics, Hydroponics and Aquaponics) and soil based (Food Forest and Eco-Garden) food production systems that calculate total production yields (lbs). For every unit system, the quantified data for input flows include: water (gal), energy (kwh), and nutrients (lbs), is adjusted against output flows: yield (lbs), biomass (lbs), and water (gal). Once the unit model is adjusted for most efficient yield while maximizing the sub-sample population, the system is scaled to complete the total nutritional requirement of the target population. Completing this computational model, the aggregated data from these food production systems are mapped spatially within the available building net area. Hence, this ensures an optimized equation between maximizing yield (lbs) with intensive food production (sqft) spatially. Once the algorithmic model is set up, the architecture of the Bi-FEW model is iterated to create a generative food resilience urban landscape.

H. RECOMMENDATIONS/DISCUSSION

Bi-FEW forms a symbiotic relationship in a network of buildings that work together to move towards a more resilient urban environment. The model can ensure urban resilience by efficiently managing the energy-water resources of a building with food production. The integration of IoT technology enables a distributed intelligence throughout the entire buildings infrastructure and is vital to the success of the food production system operations. This makes urban agriculture economically viable to integrate as a real-estate model in cities. The model also links economics with socially responsible employment and entrepreneurship practices for growing urban populations. The model ultimately aims for the improvement of public health and social security. Considering the existing gaps in the policy frameworks to support the application of Bi-FEW models, the paper recommends for a strong case to allow for innovative land use, building and planning code change to facilitate the implementation of innovative urban agriculture models. The role of FRUIT is as a support tool to provide agency for these concepts, to strengthen urban resilience through resource efficiency of cities. An interconnected knowledge platform of Bi-FEW models will provide a robust assessment framework that will enhance and support multi-level decision-making on future urban development. Integration of live data from operational market viable CEA food system prototypes will greatly assist the future development of the Bi-FEW model. A further research on environmental planning policies, and public health and nutrition should be explored for integrating Bi-FEW as model that address food security policies in cities globally.

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LEARNING FROM LIMINAL PHENOMENA: THE CASE OF ABANDONED LARGE URBAN STRUCTURES (ALUS)

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INTRODUCTION

This article focuses on a particular urban phenomenon we have increasingly observed in our cities: Abandoned Large Urban Structures (ALUS). These structures are the products of the economic crisis, of political imbroglios, of speculative movements as well as the results of obsolescence dynamics and natural disasters. The phenomenon of abandonment thus covers a broad spectrum of structures: from derelict hospitals to vacant offices, from dormant factories to moribund malls. It presents an important variety in terms of former uses, of form, of scale, of state of decay or of location. This variety leads to a difficulty: there is no universal definition addressing this diversity. Beyond this definitional issue, those structures are in a state of in-betweeness. They show a material, functional and aesthetic ambiguity, which is in direct tension with the traditional vision that dominates architecture history: architecture as the production of a stable and achieved object.

As designers, what could we learn from these structures? Would they be able to support an evolution of our practices in an age of complexity?

MAPPING THE UNMAPPABLE?

Databases of ALUS

Through my PhD research, I came to study databases of abandoned structures. Their number has seen a marked increase in the last decade (Figure 1). The original reason for this inquiry can be summed up in two questions: How was it possible to organize the vast landscape of urban abandonment? How could we make sense of such heterogeneity through the use of classification tools?

Close to 50 platforms cataloguing abandoned structures have been inventoried and analyzed. Among the most famous ones, we can point to: Forbidden Places¹, World Abandoned², Cadaveres Inmobiliarios³, Opacity⁴, [Im]possible living⁵ and Atlas Obscura⁶. If the preferred way to display the data appears to be a world map (with pins identifying the structures location), I also have taken a strong interest in how the abandoned structures were described, named and categorized. This analysis showed that, in the large majority, functional, geographical or/and status filters organized the platforms (several filters can be applied for a single classification). The functional filter differentiates the structures according to the use they were originally built for. The geographical filter classifies ALUS depending on their location around the world. Finally, the current status filter allows the platforms to discriminate structures in accordance with their current condition (level of damage, incompletion, etc.) – as illustrated in Table 1.
CRITICAL PRACTICE IN AN AGE OF COMPLEXITY – AN INTERDISCIPLINARY CRITIQUE OF THE BUILT ENVIRONMENT
AMPS, Architecture_MPS; University of Arizona
22—23 February, 2018

Figure 1. Increase of the number of platforms cataloguing ALUS: examples of online databases

Table 1. Nature and proportion of the filters organizing online platforms

<table>
<thead>
<tr>
<th>Filter applied</th>
<th>Functional</th>
<th>Geographical</th>
<th>Current status</th>
<th>Ownership</th>
<th>Patrimonial value</th>
<th>Scale</th>
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<td>58%</td>
<td>71%</td>
<td>36%</td>
<td>9%</td>
<td>13%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Confrontation with a field of ambiguity: The case of El Elefante Blanco

Together with this exploratory analysis, I conducted a field investigation within an abandoned structure, called El Elefante Blanco. The structure is an unfinished hospital located in Buenos Aires, partly and informally occupied by 100 families for two decades now. During the two periods of immersion I conducted (February-march 2013, april-june 2014), something caught my attention: the fact that this structure had a status of in-betweeness. First of all, it was only partly abandoned: some residual uses remain. Due to its incompleteness, the concrete and bricks were left exposed, giving the structure a particular roughness, midway between a building site and a demolition site. The absence of finishing materials (doors, windows) created an open facade, where ones could see through the entire structure. With its gigantism, its access ramp and its interior street linking two neighborhood, El Elefante Blanco was neither truly architecture nor truly infrastructure. It spoke as much about memory as amnesia, as much about past as future, as much about greatness as decay, as much about formal fabric as informal fabric, as much about permanency as fugacity.

In view of these observations, a question arises: Could we keep using conventional tools, such as functional classification, in order to describe, understand and act upon ALUS ?

In his article entitled « Mapping the unmappable. On notation »\(^7\), the professor Stan Allen calls for a renewal of our design tools in an era of complexity. According to him, the conventions of representation need to be rethought: « Traditional representations presume stable objects and fixed subjects. But the contemporary city is not reducible to an artifact (...) In order to describe or to intervene in this new field, architect need representational techniques that engage time and change, shifting scales, mobile points of view, and multiple programs »\(^8\)
BRINGING THE CONCEPT OF LIMINALITY INTO DESIGN DISCIPLINES

Emergence

Liminality, and its adjective liminal, come from the Latin word *limen* which means « threshold ». The term can be traced back to the writings of a French anthropologist Arnold Van Gennep who, in 1909, wrote the book *Les rites de passages*. In this work, Van Gennep argues that all rites, and especially initiation rites, are organized along a structure of three phases. One necessarily goes through these three consecutive stages when experiencing a transformative ritual:

1. The first one is the *separation stage*: the subject leaves the world, as he knew it, to enter a different world, where he loses all bearings. This phase is one of separation from the original identity group.
2. Then comes the *liminal phase*. It is the specific moment that I would like to focus on for the course of this article. During a transformative ritual, it is the stage where one is neither what he previously was nor what he is to become.
3. Finally, the last stage is the *reintegration phase*. In this last period of time, the person being initiated goes back to society, and returns to a more structured world.

Van Gennep’s studies were particularly focusing on traditional societies. Nevertheless, his work will later deeply influenced another anthropologist, Victor Turner, who extended the understanding of the liminal phase and applied it to all kinds of occurrences in modern societies, from human to non-human objects and situations. Thus, Turner’s updated definition of liminality became: « at its broadest, liminality refers to any ‘betwixt and between’ situation or object, any in-between place or moment, a state of suspense, a moment of freedom between two structured world-views or institutional arrangements (…) liminality opens the door to a world of contingency where events and meanings – indeed ‘reality’ itself – can be molded and carried in different directions »

As a result of this broader definition, it became possible to associate liminality with built environment, architecture and urban phenomena. In particular, the notion strikes a particular chord with abandoned urban structures. Indeed, in one hand, these structures were separated from their initial project (as the abandonment breaks the original bond between a structure and its planned purpose), and, on the other hand, they have not yet received their new assignment. They respond to the liminal phenomenon definition.
Integrating discontinuity into the life cycle of a building

If we consider the conventional scheme representing the main phases in the life cycle of a construction project, we can isolate three moments. Between each of those steps, there is a presumed continuity:

1. The building is first designed and built,
2. The building is then used and occupied,
3. Finally comes the end of the building’s life: the structure needs to be reclassified, either through demolition, deconstruction, or recycling. We should note that conservation, rehabilitation, reconversion, even demolition, is common procedures today, especially in Europe. They are standard ways of thinking and designing a future for those structures. They, however, have in common the desire to eliminate the time of abandonment and to reincorporate the structures into more conventional production and consumption cycles. In other words, as illustrated in Figure 3, they somehow bypass the possibility for abandonment to provide valuable learning opportunities.

![Main Phases in the Life Cycle of a Construction Project](image)

**Figure 3. Conventional representation of the life cycle of a building**

If we develop further our hypothesis, considering liminality as a potential valuable phase, the previous scheme changes (Figure 4). Discontinuity emerges and alters the linearity of the representation. The decision to abandon a structure can then be associated with the separation stage, the liminal stage itself is linked to the abandonment period and the decision to eventually reclassify the structure is analogous to the reintegration stage. How could we turn this discontinuity into an active design instrument?

Here again, the initial definition of liminality can enlighten us. Indeed, Victor Turner reminds us that: « liminal phenomenon is at once no longer classified and not yet classified … neither one thing nor another »\(^1\). Conventional definition and classification usually don’t integrate liminality, they fail for example to allow for the existence of a not-boy-not-man because they don’t really accept transitory condition. This observation encourages us to further question the databases inventory outlined at the beginning of this article.
Classification as a historically grounded tool

Since the 19th century, architecture has used classification and categorization as frameworks for analysis, as well as for action. The use of operations of selection, inventory, comparison, classification, and denomination has been, whether intentionally or not, a fundamental part of our ways of knowing, understanding and designing our built environment. Classification is a strong normative system as it influences the modes of existence of architecture. Not only it gives it some visibility, but it also shapes the perception we have of it. Historically, they are three main ways to conventionally classify buildings; they are based upon formal, functional or stylistic criteria. Through the study of databases of abandoned structures, we could observe the persistence of those historical filters, evidence that conventional representation modes survived to the present day. According to the German architect and theoretician Mathias Ungers: « Criteria on which architecture is judged are [still] oriented towards something unitary, definitive and complete »\textsuperscript{12}. In other words, the ambiguity and the incompleteness of liminal structures seem to remain outside the scope of conventional classification in architecture.

Despite this general assessment, some localized alternatives can be identified. Still rare, their essential worth lies nevertheless in their capacity to question the relevance of conventional classification in the face of critical urban situations. We propose to present the work of three groups of architects and artists who stood out from my database inventory thanks to their critical integration of liminality within classification process.

\textbf{COULD CLASSIFICATION WELCOME LIMALITY ?}

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The Atlas of Forms (Eric Tabuchi, France, 2015)
The first protagonist is the French artist Eric Tabuchi for his digital work « Atlas of Forms », online since 2015. The Atlas is both a collection of more than 1500 buildings’ photographs (including of abandoned structures), and a search tool. Indeed, Eric Tabuchi offers the visitor the possibility to manipulate the photographs, to rearrange them, thanks to the addition of 18 formal criteria (Table 2). Basically, Eric Tabuchi developed a formal classification of architecture online.

Table 2. The 18 criteria organizing The Atlas of Forms

<table>
<thead>
<tr>
<th>18 classificatory filters</th>
<th>Geometric forms</th>
<th>Formal qualities</th>
<th>Liminal qualities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circle</td>
<td>Monolithic</td>
<td>Chaotic</td>
<td></td>
</tr>
<tr>
<td>Square</td>
<td>High</td>
<td>Under construction</td>
<td></td>
</tr>
<tr>
<td>Triangle</td>
<td>Small</td>
<td>Decay</td>
<td></td>
</tr>
<tr>
<td>Polygone</td>
<td>Light</td>
<td>Ruin</td>
<td></td>
</tr>
<tr>
<td>Geometric</td>
<td>Massive</td>
<td>Skeleton</td>
<td></td>
</tr>
<tr>
<td>Mycomorph (the shape of a mushroom)</td>
<td>Completed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the top left corner of the home page, the visitor can pick 1 to 3 criteria among a list of 18 formal features proposed by Eric Tabuchi. If we take some time to consider the list more precisely, we see that the first 6 ones relate to conventional geometric criteria such as ‘circle’, ‘square’, ‘triangle’, etc. Tabuchi then refines the analysis thanks to what I would call formal qualities: is the structure monolithic? High? Small? Massive? Etc. These two first columns are very common in classification based upon formal criteria. What is less usual is the final set of 5 criteria: ‘chaotic’, ‘under construction’, ‘decay’, ‘ruin’ and ‘skeleton’. These last criteria are particularly interesting because they include a time factor in the classification. They are less about formal abstraction than they are about formal alteration.

Here, Tabuchi doesn’t reject the possibility of classifying abandoned structures. He even uses the conventional formal framework to do so. Nevertheless, he widens this framework and extends the set of criteria to introduce liminal features. We could call this first tactic The Expansion Strategy.

The Incompiuto Siciliano (Alterazioni video, Italy, 2009)
The second group is the Italian collective of artists Alterazioni Video. In 2007, the group began to develop an inventory of abandoned and unfinished structures located in Sicily. Today, more than 400 structures have been identified. In the face of such numbers, the artists claim that they found a new architectural style: ‘The Sicilian Incompletion’. With this label, the artists and activists fight for the recognition of these structures as significant constructions in the Italian contemporary era.

At first sight, Alterazioni Video seems to embrace the principles of stylistic classification, by simply adding ‘The Sicilian Incompletion’ to the already long list of architectural styles. But, reading between the lines, it is fairly clear that the tone used is actually one of criticism. We cannot ignore the irony and even the sarcasm in this work. To begin with, we all know the weight of the Heritage Legacy in Italy. By equating Italian most famous styles with ‘The Sicilian Incompletion’, Alterazioni Video brings together historical monuments and contemporary eyesores. Moreover, if we take a closer look at the logo they used for their work, the irony is even more pronounced: the artists reinterpret the logo used
by UNESCO World Heritage Sites – as illustrated in Figure 5. Whereas the original one shows the facade of a roman temple, *Alterazioni Video’s* logo displays a pretty similar temple, except that the columns are unfinished and the pediment is broken: « By taking to the extreme a formal architectural style of the official designation of a site, the importance of [*Alterazioni Video* work] lies in satirically employing the traditionally hegemonic mechanisms of heritage, turned on their head. »

![Figure 5. A comparison of UNESCO logo and The Incompiuto Siciliano logo](image)

The strategy used here is one of *The Renewal of Meaning* (or new semantic). The original classification framework is kept but its meaning is changed. Its objectives are also modified. For example, *Alterazioni Video* does not recognize institutional designation and prefers a bottom-up process to evaluate the structures. By the introduction of irony, *Alterazioni Video* takes, in this work, an implicit critical look at conventional classification applied to abandoned structures.

**Made in Tokyo (Bow-Wow Studio, 2001)**

The last group of architects is the Japanese studio Bow-Wow, famous from their book *Made in Tokyo* published in 2001. In this book, the architects draw up an alternative guide for the city of Tokyo. Instead of identifying famous examples of Japanese architecture, they focused on what they called the ‘No-good architecture’, meaning nameless and strange buildings, often partly abandoned. They made an inventory of those structures, following a precise protocol offering a double page for each structure description (Figure 6).

![Figure 6. Protocol used by Made in Tokyo to describe the ‘No-good architecture’ of Tokyo. Source: KAIJIMA Momoyo KURODA Junzo, TSUKAMOTO Yoshiharu, 2001, Made in Tokyo, Kajima Institute Publishing, Tokyo, pp. 138-139.](image)
The interest of the architects for those structures lies in the fact that they are unforeseen building types with unexpected combinations of functions. Bow-Wow argues that the traditional classification based on functional criteria is inoperative because it would lead to a smoothing of the specificities of abandoned structures. They argue that: «if we try to collapse [these] architectures into a typology, we will lose the interesting mongrel nature of the differing elements»14. The structures studied have no author and they present a juxtaposition of conflicting uses. This inherent tension is exemplified by the name the architects give to the structure: ‘03. The Highway department store’; ‘14. The Golf taxi building’; ‘35. The Rail museum’; ‘38. The Ventilator obelisk’; ‘67. The Ghost rail factory’, etc.

The architects from Studio Bow Wow argue that conventional classification based upon functional criteria implies reciprocity between content and container. It also implies a dominant function. In other words, conventional classification would only consider architecture presenting no ambiguity between content and container, which is precisely the opposite of what liminal structures have to offer. Nevertheless, the architects do not abandon the possibility of classification and they propose to highlight the disruptive capacity of abandoned structures by integrating levels of ambiguity. When a structure is listed as «OFF», it means that it presents functional diversity, hybridity and porosity between structural elements and uses. That way, the architects show the co-existence of unrelated functions in a single structure: they create cross-categorical hybrids.

The tactic used here could be called The Subversion Strategy. The architects reverse totally the classification system and propose, instead, an anti-conventional classification device.

CONCLUDING REMARKS: THE PROMISE OF LIMINALITY FOR DESIGNERS

The introduction of liminality has led us to investigate the possibilities and limits of architecture classification to address ALUS. The three works studied have shown the inadequacy of conventional frameworks to address urban liminal phenomena. However, instead of discarding entirely this device, the artists and architects used it and transformed it to propose alternative ways to understand the age of complexity and design within it (Figure 7). By confronting conventional system with the liminal nature of abandoned structures, the architects took a stance about the contemporary urban fabric, pointing fresh challenges (time-based architecture, contradictions, instability, layering of functions, porosity, etc.)15.

![Figure 7. From classificatory strategies to design tools](image)
Thus, where does the Elefante Blanco experience stand in this spectrum of critical practice? If liminality is about making space for profound change, by distancing oneself from established mechanisms; the inhabitants occupying the structure made a strong statement. By inhabiting, for decades, a structure thought for an entirely different purpose, they allowed a deep shift in perception and opened a discussion about the architectural, social and political value of abandonment.

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13 Pablo Arboleda, Reckoning with Incompiuto Siciliano: unfinished public works as modern ruins and all which it entails (Weimar: Bauhaus-Universität Weimer, Doctoral thesis, 2017), 60.
15 It is important to note that Alterazioni Video and Studio Bow-Wow have a practice far exceeding the inventory of abandoned structures. The lessons they learned studying liminal phenomena have since been integrated into their professional practice, including in the design of brand new buildings.

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SENSE OF PLACE IN THE ERA OF ANTHROPOCENE: HOW ARCHITECTURAL CULTIVATION DRAWINGS IMAGING THE URBAN ECOLOGICAL SHIFT

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ANTHROPOCENE, AGRICULTURE, AND THE QUESTION OF PLACE

Introduction

Agriculture can be considered the archetypal form of place since it changed the spatial and temporal relationship between humans and their environment, introducing the concept of place as permanent rather than nomadic. The way architecture re-interprets urban agriculture is key to understand how sense of place is envisioned in the Anthropocene, a geological time governed and controlled by human beings. Architects, as designers of the human environment, have undoubtedly great agency in forging the ecosystems and in interpreting new ways of shaping the land. Today, their role is crucial since their urban cultivation visions occur at a time when climate change forces us to think in terms of globalization while, at the same time, globalization is putting local spatial identities at risk. Sense of place developed by agriculture is floating within this shift from local to global. This paper pierces three visions of architectural cultivation and their relative sense of place, through the analysis of interviews and drawings of three emerging firms Studiomobile, Gravalosdimonte arquitectos, and Conceptual devices. While the contemporary social phenomenon of urban agriculture has widely been studied revealing a rise of environmental awareness, the renewed architectural attention to this urban activity remained unexplored. Floating greenhouses, biological walls, and vertical farms are only a few examples of the projects that flood the web magazines and exhibitions. In this plethora of possibilities, it is difficult to read what kind of sense of place is emerging and therefore what kind of new understanding of life emerge from the juxtaposition global/local. In this light, drawings can be a key of interpretation. As tool of reflection, architectural drawings have always been the holder of imagination. This reflective quality positions them as a central tool of the design process as well as of the world they represent and create. Drawings can reveal the multiple sense of place that architectural cultivation creates revealing at the same time the synchronic nature that connect these projects to the past. In unfolding the multiplicity of the meaning of urban cultivation we will be able to embrace a world of possibilities, perhaps diverse one another, yet equally relevant to respond to the complex contemporary environmental emergencies through a qualitative approach to place.

Imaging Sense of Place

Architectural theorist Marco Frascari believes that in architecture, a sense of place develops first and foremost in the mind and it becomes visible through imaginative drawings. Interpreting Charles Sanders Peirce’s theory of dreams, Frascari argues that our mental images are icons which are a tool of mediation. The alchemy of the architectural drawings lay in a state of dreaming that connects the architect and his/her imagination to the constructed world. This state of mediation can be found as early as the Renaissance period. As Joseph Rykwert wrote in Translation and/or Representation, the frontispieces of Palladio and Vignola treatises were decorated with two ladies representing theory and practice of architecture. Both sides of the discipline were decorated with drawing instruments. For theory, a square and a circle, for practice, a compass, and a quadrant. Clearly, “working on the board was […] considered
the essential passage from thought to materiality.” Hence, drawings were considered a tool of translation. According to Alberto Pérez-Gómez this approach to drawings reveals its characteristics of being creator of sense of place, he states that in “[…] defining the urban context and its institutions through ‘images’, the architect enhanced the traditional sense of place, adding meanings that spoke to man about himself, about a new understanding of life as valuable experience.” Frascari proved that the dream-nature of architectural modern drawings develops a sense of place beyond their own time by using Edward Casey phenomenologist study of Palazzo Chiericati in Vicenza (1550) designed by Palladio. In this study dated 1993, Casey narrates his walk around the palace, even though the built construction cannot be circumnavigated. Rather, Casey had in mind the drawings printed in the Four Books of Palladio (1570) which ideally permit a stroll around the building. The architectural drawing is therefore a strong and powerful locus that prevaricates the reality. Frascari’s study told us that drawings can be creators of place which belongs to the dream world raising the intellect of the human beings and informing them about new understanding of life. This attitude toward drawings and place started to change during the Enlightenment when drawings became a tool of reduction rather that translation, favouring perspective to plans and sections. Drawings had to represent the reality and nothing more, an anti-process focused more on the form and object of the representation rather than on the act of making ideas. As Michel Foucault affirmed in *Orders of discourse* “[…] the highest truth no longer resided in what discourse was, nor in what it did: it lay in what was said. The day dawned when truth moved over from the ritualized act - potent and just - of enunciation to settle on what was enunciated itself […].” The sovereignty of digital drawings of our contemporary era has been exponentially enhancing this transformation from translation to reduction, concretizing Frascari and Pérez-Gómez foresights. However, examples of digital drawings as “mimesis of a transcendental reality” and the consequential creation of an intellectual sense of place exists also today as shown by the work of Perry Kulpert. Peter Eisenman, architect and theorist known for his dissociation from phenomenology, also believes that “[…] ‘real ‘architecture’ only exists in the drawings […].” confirming that drawings are powerful tools to imaging and reading architecture beyond the connection between imagination and perception of place.

**STORYTELLING OF SENSE OF PLACE**

**Reading a Drawing**

Drawings, not mere illustrations but material thinking, are what connect us to place through the act of translating theory to practice, and imaginative world to object. How can we read drawings of our contemporary world, handmade, hybrid, or digital? As an unattainable and unreachable storytelling, drawings hold the secret that lead to the sense of place of their time. This apparent impenetrability can be pierced following the intuition of Frascari ideas synthetized in his sketch titled “Templum” (figure 1). The sketch shows three levels of reading of a project, the ground, its literal appearance, the underground the moral value of the reading, and the sky, its allegory and metaphorical significance. If we follow this method, “the reading between the lines is a reading of the lines” so that understanding the signs will reveal the story narrated by the drawing. Hence, drawings are an archeological method that enables the reader to pierce one or more discourses of cultivation, or as Michel Foucault would say, to pierce its multiplicity.

The author selected three European architectural firms, Studiomobile, GravalosdiMonte arquitectos, and Conceptual Devices for their relevance and leading role in the field of architecture with projects that engage the urban in cultivated visions. These firms pioneer architectural cultivation, as recognized by awards and appearances in several international exhibitions. Applying Frascari’s method as a guideline for the analysis of selected drawings, and enriching it with qualitative interviews, the author will be able to trace the ground and underground levels of each vision, and subsequently, by comparing results, to describe the higher level of the sky.
Sense of Place as Ephemeral Module

Studiomobile is an Italian firm founded by architects Cristiana Favretto and Antonio Girardi, who focus their research on the intersections between botanical science and architecture. Their project *Jellyfish Barge*, a floating and self-sufficient greenhouse, has received several awards, one of which by the United Nations, for its innovative approach to agriculture.

Ground Level

As seen in the section (figure 2) and views (figure 3) of Jellyfish Barge, the greenhouse is a hexagonal floating glass construction. The cultivable growing medium is not soil, but a hydroponic garden that uses water in an enclosed system that is built at the center of a wooden platform. The structure of the garden works also as the structure of the greenhouse itself, providing one of the few examples in which a cultivation support, works also as construction system, rather than be only a feature attached to a building. Energy is gathered by solar panels positioned around the external glass envelope which has also the purpose of gathering rain water along the perimeter.
The section of the Barge provides a very technical interpretation of the project, while the views add a more social vision of it, some imaginative projections of how people and cities would engage with this object that floats along the shores. The greenhouse is pictured as modular, so that one or more unities can be joined together to create food hubs with more than one function, cultivation sites, markets, restaurants, community gardens, and education facilities.

*Figure 3. Views of Jellyfish Barge, 2015.*
*Source: courtesy of Studiomobile.*

*Underground Level*

In one of the first sketches of Studiomobile concept (figure 4), a simplified version of the barge, there is no apparent interaction between humans and nature. The stress is given to the mechanism of using natural resources through mimesis design (capillary action). However, nature is not only seen as a source of inspiration in terms of design shape and functionality. Nature inspires also the idea of modularity. As Girardi said “plants are […] decentralized systems […] of modular control units. [Because of this, plants are] able to endure and recover in situations of danger.” Studiomobile translates this principle into the construction modularity that allows different modalities of cultivation supporting a diverse set of functions (markets, schools, etc.). This flexible space creates different kinds of investments, either public or private, developing a symbiosis between private gains and local community benefits that acts as an engine for a “regeneration at a larger scale.” This endurance inspired by plants is a strong moral value behind this proposed cultivation.

*Figure 4. Sketch of Jellyfish Farm, 2007.*
*Source: courtesy of Studiomobile.*
Sky Level
The idea of cultivation as social generator is a legacy that Girardi deems to Italian architect Aldo Rossi. As Girardi states mentioning Rossi:

“Aldo Rossi once said about the Siedlungen of Frankfort “...now it seems naïve thinking at Siedlungen of Frankfort during the Weimar Republic as something that could change what happened in Germany in the 30s, but those projects, at least for what regards architecture, conveyed a strong message of what architecture could done.” So, the projects did not achieve the scope, but demonstrated clearly a new way of conceiving the society, a new way of conceiving the city.”

With these words the Jellyfish Barge allegory for a future city is clear. It is about possibilities, suggestions, and visions. The suggested architecture is an outward place that embraces the natural elements and the built urban environment with an ephemeral presence within the urban pattern. The sense of place created by these drawings are rooted in an ecological mimesis that generates social unity between private and public investments, and between flexibility and modularity as key of development and resilience.

Sense of Place as Participatory construction
GrávalosdiMonte arquitectos is an Italian-Spanish firm founded by Ignacio Grávalos and Patrizia Di Monte. The firm is dedicated to the study of urban renovation and placemaking design. Their project Estonoesunsolar is a collection of several conversions of empty urban lots into public places for the communities of Zaragoza. Started as strategy to support the job market during the economic downturn of 2008, the project became an innovative tool of urban regeneration where associations, neighborhood, and municipalities participated directly in the decision-making process.

Ground Level
The drawings of Estonoesunsolar are puzzling and enigmatic. From the sketches (one example shown in figure 5) we can only perceive the urban space through the presence of some edges and boundaries, however there is no visible context. Cultivation is not clearly visible, it is only suggested. The technique used by the designer is pencil, colored pencils and no annotations; the signs on the paper are made to be erased and re-drawn. They are feeble and temporary.

![Figure 5. Sketch of Estonoesunsolar. Source: courtesy of GrávalosdiMonte arquitectos.](image)
Underground Level
The challenging reading of GravalosDiMonte drawings is ascribable to the modalities of their making. The most fascinating and intriguing finding is in fact related to the open ended and collaborative nature of the drawings, which determined the low level of readability of drawings. Through the interviews conducted with Patrizia di Monte between 2016 and 2017, the author discovered that the project had not been developed in a traditional way, first initial sketches, and then preparatory drawings to show the clients/communities. On the contrary, the drawings have been mapped with the community involved in the project during open meetings. Cultivations were communities requests, revealing a rising interests of the urban citizens to food and self-sufficiency.

Sky Level
In the light of the two preceding levels, one conclusion is that drawings are the outcome of the mind of the designer, but also of the organizations involved. While participatory activity is a recognized design tool, the use of participatory drawings in such activity is pioneering. These maps are changeable, malleable, and opened tool that can become platforms of shared reflection. Ultimately transformed in sketches, they were brought directly to the construction site to trace on the soil the ideas of the community. Di Monte called this *modus operandi* “from the ‘sketches to the site.’” The action of tracing the soil translating the ideas into materiality has to be considered a drawing itself proving that the process of translation inherent of drawings as theorized by Rykwert is still existent. In *Estonoesunsolar* the translation occurs between inhabitants of the city and the texture of the urban pattern in a way that democratized the process of design and is very much in line with what sociologist Henri Lefebvre’s theory on the Right to the City suggests. Furthermore, *Estonoesunsolar* perfectly embodied the idea of drawings as loci of places as suggested by Frascari. The drawings became not only the tool of reflections of the architects, but also the communal reflection between designers and the community they wish to serve. In this light, sense of place is perceived in the imagination of the inhabitants of a city.

Sense of Place in Knowledge
Conceptual Devices is a firm located in Zurich (Switzerland). The founder Antonio Scarponi pursues a research that advocates for small interventions in the city space to activate urban and social changes. He often calls for a more cultivable city identifying in the food security one of the main problem of contemporary and future city. ELIOOO is one of his several projects on urban agriculture. It is a manual for a self-built indoor hydroponic garden (figure 6).
Ground Level
As mentioned earlier, the main purpose of this study is to shed light on the multiplicity of cultivation visions in the city. Studiomobile and Gravalosdimonte deliver very diverse drawings. The drawings of Conceptual Devices are another example of how the creation of sense of place is unique to the sensitivity of the designer. In the sketches of Antonio Scarponi there are three unexpected elements for a project that aims to activate urban changes: the presence of industrialised products (Ikea), the introduction of construction tools, and the presence of instructions (figure 7). The language is clear, readable, and simplified. The objective seems to be a self-explanatory project that everyone can do with or without special skills.

![Figure 7. Sketches of ELIOO. Source: courtesy of Conceptual Devices.](image)

Underground Level
The manual designed by Scarponi is not the first one that tries to reach out the population in regards of food security. In 1987, French architect Yona Friedman, delivered a manual on how to grow food as part of a “Communication Centre of Scientific Knowledge for Self-reliance” project for the rural population of India.²⁶

Friedman theorized the necessity for manuals with an equation (1).²⁷

\[
GNR \ p.c. = \frac{(\text{natural resources} + \text{human labor force} + \text{human intelligence})}{\text{number of population}} \quad (1)
\]

He considers natural resources as fixed, while working force and the number of population strictly related and proportional. The only factor that could increase independently by the others is the intelligence. Hence, his conclusion brings him to focus on the enhancement of the intelligence of the population designing manuals to spread knowledge. The same knowledge pursued by Scarponi.

Sky Level
When comparing Scarponi and Friedman we notice that the concern for food security has moved from the rural to urbanized areas. Furthermore, Friedman’s manual aimed to provide a collective knowledge sharable by a community that ideally works together. In Scarponi’s manual, the focus is on the individual experience of learning a technique. However, the shift from rural to urban makes the independent act of cultivation in a city an act of community guaranteed by the democratic accessibility of the knowledge.
The sense of place is a sense of belonging to a wider community that goes beyond the boundaries of the house and the city, while respecting the individual necessity.

CONCLUSION

The three set of drawings presented in this short paper provide a collection of architectural cultivation visions. Their investigations unveil multiple interpretations of sense of place, a flexible and ephemeral place in the urban texture, place of democratic communal imagination, and individual place embedded in a collective knowledge. All their drawings are rooted in an idea of sustainability that goes beyond the notion of technological sovereignty. On the contrary, it relies on values of openness, adaptability, social participation, and self-resilience. An idea of con-division (before any division) that proves the existence of a friendship of ideas, knowledge, economic and social benefits that so much recalls the Italian philosopher Giorgio Agamben’s idea of ‘the Friend.’ Therefore, the archetypal way of cultivating the urban is a condition of being “since what have to be shared is the very fact of [...] life itself” in which the friend is not only the Other human, but also the Environment. In this light, the shift from local to global occurs in the shift from the local identities of the human to the global identities of the bio-community.

As Italian architect Giancarlo De Carlo said reflecting on his life-long interest on design participation “the problem was no longer how to make people participate in architecture, but how to make architecture that can be appropriated and participated in by people.”

Studiomobile, GrávalosdiMonte arquitectos, and Conceptual Devices sense of place seem to have stepped toward De Carlo’s goal where architecture play a role of mediator, or friendly mediator, between humans, environment, and the urban.

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20 Frascari, Marco Frascari's Dream House, 16.

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INTRODUCTION

In March of 2014, United States Customs and Border Protection awarded Elbit Systems of America a contract to design, construct, and deploy Integrated Fixed Towers (IFT) at an unspecified number of sites in unspecified locations along the southwestern border of the United States. Elbit’s responsibilities extended beyond mere construction and monitoring to in situ testing, ensuring customer satisfaction with their product’s ability “to detect, track, identify, and classify movement on the border.” While sites and numbers remained obscure, the objective of the towers was certainly made clear: they were to be integral nodes in what was becoming an increasingly robust border surveillance apparatus. Supporting agents in the field with “long-range, 360-degree, all-weather, and persistent surveillance capabilities,” the towers would assist CBP in “identifying and classifying ‘items of interest’” near the border. Moreover, the towers were touted as a “technology solution for the distinct terrain within USBP Tucson Sector.”

The terrain of the United States Border Patrol’s Tucson Sector is indeed distinct. Stereotypically described as empty, hot, and inhospitable, the Sonoran Desert has most recently captured the attention of national media as a deadly expanse, whose in navigability, extreme climate, and sparse habitation leaves migrants stranded in perilous heat en route to the United States. It is here that, in the recent migration “crackdown” in the US, asylum seekers are arrested by Customs and Immigration Enforcement (ICE)—but more than just an apparatus of apprehension, the desert is used as a topoclimatic device to channel the flows of migrants. In the eyes of CBP the desert acts a kind of natural barrier too harsh and depopulated for many migrants to travel, and from the 1990s onward the Department of Homeland Security’s Operation Gatekeeper used the perceived unknowability and danger of this terrain to funnel border crossing towards urban areas, or toward the eastern segment of the Rio Grande. Yet, as fears of drug trafficking increased during the Barack Obama administration, and anti-immigrant rhetoric accelerated to fever pitch under Trump, the Sonoran Desert became a site of intervention in the physical landscape and security imaginary. And within the broader border region, the area where CBP ended up proposing to build the IFTs was in an even more specific swath of this arid landscape. Barring any changes in federal border policy or a major intervention on the part of tribal government, sixteen Integrated Fixed Surveillance Towers will be erected in the indigenous Tohono O’odham Nation along its southern border with Mexico and its western border with the Organ Pipe Cactus National Monument, which extends far into the interior of the United States. While much critical debate in the popular media, activist, and academic circles has turned to the heinous policies ICE and CBP are exercising toward asylum seekers at the border, in detention facilities, and within the US interior, this paper seeks to expose and dismantle the racist settler colonial practices of the
Department of Homeland Security on a population often overlooked in the border debate—transborder indigenous nations. Focusing specifically on surveillance infrastructure within the Tohono O’odham nation, but with ramifications for indigenous communities in the US and in border regions worldwide, this paper will focus on infrastructure as a dispositif ordering sovereignty, mobility, and land itself, as well as on mechanisms for undermining its power. Methodologically, it makes claims for looking to material systems and ontological ones in tandem, ultimately offering a theory of the border that interpolates settler colonial history, spatial epistemologies, and terrain itself to push for the rights of transborder indigenous populations.

The Tohono O’odham traditional lands encompass thousands of square miles of the Sonoran Desert in a territory that straddles what is now the border between Arizona in the United States and Sonora, Mexico. Historically, tribal members have moved fluidly through this terrain, traveling to seasonal villages, harvesting saguaro cactus, visiting the Gulf of Mexico, and performing spiritual walks or runs. Yet today, the Nation represents only a tenth of the territory the O’odham inhabited for centuries—a territory systematically reduced through invasion, land purchases, and executive orders that the O’odham—never recognized as a sovereign nation by the United States or Mexico—were not party too.\(^4\) The O’odham nation is not a “treaty reservation”—one made though a treaty between a sovereign Native American government and the US—but rather a reservation by executive order, meaning their landbase was forcibly consigned to them by the US government.\(^5\) On what was until 1917 O’odham land, there is now a United States National Park, a United States Air Force Base, and a United States border. In short, the United States federal government, in one form or another, exercises jurisdiction over ninety one percent of O’odham ancestral lands—lands once understood solely through O’odham traditional knowledge and inhabited through O’odham sovereignty.
Despite the constriction of their landbase, crossing the international border has remained a daily activity for the O’odham, necessary in order to practice their religion and traditional way of life, visit family (many of the tribal members have family and residences on both sides), collect traditional food, receive healthcare and education, and partake in a cross-border economy. For this reason, the O’odham Nation’s constitution determines tribal membership on the basis of a person’s ancestry and not a person’s citizenship. That means someone with sufficient O’odham blood born in Mexico is a member of the tribe—a tribe recognized by the United States government. But post-9/11 Patriot Act legislation has changed this historically open terrain and restricted the mobility of its inhabitants. With the Patriot Act, crossing the US-Mexico border along the Tohono O’odham nation was restricted to three “tribal gates”—Customs and Border Patrol managed checkpoints, where sufficient
documentation is needed to cross. Crossing along traditional, unguarded paths was made illegal. This has produced an incredibly complex and increasingly tight condition of border militarization, where divergent understandings of property, connectivity, and permanence have created an impasse in which indigenous rights to the land are seen as incompatible with the perceived demands of national security. Here the towers deploy not only the technologies that compose them but also the terrain on which they may someday stand. Cultural, spiritual, and territorial understandings of the landscape participate in the infrastructural operation of the towers, extending the radius of their impact beyond a physical footprint, they mobilize the land itself in an affront on the O’odham himdag (way of life).

INTEGRATED FIXED TOWERS

The proposed IFTs are planned to be laid out in a curved line following the US-Mexico border before turning at its juncture with the Organ Pipe Cactus National Monument and extending along the Tohono O’odham border into the interior of the United States. Structurally, these towers are pretty straightforward. 120 to 180 feet high, they include a base with a propane tank, generator, solar panels, and equipment shelter. Their footprint is anywhere from 50 by 50 to 160 by 160 feet wide and includes a parking area. They are surrounded by a fence that would enclose up to 10,000 square feet, and a 30-foot wide fire buffer beyond that. Tower access will also include seventy miles of new road, including entirely new access roads, the widening of existing roadways, and drainage ditches. They are then hooked up to the grid where possible, necessitating new power lines and fiber optic cables. 8

Figure 04: Map of proposed integrated fixed towers. Drawing by the authors, based on information by the Department of Homeland Security.
But the footprint of the towers extends beyond the perimeter of the fence, and even beyond the roadways that connect to it. They will be outfitted with a range of surveillance equipment designed to, again, identify and classify “items of interest” near the border. This includes radio-frequency radar that can detect moving bodies within a 9.3-mile radius, long-range video cameras to capture everything within a range of 13.5 miles, another radio-frequency radar that can detect moving vehicles within an...
18.6-mile radius, and microwave communication receivers that transmit up to 40 miles. In addition to that they hold spotlights and laser illuminators for night operations.

What radar, cameras, and lights are able to capture, communication systems and dirt roads facilitate the pursuit of. Strategically flanking the Sierra de Santa Rosa and the Ajo Range (Tak-Va’Vak in O’odham) that divide park from reservation, the towers rely on the region’s geography for maximal surveillance and visibility. Visibility is essential not just as a vantage point over land but also as a line of sight. In order for microwaves to reach from one tower to the next, each must be aligned in an unobstructed path. For comprehensive video and radar feeds, the radii of their range must overlap. And they do so extensively, reaching beyond the US-Mexico border into Tohono O’odham traditional lands in Mexico.

It’s no coincidence that along with the construction of towers comes detention facilities for people apprehended crossing the border. It also requires little stretch of the imagination to understand that the infrastructure apparently needed to support construction and maintenance of towers (the truck paths latticing the desert, the movement of Border Patrol Officers to nearby stations, the tracts of housing and trailers of mobile offices) are also quite useful in the pursuit of “items of interest”—be those local...
residents, US citizens, or migrants entering the country legally or illegally—and the persistent, low grade harassment of permanent population in the borderlands.

Given the distributed loci and multiple forms that Customs and Border Protection takes along the US-Mexico border, it is then worth asking what the border is and how it operates within this specific jurisdiction. The border is many things—a line on a map to be sure, but also a thick militarized, administrative zone and an infrastructural apparatus. In thinking through the border as thick and distributed infrastructural system, it is useful to invoke Stuart Elden’s theorization of Roman *limes* and the frontier system, as well as his recent work on terrain as a geopolitical and geophysical concept, which we will turn to later in the paper. In *The Birth of Territory*, a long history of the term’s emergence in Western thought, Elden comes to the *limes* (roughly translated to limits) of the Roman Empire. Unlike the *fines*, or borders, *limites* were understood as contained within the boundaries of the Empire and integral to its territorial cohesion. As Elden says, “*limes* were, at least at one time, things that linked rather than divided, modes of connecting points within the imperium.”

Rivers, highways, fortifications, they were, essentially, infrastructure—border infrastructure. Through connectivity and use, the Roman government was able to establish administrative presence at the edges of Empire and link those edges to the center. The border yielded the materiality of the territory. If we think of the US Mexico border as a similar frontier system or a *limes*, then its operation on the national interior becomes clear. In addition to its Southward oriented xenophobic and racializing effects, surveillance infrastructure is intended to interpolate the Tohono O’odham Nation into the state within which it is embedded—the United States—thereby further eroding the sovereignty of a nation whose population traverses, and exists on both sides of, the international boundary. It is thus a continuation of the settler colonial project that seeks to dominate and control land on registers sensorial, physical, and epistemological: cameras and radar constantly image the landscape, bodies monitor movement on the ground, and documents like Environmental Assessments and Impact Statements—which will be addressed in more detail in the next section—dictate what the land and its use *means*. Here, anthropologist Audra Simpson’s definition of “settled” is illuminating. For Simpson, the settled of settler colonialism refers both to the notion of establishing a population on a specific territory, but also as “‘done,’ ‘finished,’ ‘complete’”—hence settlement is also the state’s monopoly on meaning making. It is similar to what Elizabeth Povinelli calls “geontopower”—a set of, “discourse, affects, and tactics used in late liberalism to maintain or shape the coming relationship of the distinction between Life and Nonlife.” In the case of the Department of Homeland security, transforming terrain into a surveillance instrument dictates a meaning for land that is in direct opposition to an indigenous relationship to land, one that is ontological and experiential, one in which the living and non-living are interconnected, and one that is itself an exercise of sovereignty.

Site surveying in preparation for the IFTs has begun to have an impact on the land and daily life in a place already transformed by border militarization. There are approximately between 1,000 and 1,500 customs and border patrol agents stationed in the three sectors that have jurisdiction over the reservation. The population of registered tribal members on the reservation is 13,055. That’s roughly one border patrol agent for every ten O’odham. While not all of these agents are on duty at the same time or on duty on the reservation (the Ajo sector, Casa Grande sector, and Tucson sector include other areas as well), it does give you a sense of how saturated the region is by law enforcement. This is what is meant by “persistent surveillance,” the term CBP uses to describe the capability of the towers. Given the Department of Homeland Security’s increased funding and more aggressive policies at the border these numbers are liable only to increase. These towers are a great incursion on the sovereignty of the O’odham—the most recent in a chain of systemic rights violations.
that date back centuries. Not only do the towers’ impact extend much beyond their physical footprint, the area of their right of way—a considerable 6,428 acres—and the border patrol they bring with them are just one more instance in a very long history of the United States government militarizing and occupying Native American land. An infrastructure of surveillance—which includes patrolling bodies—and its attendant culture of fear has changed a tribal relationship to the land with significant cultural consequences. The towers, like the border fence, become agents of indoctrination, material mechanisms used to assimilate tribal members into Western culture, with divisive consequences. The increased presence of Border Patrol Agents, for instance, has caused young O’odham to spend more and more time at home instead of out on the land. By claiming the tribal “common” land of the reservation as the space of surveillance and militarization—as property of the federal government and within its sovereign territory—border patrol forces tribal members into a space that they can easily define as private property of their own: the house.\textsuperscript{14} By pushing tribal members into a lifestyle centered around private property, border surveillance not only has immediate consequences in terms of physical and psychological well-being (for instance, conversation with young people reveals how harassment has already been normalized among the youth), it also ruptures intergenerational ties and spiritual knowledge and results in cultural disconnection to the land for its inhabitants. As tribal elder Ophelia Rivas says,

Land has always been defined by Europeans as properties. [CBP] have a different perspective on land and so from that perspective it’s very difficult for them to understand our relationship to it. I’m saying that because I’ve seen the reaction of the border patrol when we talk about our land and how we’re connected to it. It seems not to make a difference to them that it’s of great concern to us. It’s very disturbing to the people who continue to follow that ceremony way of life. […] When I grew up I climbed all these mountains and we ran and played all over. There were also people crossing the border that were undocumented. There was always drug trafficking, but we played everywhere. And now the kids are just stuck in their homes. It seemed it changed our whole way of life. It impacted it ever since this constant surveillance began. And when it began after 9/11, it was so aggressive that it forced the people not to go out on the land anymore. And that is really affecting the health of everybody. The health of the elders—who really need to be out on the land to connect with the plants and with the mountain. From that point on the children don’t see their elders out there, they’re not connecting to that part of our life. This forced disconnection to the land is unhealthy because with the disconnection they lose their language, traditional diet, and sensitivity to turn to traditional medicine.\textsuperscript{15}

ENVIRONMENTAL AGENDAS AND ENVIRONMENTAL ASSESSMENTS
In April 2017, CBP published an Environmental Assessment, as final step of the National Environmental Policy Act process they followed, stating that the Integrated Fixed Tower project will have no considerable impacts on the ecosystem or the tribe.\textsuperscript{16} As the widespread opposition to these towers by many tribal members and several traditional leaders shows, this is not the case. Because of their strong connection to the land, a connection border militarization is already eroding, residents of the tribal districts affected by the towers feel the towers’ presence would be catastrophically disruptive to spiritual practices and daily life, as well as irreversibly destructive to a landscape they hold as sacred.
The technical specifications of the towers and assemblages of security they bring with them merit extensive analysis as infrastructural systems and mechanisms of territorial control, to understand their genesis and greater impact one should first look to the concepts of territory on which they are built. In chapter five of his *Second Treatise on Government*, John Locke distinguishes between the state of nature and the laws of property ownership. In the state of nature, according to Locke, resources belong to the commons, whereas under property law they have been appropriated under the domain of the individual and thus rendered more productive. To theorize this state of nature Locke turns to the “Indian,” specifically to the Indian in Britain’s American colonies:

> And tho' all the fruits it naturally produces, and beasts it feeds, belong to mankind in common, as they are produced by the spontaneous hand of nature; and no body has originally a private dominion, exclusive of the rest of mankind, in any of them, as they are thus in their natural state: yet being given for the use of men, there must of necessity be a means to appropriate them some way or other, before they can be of any use, or at all beneficial to any particular man. The fruit, or venison, which nourishes the wild Indian, who knows no enclosure, and is still a tenant in common, must be his, and so his, i.e. a part of him, that another can no longer have any right to it, before it can do him any good for the support of his life.17

The Indian, here emblematic of the basest form of civilization, has an inherent understanding of appropriation and of ownership. Yet, because he does not know enclosure, he is unable to make the land useful, which is to say to cultivate it in a way that is economically productive on a large scale. Private property, according to Locke, allows the land to yield, and through land ownership man is able to manage labor and to push that labor towards industrious productivity; appropriation and enclosure gives rise to increased cultivation and cultivation produces amassable wealth. This is why Locke writes that an acre of land planted with tobacco or sugar is far more valuable than an acre of land lying in common. The large cash crops that made the colonies so lucrative were sewn in soils that institutionalized a hierarchy between landowner and laborer (most often enslaved in America). Land use of the American colonies indigenous inhabitants were, in the eyes of Locke, and by extension in the eyes of the United States government founded on the ideas of liberalism Locke promoted, antithetical to the process of privatization and enclosure that economic productivity depended on, hence the relationship between territory and labor that so puzzled the philosopher when observing indigenous Americans—rich in land but poor in the comforts of life. Mobility and property were deeply imbricated in enlightenment philosophy and in the liberal ideology of the early United States where physical movement west was a means of incorporating unsettled land into nation’s boundaries. The nation’s first infrastructures—wagon trails, canals, and railroads—drew Eastern colonists to the uncharted West forging trajectories of conquest and ensuring a steady presence of settlers and, through the bodies that regulated transportation infrastructures, of the state. As the government quickly grabbed the land from its original inhabitants, they relied on the tenets of enlightenment thought to justify their seizure. Cultural critic Sylvia Wynter explains that the enlightenment and humanist conception of what she calls the “degodded” and “nonhomogeneous” man provided a conceptual framework to expropriate land from indigenous Americans by disregarding indigenous ways of knowing as outside the bounds of rationality and therefore less human.18

It could of course then be said that Native Americans understood the value of land in a way impossible for the Europeans, or by the nineteenth century, white Americans. Traversing the desert was, and is, an
integral part of O’odham time keeping, connected to harvesting and hunting, and to spiritual practices. Mountains, valleys, and washes are known deeply and have stories attached to them, walking and running to sacred sites are spiritual acts, and migration patterns determine hunting cycles. The type of movement this engenders could be what Hagar Kotef calls “excessive movement”—unbounded mobility that did not seem, in the eyes of white colonizers, circumscribed by the self regulation that inscribed property. Kotef also argues that it is this idea of excess or of improper movement that allows the ties between indigenous populations and the land to be severed, leading to diasporas, expropriation, and occupation—and in the case of the United States to the reservation system where the allotment of property to Native Americans was both an agent of containment and assimilation. By looking at indigenous land use through the lens of property law, Locke was only able to define that land use negatively instead of recognizing a different ideology and different relationship to land that had equally powerful cultural and social consequences. As a result, the United States legal system, which is fundamentally based on Locke’s treatises and the enlightenment philosophy that he contributed to, is systemically at odds with indigenous cultural practices and ways of thinking. Following the Gadsden Purchase of 1854, which annexed 30,000 miles of Sonora into the US—including O’odham territory—the government established two O’odham reservations in San Xavier and Gila Bend. 1887 marked the passage of the Dawes Act, which divided tribal lands into individual allotments for Native Americans, and in 1916, in response to the Mexican revolution and Pancho Villa raids, the government created the Sells reservation, now called the Tohono O’odham Nation, and created the first US-Mexico border fence on it. Thus began a long history of federal incursions onto O’odham land (predicated on an even longer American and Spanish colonial past) in the name of defining and securing national property and hence national sovereignty. But within this national sovereignty and its attendant regimes of property and security existed, and exists, another embedded one: indigenous sovereignty. Writing on Mohawk communities whose territory spans the Canada-US border, and on first nations sovereignty more generally, Audra Simpson introduces the term “embedded sovereignty” to describe the status of indigenous nations nested within other nation states. It is a complex and conflictual form of sovereignty, granted by the settler state, which understands the concept and rights it confers solely through western political frameworks, and which believes their citizenship to be de facto primary. As Simpson puts it,

Sovereignty may exist within sovereignty. One does not entirely negated the other, but they necessarily stand in terrific tension and pose serious jurisdictional and normative challenged to one another: Whose citizen are you? What authority to do you answer to? One challenges the very legitimacy of the other. As indigenous nations are enframed by settler states that call themselves nations and appear to have a monopoly on institutional and military power, this is a significant assertion.

And, following Simpson, as indigenous sovereignty challenges the authority of the military and administrative power of the United States, we see that it is not just the existence of an embedded sovereignty that threatens the settler state, but also what sovereignty means and how it is exercised. The ways of knowing, understanding, and being with territory—which is to say the ontological, traditional, and also legal forms of land use that germinate from interconnections between living and non-living, human and non-human things—that the O’odham practice abrade Western, capitalistic notions of sovereignty. It is these forms of interconnectivity that the Department of Homeland Security aims to challenge and undermine though technological, informational infrastructure.
Paradoxically, the desire for technological connectivity across this mountainous and sparsely populated landscape results in cultural disconnection to the land for its inhabitants. This paradox is only deepened when reading the draft Environmental Assessment produced by CBP that justifies the towers on the basis of the landscape itself saying that, “The difficult terrain and a lack of infrastructure within the Tohono O’odham Nation create a need for a year-round, persistent, technology-based surveillance capability that would effectively collect, process, and distribute information among USBP agents.”

To counteract a terrain lacking in infrastructure, CBP is proposing to install a surveillance system that must tap into the very infrastructure they say the land is missing—roads, the electric grid, and fiber optics. So with these towers will come an extension of the grid where possible and new roadways, which further enforce a sedentary domestic lifestyle based on private property like houses and cars. To truly understand impact here, the geographical political theories of Stuart Elden are again helpful. A rigorous understanding of terrain allows us to see how it is deployed materially and conceptually by the US government. Terrain is not simply the physical contours and geological composition of a landscape, but also the built structures on it, the communities that use it, and the political regimes that govern it. In the words of Elden, “Instead of static representations, terrain helps to understand dynamic spaces. Terrain makes possible, or constrains, political, military and strategic projects, even as it is shaped by them. It is where the geopolitical and the geophysical meet.”

As already discussed, Operation Gatekeeper and related policies built terrain into the border wall apparatus so that the desert itself became “a weapon against migration.” As CBP angles to replicate this strategy on the Tohono O’odham nation, terrain is not only used as a migration deterrent—with towers places on mountain peaks for maximal range and in corridors difficult to access by vehicle, and therefore likely used for passage—but also as a mechanism of territorial control, imposing one ontological system onto another. Spiritual beings, the stuff of origin stories, bedrocks of temporal and spatial knowledge, ceremonial grounds and hunting trails, ancestral sepulchers and living habitats, become armatures in the militarized reach of the state.

Implicit in CBP’s approach to the Sonoran Desert terrain is a distrust of the landscape itself, and a need to use infrastructure to dominate and cultivate it in the same manner as notions of property were used centuries ago. In the eyes of the federal government the only way to know this landscape is through a system that scientifically measures and observes it, in line with the metrics-based “risk management” approach taken by the Border Patrol since 2011. CBP’s language also speaks to the ambivalent manner in which the desert itself is deployed in by the border patrol—either rhetorically as a site of vulnerability or as an area so inhospitable as to be weaponized. Geographer Kenneth Madsen calls this the “balloon effect” of border enforcement, a process of squeezing at one end and bulging at another.

And, in the 1990s, the Organ Pipe Cactus National Monument, a 517 square mile swath of National Wilderness to the west of the Nation, became a bulge in the balloon. Because of the park’s preservation mandate, it is mostly empty of human life. No one lives there except a few rangers, only a couple roadways crisscross its plateaus and plains, and, in order to facilitate migratory paths, no barriers were permitted along the border until 2004. As CBP was tightening its grasp on border city bottlenecks in Nogales and Yuma in accordance with the Southwest Border Strategy, migrants were funneled toward the park where they would often cross its eastern border and enter the Nation seeking food and assistance. So, in the 1990s, US Border policy and preservation practices colluded to create the “high risk” situation in the Nation that today necessitates a “persistent surveillance” infrastructure. In 2003, the situation was amplified when the park was closed following the 2002 shooting of one of its rangers and the very Wild West declaration of it as the “most dangerous national park.”
Organ Pipe’s closure from 2003 to 2014, CBP built a vehicle barrier along the entire extent of the international boundary within the park, and erected several mobile surveillance towers near the international boundary as well as at the very northern edge of the park along its border with the Tohono O’odham Nation. In 2014, when the park reopened, CBP proposed the sixteen towers in the Nation, including eight along the border with Organ Pipe Cactus Monument (not Mexico) connecting to the mobile towers already installed in the park.

In an interview, superintendent Ranger Brent Range touted the close and collaborative working relationship the park has with the Department of Homeland Security. It’s a relationship that was undoubtedly enriched through a decade of collaboration over border infrastructure, but that also predated the closure of the park. As Rick Felger, Director of Natural Resources, told us, the park works closely with the border patrol when agents find ‘cultural artifacts’—which is to say, O’odham artifacts as the park used to be O’odham land—and are required by the National Historic Preservation Act (NHPA) to consult with the Organ Pipe archeologist and the National Park Service’s regional conservation center in Tucson. The National Historic Preservation Act—the law that governs how park rangers handle the human and cultural remains they find—is also what is invoked in the Environmental Assessment, which was commissioned by CBP as part of the standard approval procedures for large-scale infrastructural projects. Indeed the Assessment states that,

The archaeological APE for the Proposed Action is limited to the areas of permanent and temporary ground disturbance... Of the new and previously recorded sites CBP identified within the project area, 26 are recommended or have been determined eligible for listing on the NRHP [National Register of Historic Places, administered by the National Park Service]. Surface evidence alone was insufficient to accurately assess the NRHP eligibility of 18 sites. These sites would require additional investigation, including but not limited to subsurface archaeological testing to accurately assess eligibility. In addition, one assessed site, an artifact scatter from the Ceramic period, is not recommended NRHP eligible.

So, while twenty-six nationally historic places are potentially threatened by the construction of the towers, the findings were not significant enough for the Department of Homeland Security that commissions the assessment to recommend the towers not be built. This is problematic for two reasons. Firstly, the National Park Service was the main body to be consulted on these sites, not the O’odham who advised only in a secondary capacity. According to residents of the Gu Vo district (where the majority of sites are located), the local council was not consulted at all, only the Tribal Historic Preservation Officer in the Nation’s capital Sells, who had not yet given his report to Homeland Security at the time the draft was released. Secondly, the preservation framework, regulated by the National Park Service, did not take into account the deep and myriad ways the construction and presence of the towers would harm daily and spiritual life of nearby residents.
According to O’odham beliefs, ceremonial pottery and human remains should not leave their place of entombment. They are just as much a part of the mountain as the caves, the cactus, the grasses, and the grazing deer. Uprooting them at all is extremely offensive—let alone expatriating them to a conservation center in Tucson where the tribe must petition to have them returned. Road clearing and surveying has already uncovered countless pieces of pottery and of bodies. It has also stunted the growth of mountain grasses and displaced deer, tortoises, sheep, and jaguars from their migration routes and habitats, impacting the O’odham hunting rituals that are integral part of the O’odham traditional calendar. The widespread reach of these concerns and their ecological and cultural interconnectedness doesn’t register with the Department of Homeland Security, whose property-based conceptual framework they fall outside of.

Archeological investigations needed to produce an Environmental Assessment and determine worthiness of historical preservation impose a Western scientific frameworks onto O’odham way of life, and fail to understand that O’odham himdag and history cannot be isolated in precise coordinates or confined in 250-foot investigation radii. Instead of thinking about proposed tower sites as specific points on a map potentially requiring federally-adjudicated National Historic Preservation, a true environmental assessment ought to think about how the environment as a whole will be impacted by
tower construction and persistent surveillance—from the penetration of microwaves to the unpredictable patterns of border patrol vehicles. The violence of these towers will be at once immediate and apparent as well as passive and invisible. Emissions from towers will affect the presence of living beings for hundreds of square miles—and, bringing Jeremy Bentham to the twenty-first century, local communities will potentially always be under watch.

The NHPA, and the legal framework that produced it, does not recognize a holistic approach to preservation, instead favoring specific sites and built structures for protection. What’s more, the Act assumes an American nationality rooted in a colonialist historical narrative instead of a pluralistic national or transnational identity. These sites are in the Tohono O’odham Nation, and their need for preservation should be evaluated according to their significance for that Nation and in a way respectful to tribal culture.

In conversations with Rivas and other tribal members, one of the most offensive aspects of the towers is their physical appearance. Countless times we heard disbelief and indignation that these structures would be sitting on the mountaintop forever. O’odham history far predates a European presence in North America, let alone America. What are now Northern Sonora and Southern Arizona have been O’odham homeland since the tribe’s recorded history, predating first contact with Europeans in the fifteenth century—so the permanence of permanent towers has tremendous temporal gravity. The mountains on which these structures are to sit are integral part to the O’odham’s connectedness with the land because they are part of the tribe’s origin story. To impose a permanent technological, infrastructural, and militarized form of connectivity onto a symbol of connectedness to the land that has existed for the O’odham literally since the beginning of time is aggressive and traumatic, a trauma that is incomprehensible in Western understanding of property, sovereignty, and environment held by the border patrol and the National Park Service. Rivas recounts existing border patrol practices she fears will increase as this part of the mountain range is more closely monitored:

In Pisinemo—the district next to us—when they were doing their ceremony hunt, the border patrol surrounded them, tied their hands behind their back and made them sit there until someone came and verified that they’re hunters on a ceremony hunt. That disturbs everybody. They people involved in the hunt, the women that are home praying for them, and the deer praying it will go well. It disturbs everything. For six years they didn’t get a deer because the border patrol was disrupting. Typically we go to ceremony and after ceremony is over they come around with the big baskets with deer meat and hand out deer meat for our blessings. It’s our spiritual food our kind of energy food for the whole year and for six years we didn’t have that if you can imagine.

Her fears convey not only the existing militarization of the Nation and violation of indigenous rights, they also speak to the connectedness of spiritual and social life, ecology, and landscape—an imbricated worldview that exceeds the compartmentalized and quarantining scope of the National Park Service’s conservation ideology and that has been disregarded by the preparers of the Environmental Assessment at ManTech, the “international corporation leading the convergence of national security and technology,” contracted by the Department of Homeland Security. Organ Pipe Cactus National Monument does not allow the yearly ceremonial deer hunt within its confines and requires O’odham to apply for a permit before entering the park to harvest saguaro fruit and cholla cactus buds, or performing runs to sacred sites. This regulatory apparatus is in many ways similar to the permitting
process Mexican O’odham must go through to cross into the US side of their territory, consequently, though the park touts their friendly relationship with the O’odham, they are viewed as an isolating bureaucracy—another federal organization on former O’odham land whose acquiescence in environmental assessments lays a foundation on which surveillance infrastructure is primed to be built. Environmental Assessments or Impact Statements are ubiquitous in architecture and planning, yet their format goes uninterrogated: their inherent biases are accepted as necessary for many construction projects, establishing default definitions for “environment” or “impact” without questioning how those words change among sites and contexts. But, as the conditions here and recent struggles at Standing Rock show, these perceived forms can perpetuate epistemological violence and a hegemony of expertise.

What the nature of opposition to the Integrated Fixed Towers on the Tohono O’odham Nation clearly shows is that the clamoring not to build goes hand in hand with the repudiation of the ideology that underpins the rationale for those projects’ necessity. In opposing the Department of Homeland Security’s Environmental Assessment, the O’odham do not offer alternative locations for the towers, or request fewer towers installed, as suggested in the Alternative Proposal the Assessment. They entirely refuse the premise that the towers are needed on the basis that the constellation of human, material, and ideological elements that comprise each tower infringe on indigenous sovereignty. This is what Audra Simpson would call an act of refusal—a move that rejects the strictures of settler colonial bureaucracy in favor of exercising indigenous sovereignty. “Refusal,” as she says, “comes with the requirement of having one’s political sovereignty acknowledged and upheld, and raises the question of legitimacy for those usually in the position of recognizing.”

The repudiation of the tower project forces us to reassess not only how we, as people who work with and think about the built environment, talk about impact, it also pushes us to question on what basis potential sites for large-scale built projects are assessed and impacts are negotiated and where the voice of the impacted community meets the experts assessing environments according to standardized categories and scientifically sound evaluation methods. In the case of the Environmental Assessment on the Integrated Fixed Tower project on the Tohono O’odham Nation, the numerous objections sent to the processing agency by tribal individuals and districts affected did neither change nor find entry into the final document, however the Tribal Council still has not approved the project, leaving it in a bureaucratic limbo.

One aspect the tribe’s repudiation of the IFT project clearly does put into question is the distinction between action and inaction, preservation and resistance. At this point they can no longer be understood as opposed categories.

Though absolutely politically urgent, the terms of border debate in the US can often silence the voice of indigenous communities who live in the borderlands. In the rub marks of such acts of erasure we propose new forms of representation that more accurately reflect indigenous understandings of land and sovereignty, and therefore the full extent of border militarization. To this end, for the last two years we have been collaborating with tribal elder Ophelia Rivas on an Alternative Environmental Assessment that, through maps and text, articulates the wide-reaching political and social impact of the proposed towers, and that can be used as an informational tool to advocate against them.

REFERENCES

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Rivas, Ophelia. Interview with authors. December 13, 2016.


POLITICS OF MASS HOUSING IN BAGHDAD: FROM SOCIALISM TO NEOLIBERALISM

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INTRODUCTION
Mass housing refers to urban housing or housing estates constructed on a large scale using mass production techniques as a response to housing demands for the masses of city dwellers. In Iraq, national interest in mass housing programs dates back to the mid-1950s. Since then, Iraq’s architectural identity has paralleled political and economic shifts. Several authors have pointed out how political regimes, after power shifts, have transformed the built environment of their capital city with an emphasis on public buildings and major projects such as mass housing projects, in order to contextualize the rise of a new political power and to demonstrate that power’s control over its territory. Therefore, mass housing in Iraq has become a reflection of socio-political ends of successive regimes. As urban focal points, mass housing projects have become a political tool for the state to achieve political goals.

This paper will examine the causes and consequences of the transformation of mass housing typologies in connection to their politico-economic context in comparison with those that emerged during the 20th century. It emphasizes the characteristics of its physical structure as well as the socio-economic characteristics of its inhabitants. Moreover, this paper hypothesizes that mass housing in Baghdad, since its initiation in 1955 up to the present, has not necessarily been a state-provided social service for the common good; rather, it has been a product of economic orientations, and a spatial translation of political aspirations. The shifts in these political aspirations have produced a transformation of mass housing dynamics, actors, and typologies.

DATA AND METHODOLOGY
To test the validity of the above hypotheses, the methodological approach will utilize a chronological examination of mass housing development and divide it based on four shifts in politico-economic trajectories in Iraq (monarchy, communism, socialism, neoliberalism). For further insight, this paper will employ a comparative analysis of four case studies, one from each politico-economic phase. These case studies include: Sector no.10 (Iskan) 1957, Dhubat (Officers) 1962, Saydiya 1985, and the Yamama city project (YCP) 2018. This project represents the shift in mass housing typology from non-gated urban housing to privatized gated communities.
MASS HOUSING AND THE MONARCHY (1955-1958)
This first serious attempt to create a comprehensive housing program in Iraq took place in 1955 against the political backdrop of a monarchy system under King Faisal II. During that era, a communist agenda, supported by the former Soviet Union, was increasing in popularity in Arabian countries. The monarchy regime perceived communism as a threat to its political power and thus sought to take actions against it by initiating social reform. With communism promising an uprising for the poor and better financial and social statuses, the need for social reform and state gestures for the poor seemed urgent in Iraq. In response, the Iraqi Development Board during the monarchy’s regime increased its funding for housing and community facilities in an attempt to gain social support for an increasingly unpopular monarchy from low-income groups of sarifa dwellers, who represented about 18.4% of Baghdad’s population. In addition to gaining social support, the creation of modern housing was based on a political vision that held that the modernization of the cityscape of the capital city would solidify their democratic image of standing against the non-democratic colonialism of communism.

Consequently, in August 1955, the Development Board of the Government of Iraq commissioned the consulting organization Doxiadis Associates (DA) to design a housing program that would take into consideration the country’s housing problem as a whole, with an emphasis on Baghdad. DA proposed a National Housing Program of Iraq (NHPI) which aimed to fit in with the wishes of the monarchy to achieve social reform against the communist agenda – because it focused primarily on the sarifa social groups. Two major experimental housing projects were proposed by DA in Baghdad: The Western Baghdad Development Housing Project (WBDHP) and Eastern Baghdad Development Housing Project (EBDHP).

The projects’ layout was designed to enhance social integration of sarifa dwellers with the existing community and convey the modernized national image requested by the political system. For instance, Sector no.10 in the WBDHP encompassed single-family housing units. Their physical appearance conveyed the standardization and modernization of local vocabularies such as shanasheel constructed with concrete instead of wood. Notably, DA’s proposals facilitated the transformation of sarifa dwellers into urban dwellers, this, in turn, achieved the Iraqi regime’s goal of obtaining social support against the increasing popularity of communism. By 1958, due to the political shift in Iraq, only parts of the WBDHP were implemented for low-income groups between 1956 and 1958.

MASS HOUSING AS A SUPPORT OF A NEW REPUBLIC (1958 TO 1963)
On the 14th of July 1958, Iraq’s monarchy was overthrown by the coup d’état led by Abd Al-Karim Qasim, and a republic was established. During that year, the increase in the national GPD from oil revenue allowed the political regime to implement several development projects, including DA proposals for housing. Although Qasim’s Soviet-allied communist vision contradicted the vision of the precedent anti-communist monarchy, his political regime did allow the implementation of DA proposals for mass housing development. A closer look at Qasim’s political propaganda may provide an answer as to why. Despite his communist vision, Qasim was influenced by the pan-Arab socialist vision of Nasser’s Egyptian revolution 1952, and the nationalist goals of the 14th July revolution of 1958. Therefore, DA’s work did see the light because DA’s proposals were based on mass produced, standardized housing that reinforced social equality for low-income groups of sarifa dwellers. The DA proposals were thus imbued with Qasim’s communist agenda that rejected social class and called for equality.
The residential development implemented in Baghdad during Qasim’s era not only promoted social equality but attracted social and political support. This was because mass housing projects during Qasim’s regime were dedicated exclusively to marginalized groups and military personnel. Examples included a housing project for Sarifa Dwellers known as Al-Thawra city, the officers’ housing project in the Yarmouk neighborhood, and another officers’ housing project in the Zayona neighborhood. In terms of housing typology, all three projects resembled the aforementioned Sector no.10. All housing projects were primarily composed of semi-detached single-family housing units, and were designed to act as semi-independent communities in terms of their services. Houses of both officers’ housing projects in the Yarmouk and Zayona neighborhoods were distributed exclusively to middle-income army officers. Despite its strong belief in socio-economic equality, Qasim’s regime ended up creating clusters of socio-economic classes that led to the eventual criticism that the implementation of residential developments during his era was primarily an effort to gain social support from various strata of Iraqi society, rather than to achieve a communist agenda.

MASS HOUSING AND SOCIALISM (1963-2003)

In 1963, Qasim’s regime was replaced by the Ba’ath Socialist Party. In economic terms, socialism celebrated state ownership and control of resources and investment in all key sectors (i.e., education, housing) as opposed to market control. Therefore, the socialist model in Iraq viewed housing as a political priority, a social service expenditure, a constitutional right, and a responsibility of the state. Consequently, Amanat Al-Assima signed an agreement with the Polish consulting engineering firm ‘Polservice’ to transform the cityscape of Baghdad. Unlike DA’s plan, the Polservice development plan of 1965 proposed multi-family housing. This plan was later approved and passed by the state in 1971 as law no. 156. According to this law, Baghdad was “the capital and the primary center of modern Iraq and thus, it should respond to modern life requirements.” It is also stated that in low-density locations, apartment buildings can be constructed to give those locations the necessary contemporary form instead of the identical, monotonous one to two story houses that dominate the old quarters of Baghdad. This law clearly indicated the will of the political authorities in Iraq to create a new image for the capital city that would convey the rise of a new political power by the insertion of high-rise structures into the city.

Polservice’s plan aimed at accommodating 20% of Baghdad city’s inhabitants in multi-family housing by the year 2000. It is important to note that less than 1% of Baghdad’s population lived in multi-family housing. This lack of popularity was mainly due to a general negative attitude towards multi-family housing. Since lower-income earners were the main inhabitants of multi-family housing, a social stigma was attached to that housing typology. Nonetheless, Polservice’s plan attempted to change that social attitude by attracting mixed income groups to live in mega-structures of multi-family housing to convey the Ba’athist regime’s agenda for modernization. Supported by the economic development from the sharp rise in oil prices, several mass housing projects, in the form of apartment blocks, began to emerge in Baghdad in the late 1970s.

For the architectural style of multi-family housing, the government required the proposed designs to mediate between the political ambitions of modernization and local specificity. Due to this combination, local scholars categorized the resulting architecture of mass housing projects constructed in Baghdad during the Ba’athist era as hybrid architecture. A good example of this modernized cultural image is the Saydiya urban housing. This project was commissioned by Baghdad Municipality in September 1980 to The Architects Collaborative (TAC) of Cambridge, Massachusetts. It was comprised of 3-story apartment blocks in order to convey a modernized image through creating a
visual disintegration with its adjacent horizontal fabric. In terms of the social characteristics, the project’s delivery system took into consideration the inclusion of mixed-income groups.

6 MASS HOUSING AND NEOLIBERALISM (2003-PRESENT)

Recent years have witnessed a strong return of mass housing projects into the urban scenery of Baghdad. Following the dissolution of the Ba’ath socialist regime in 2003, the international trade embargo imposed on Iraq by the United Nations (1991 to 2003) was lifted. The end of the U.N. embargo has enabled Iraq to join the world market and embrace a neoliberal economic orientation which has minimized the role of the government in the provision of basic necessities such as housing. These combined political and economic changes paved the way for several housing programs, policies, and projects to develop in support of the economic shift. New laws were passed, and others were revised. These included new investment laws that were passed in 2006 to encourage private investment in various sectors, with an emphasis on the housing sector. Here, mass housing has changed from a state-provided social service for the common good into an investment project for the benefit of private developers (see table 1).

In order to facilitate, organize, and attract local and foreign capital investment, the Iraqi government established the National Investment Commission (NIC) in 2009; passed new regulations to facilitate loan processing and to include buyers of housing units in newly constructed mass housing projects; and announced the commencement of the Million Housing Units Plan (MHUP) in 2010. This plan is expected to mitigate the problem of the massive housing shortage in Iraq, estimations for which have reached to two million housing units. During the same year, 2010, a new National Housing Policy was released along with a National Development Plan for 2010-2014. They both encouraged the public sector to focus solely on the housing needs of vulnerable groups (low-income and lower-income) and leave the housing demands of other income groups to be satisfied by the private sector. These recommendations led to the rise of a new housing typology in Baghdad in 2012, namely low-cost housing, provided by the public sector to meet housing demands of low-income groups. Examples of this typology include the two-story Shams housing and Qamar housing, and also the single-family housing of the Jihad project and the Saydiya project. Eligible resident groups included low-income earners, informal housing householders, victims of terrorism, orphans, and displaced householders.

While the state focused on producing low-cost housing for low-income groups, the private sector has produced a new typology of mass housing in Baghdad for middle-income and upper-income groups. This typology can be described as gated communities, such as Yamama city project (YCP). With the application of neoliberal policy comes the privatization and commodification of housing as a source of capital accumulation for private investors. These gated residential estates gained rapid popularity and increase in number, primarily due to several services offered within those communities, most importantly, security. Crime rate, death rate, and ethnic violence soared in the aftermath of the 2003 war. Thus, it is very typical for people to seek housing in a secured environment (i.e. gated communities). It is also typical for private investors to employ militarized features in housing projects, such as gates, guards, and secured fences, to lure people to purchase housing units. Here, the characteristic of militarization cannot be tied only to the amplified sense of fear in Baghdad, but also to the commodification of housing as part of the neoliberal policy because militarization was employed as marketable characteristics by the private investment company.

A good example of this residential enclave is the Yamama city project (YCP); a gated community in the form of high-rise apartment blocks, constructed by a private investment company of Yamamah.
The YCP apartments range approximately from 90 to 151 thousand US dollars, with a monthly payment of 600 US dollars. Therefore, only middle-income and higher-income earners have been able to afford the newly constructed apartment units. It is designed as self-sufficient micro-urban area, or micro-city, that is functionally and socially independent from its immediately adjacent built environment. The YCP reveals several differences when compared to case studies of mass housing projects from the 20th century — Iskan (Sector no. 10) 1957, Dhubat 1962, and Saydiya 1985. These differences encompass the dynamics of housing provision, main actors, and methods of residential security (see table 2).

**Table 1. Mass Housing in Baghdad in relation to Economic Orientation.**

*Source: Author*

<table>
<thead>
<tr>
<th>Economic orientation</th>
<th>Neoliberal economy</th>
<th>Socialist economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mass housing Production</td>
<td>Nearly 85% of mass housing produced by the private sector and 15% by the public sector</td>
<td>100% of mass housing produced by the public sector</td>
</tr>
<tr>
<td>Mass housing Funding sources</td>
<td>Private sector, public sector, and public-private partnership.</td>
<td>Public sector</td>
</tr>
<tr>
<td>Expenditure type</td>
<td>Mass housing is viewed as an investment and as a public service expenditure</td>
<td>Mass housing is viewed as a public/social service expenditure</td>
</tr>
<tr>
<td>Supervision of mass housing projects</td>
<td>NIC, BIC, Mayoralty of Baghdad, and MOCH</td>
<td>Mayoralty of Baghdad (Amanat Al-Asima), and Public Authority of Housing</td>
</tr>
<tr>
<td>Ownership</td>
<td>Housing units in all projects are sold to individual owners - Site, services, and amenities are government-owned in publicly-funded projects. - Site, services, and amenities (except for educational facilities) in investment projects which are privately funded, are owned by investors. Services and open spaces are privatized (managed, owned, maintained by private investment company and are used only by residents).</td>
<td>Housing units in all projects are sold to individual owners. Site, services, and amenities are government-owned</td>
</tr>
<tr>
<td>Governance and Maintenance</td>
<td>Mayorality of Baghdad and housing authorities are responsible for public-provided housing. Investors are responsible for management, maintenance, and provision of services in investment projects.</td>
<td>Mayorality of Baghdad and housing authorities</td>
</tr>
<tr>
<td>Occupants of mass housing</td>
<td>- Publicly-funded projects are dedicated to low-income fragile groups - Investment projects (privately funded) are dedicated to middle and upper-income groups</td>
<td>Mixed-income groups</td>
</tr>
</tbody>
</table>
Figure 1. Mass housing production works in accordance with shifts in political trajectories.

Source: Author
Table 2. A comparison between four case studies in terms of architectural and spatial characteristics.

*Source: Author*

<table>
<thead>
<tr>
<th>Socio-spatial and physical characteristics</th>
<th>Project name</th>
<th>Iskan</th>
<th>Dhubat</th>
<th>Saydiya</th>
<th>YCP</th>
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<tbody>
<tr>
<td><strong>Components</strong></td>
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</tr>
<tr>
<td>Layout</td>
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<tr>
<td>Site layout</td>
<td>Grid Pattern</td>
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<td>●</td>
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<tr>
<td>Clusters of buildings</td>
<td></td>
<td>●</td>
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<tr>
<td>Unit layout</td>
<td>Modern (opened)</td>
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<td>●</td>
<td>●</td>
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<tr>
<td>Traditional</td>
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<td>●</td>
<td>●</td>
<td>●</td>
<td>●</td>
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<tr>
<td>Interstitial area</td>
<td>Access Gated</td>
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<td>Non-gated</td>
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<td></td>
<td>Street network</td>
<td>●</td>
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<td></td>
<td>Integrated</td>
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<td></td>
<td>Separated</td>
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<td>Physical components</td>
<td>Residential buildings</td>
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<td>Single-family</td>
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<td>Detached</td>
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<td>High-rise, above 8</td>
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<tr>
<td>Open spaces</td>
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<td>Hybrid (combination of traditional and modern architecture)</td>
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<td>Defensibility</td>
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<td>Activity generates</td>
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<td>Gates</td>
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<td>Availability</td>
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### Socio-economic Characteristics

<table>
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<th>Private sector-provided (Investment)</th>
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<table>
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<tr>
<th>Economic groups</th>
<th>Low-income groups</th>
<th>Middle-income groups</th>
<th>High-income groups</th>
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</table>

### CONCLUSION

A critical examination of mass housing typologies in Baghdad from 1955 to the present reveals that political agendas and economic trajectories played an essential role in shaping those typologies in terms of the characteristics of the physical structure and socio-economic characteristics of their inhabitants. With each political regime came a new phase for mass housing. Unlike in the current political system, all three different political regimes that governed Iraq during the 20th century celebrated a centralized economic system in which the government provided social services, including housing. The politico-economic shift in Iraq after the war of 2003 has moved Iraq from a centralized socialist system to a decentralized neoliberal system in which the housing sector is no longer a social service, but a commodity with marketable characteristics. This shift has produced new typologies of mass housing — gated communities, low-cost housing — and has introduced the private sector as a central actor in housing production. During each politico-economic phase, the motives, aspirations, and agendas have differed and thus, the typology of mass housing has varied to fit and to reflect those agendas.

### REFERENCES

6. Ibid.
8. Ibid.
9. Aqeel Mullahiwaish, *Modern Architecture in Iraq* (Baghdad: Afaq Arabiya, 1988), 122, 125. *Sarīfās*, are huts made of reed and mud with an average area of 20 m². Sarīfa settlements gradually started to form in the outskirt areas of Baghdad in the early 1950s and has reached to 45% of the total built stock in Baghdad during the mid-
1950s. They originally sprang up as rural settlements of low socio-economic groups who immigrated to the city of Baghdad in search for a better life. In 1958, sarifa dwellers represented about 18.4% of Baghdad population.


Ibid. 6.


Ibid., 1088.

Ibid., 1067.

Ibid.


Ibid., 116.

Ibid.


Urban housing had long been in existence in other parts of world, yet, unlike the subsidized rental system of public housing in Europe and the U.S, a subsidized ownership system was applied in Iraq.


