Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Merijn Vonk
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Studio	
Name / Theme	Borders & Territories	
Main mentor	Stefano Milani	Architecture
Second mentor	Mauro Parravicini	Building Technology
Third mentor	Oscar Rommens	Research Mentor
Argumentation of choice of the studio	Firstly, after an exchange in Hong Kong and multiple visits to China—both to the countryside and to large cities like Shanghai, Shenzhen and Macau—I was left baffled by the scale of the Chinese city. The buildings seemed so much bigger, the distances so much larger and the people were living together in such high proximity and quantity. Although I did not feel at home in the Chinese city, I did and still feel there can be lessons to be taken from the city planning that makes that high density possible. I was also curious to what I could design in such a city. Secondly, when listening to the introductory presentation by Marc Schoonderbeek, I felt at ease with both the tone and substance of the presentation. I think the studio outlook is a bit different than other graduation studios in that it is more precise in the usage of architecture theory—though I don't remember the content of the specific presentation I remember loving the calmness and clearness with which Marc could present seemingly complicated theory—as well as more generous with defining the scope architectural intervention, meaning I thought it would be possible to stretch a proposed intervention more within the studio.	

Graduation project	
Title of the graduation project	Space Leak

Goal	
Location:	Chongqing
The posed problem,	In Chongqing, urbanization and urban development has unfolded at an incredible speed. The created cityscape is one of accretion: land is issued quickly and frequently [See research question: *"Why does space leak occur in Chongqing?"*], with little—or by sheer speed alone at least less—consideration for architectural cohesion. This leads to a *next-to-each-other-ness* of architectures: a patchwork of isolated developments coexisting but not fully relating to one another. This can be seen both in building block, which in the megalopolis often positions itself solely to the architectures inside of the developers plot [See fig. 1 & 2], as well as in architectural forms on the façade, which primarily hold consistency within the building or, again, within the developers plot [See fig. 4 & 5]. On the one hand this leads to an interesting cityscape, with surprising places where different architectures coexist. On the other hand, building on theories by Tamburelli and Koolhaas on space, I argue that this leads to s*pace leak* [For both the theories by Tamburelli and Koolhaas and a more precise definition of space leak see research question: *"What is Space leak?"*]. Space leak can be regarded as a twofold occurrence, it is a situation where space in the city leaks because it is not uniformly held (1), and it refers to a situation where memory of the spaces visited leaks because of over saturation of city form (2). In a paradoxical relation, the over saturated city scape—with architectural forms of different heights, breadths and widths—becomes unrememberable.
research questions and	**What is s*pace leak* ?** To deal with Chongqing's very particular city scape, the student draws inspiration from Pier Paulo Tamburelli's book *On Bramante* as well as Koolhaas' *Junkspace* and introduces the term *space leak* to characterize a perceived problem with the experience and memorization of city scape in Chongqing. Firstly, Tamburelli brings forward a theory of space as a distinctively human made operation. To the Italian writer and architect: "*Space does not exist in nature. Space is made, like a pot, not discovered, like a planet"* —Tamburelli (2022, p.

157). He continues: "*Space is always taken from nature, always artificial, always measurable, always produced. And as a product space also makes available its experience, which is always experience of something recognizably made by human beings*" —Tamburelli (2022, p. 157). It is something that Koolhaas underpins, when in his essay Junkspace he writes: "*Space was created by piling matter on top of matter, cemented to form a solid new whole.*" –Koolhaas (2013, p. 6). Drawing from the theoretical framework above, the first part of the argument I make roughly follows the following logic:

- Space does not exist in nature, it is made by humans for humans
- Space then is held up by human made operations: by architecture
- When buildings are spaced too far apart and in a chaotic way, space between them is also stretched and becomes chaotic in itself
- This is what I call a space leak (1). The space is not uniformly held by orderly manmade operations in close proximity. Rather, chaotically scattered building blocks lucidly attempt to hold and create space, these however sit too far apart and act without correlation, thus losing their ability to *make* space.

Secondly, in computer science a *space leak* occurs when a computer program uses more memory than necessary. By analogy, this concept can also be applied to architecture and city form. To make the argument the student again draws on Tamburelli, as well as adding a characteristic of Junkspace by Koolhaas.

Tamburelli argues "*Space is understood through measurements, through analogy with similar spaces that have already been experienced*" –Tamburelli (2022, p. 160). Tamburelli builds his argument with a hypothesis by Gehlen, an anthropologist writing in the second half of the 20th century who is convinced that: "*…forms like the sphere and the cube, quite apart from any rhetoric about "divine proportion," would be imprinted on the memory of human beings (and then recognized, named, recalled, and associated or contrasted with other forms)*" –Tamburelli (2022, p. 151). Tamburelli continues: "*The geometric figures that govern buildings were not chosen because they had an intrinsic symbolic or metaphysical value, but for their capacity to stand out from the background as conspicuous elements, for the possibility of their being recognized, for their ability to arouse an expectation and leave a trace in the memory*" –Tamburelli (2022, p. 153).

So, to summarize the point by Tamburelli, architectural forms stand out from a natural backdrop as conspicuous elements, thus holding up the manmade space. The rule governing this space can then be recognized, at least approximately, and remembered. Taken together this leads Tamburelli to argue for the making of architecture with the use of elementary forms placed by a guiding principle or rule, so that the spaces created are easily related to, as to be easily remembered.

On the other hand, Koolhaas speaks of Junkspace, as a space that "*…replaces hierarchy with accumulation, composition with addition*"–Koolhaas (2013, p. 6). He continues: "*Junkspace is additive, layered, and lightweight, not articulated in different parts but subdivided*"–Koolhaas (2013, p. 6). Junkspace is oversaturated, all at once, and as a result, to Koolhaas, Junkspace "*…cannot be grasped, Junkspace cannot be remembered. It is flamboyant yet unrememorable*"–Koolhaas (2013, p. 7).

Drawing from the theoretical framework above, the second part of the argument I make roughly follows the following logic:

- Tamburelli argues for an architecture that is about producing space with the use of strong geometrical forms, which are placed by a guiding principle or rule, so that buildings can be easily related to and remembered
- Koolhaas sees in the world an architecture—which he calls Junkspace—that is not governed by guiding principle or rule, but instead by accumulation and addition, and renders it unrememberable
- This is what I call a space leak (2). The leakage of memory of spaces visited because of a lack of a rule governing them. Paradoxically, the oversaturated city becomes unrememberable. When buildings use very different architectural form, i.e. when hierarchy and order is replaced with accumulation and addition, it becomes difficult to understand and relate to them (run the program), thus losing their ability to leave a trace in memory.

Why does space leak occur in Chongqing?

Chongqing sits on a mountainous area at the confluence of the rivers Yangtze and Jialing Jiang in Central China. In 1997, through government decree, it became one of China's six first tier cities (other's include Beijing, Shanghai, Shenzhen, Guangzhou and Tianjin), thus forming a "*key connection in the Yangtze River Economic belt, and a strategic base for China's Belt and road Initiative*" (Worldbank, 2019). Following the

appointment as a first tier city, as well as multiple policy changes dating back to the 1980's—examples include the Opening-Up Policy by Deng Xiaoping, the relaxation of the Hukou system leading the coming into existence of China's floating population, and the development of Township and Village Enterprises (TVEs), all of which led to an increase of urbanization processes (Perkins, 2009)—Chongqing urbanized. This urban development has unfolded at an insane speed, with most of the megalopolis being built in the last 50 years. Cities usually develop over centuries, Chongqing was built in half a lifetime. Moreover, through land overconsumption—a process fueled by local governments' desire for more land income—the urban area of Chongqing has "*increased twice as fast as its urban population in the past two decades*" (Worldbank, 2019). The cityscape that comes out of this, is one of accretion. Land is issued quickly and frequently, with little—or by sheer speed alone at least less—consideration for architectural cohesion, leading to a *next-to-each-other-ness* of architectures: a patchwork of isolated developments coexisting but not fully relating to one another.

Within the context as sketched above, I argue space leak occurs in Chongqing for two reasons:
- Given the speed and frequency of land issue in Chongqing, the city has developed as a patchwork of isolated developments, coexisting but not fully relating to one another. Building blocks are positioned solely to the architectures inside of the developers plot, and thus do not relate to developments outside of the plot [See fig. 1, 2 & 3]. This leads to chaotically scattered building blocks, which together lucidly attempt to hold and create space. These however sit too far apart and act without correlation, thus losing their ability to make space, leading overall to countless space leaks in Chongqing.
- Given the speed and frequency of land issue in Chongqing, the city has developed as a patchwork of isolated developments, coexisting but not fully relating to one another. Architectural form on the facades only hold consistency within the building or within the developers plot [See fig. 3 & 4], and don't follow shared governing rules. As a result of this the buildings use very different architectural form, hierarchy and order are replaced with accumulation and addition, and the city becomes difficult to understand and relate to, thus losing the ability to leave a trace in memory and leading to countless space leaks in Chongqing.

	Where does space leak occur in Chongqing? Although space leak was observed in countless places in Chongqing, a certain demarcation is necessary to make the project operable. When visiting Chongqing, I walked a route through the city center from mountain range to mountain range, passing the Jialing Jiang river and crossing the Yangtze [See fig. 1]. Along this route I chose three sites—one mountainous, one next to the river and one on the central peninsula—where some variation of space leak occurs [See fig. 3]. The first site, on mountainous terrain, combines the challenges of chaotic building placement with very different architectural form. Large apartment buildings stand in a superblock and sit next to small scale urban sprawl with a village feel. Part of the mountain next to the small scale buildings has been terraced, leaving space for urban farming. Taken together it leaves an interesting site with widespread high rise sitting next to very concentrated low rise. The second site, next to the river, presents a different challenge. Here the river and the highway next to it dominate the city scape. The river, though always present in view, is highly inaccessible, with the highway floating above the river bank cutting it off entirely. Here a commercial and financial center sits next to multiple superblock developments. The architectural form of these developments is very different again, and the buildings stand far apart. Moreover, being built to accommodate vehicles driving at a speed of over 100 km/h, the highway brings a different speed to the location, one that dwarfs the human pace. The third site, on the central peninsula, is most densely populated by buildings. Of the three sites it is the oldest and most solidified, with buildings dating back a few decades. It is also the most dense, meaning the first iteration of space leak—the leakage of manmade space—doesn't occur here. Architectural form however is very dissimilar, with building form exclusively holding consistency within building. The challenge here is how to counter space leak when it is virtually impossible to add building and architectural operation.
design assignment in which these result.	**Can space leak be countered in Chongqing?** At the time of writing I must admit I don't exactly know how to counter space leak. It is part of what the coming half year is for I think, to get an even better definition and understanding of the concept—primarily through drawing—and with those drawings get to a design. Given the framework and theories

that I list above however, I see three strategies to counter space leak: three ways to start thinking about *space catch*. Firstly, when building blocks are spaced too far apart to hold space, it could be possible to add building mass or architectural operation to help hold the space. This means filling the gaps between building blocks.

Secondly, I expect it to be possible to counter memory space leak by the adding of a rule to govern architectural form within existing context: to add cohesion in architectural form by bringing it closer together. Neither Tamburelli nor Koolhaas provide an all-encompassing rule to use, their theories are generous in that they don't prescribe a precise operation but instead guide a free process of coming to a design. I hope to find the rule to govern architectural form in the existing context. To specify, for the first iteration of this I will try to overlay façade views of different buildings to try and find joint dimensions and measurements. I can then either accentuate existing and overlapping measurements, making two different buildings cohere more, or I can design something in between them that uses both measurements, thus making the cityscape more coherent.

The first two options to counter space leak form two sides of the same coin, both try to add order by architectural intervention. Alternatively, and because I've also experienced Chongqing as an interesting cityscape with surprising places where different architectures messily coexist, I wonder if it would be possible to celebrate the spatial condition of these sites in a way that can render them rememberable. So, is it possible to celebrate space leak instead of countering it, thus rendering it rememberable again, thus countering it. For this I draw inspiration from Christo's valley curtain, as well as his and Jeanne-Claude's work Running Fence, two beautiful examples of large scale land art. Using my modus operandi 3, with different overlays of the chaotic city, I can design large scale curtains, to hang between buildings and celebrate the city as is.

Process

Method description

The foundation of this project lies in the theoretical constructs proposed by Pier Paolo Tamburelli and Rem Koolhaas, whose ideas form a framework for understanding and addressing the phenomenon of space leak. The project builds upon their theories, emphasizing architectural form as a critical element in holding space, shaping memory, and addressing the challenges posed by Chongqing's rapid and fragmented urban development. The concept of space leak will most likely develop to some

extent within the project, but the base as denoted above and below should still stand.

The following is a rough sketch on what I think I need for the project to keep moving forward and, ultimately, succeed.

Space leak; the conceptual framework

Tamburelli argues space is inherently human-made, contained by deliberate architectural operations that render it measurable, perceptible, and relatable. Space, according to this perspective, is not an incidental byproduct but a purposeful construct meant to be experienced and remembered. Koolhaas complements this by critiquing a part of architecture which he calls *Junkspace*—a fragmented, oversaturated accumulation of elements lacking coherence and thus resisting memory. Together, these theories frame the dual nature of space leak:

- The inability of chaotic and scattered architectural forms to cohesively hold space.
- The cognitive inability to recall and relate to spaces due to the absence of unifying principles or rules in architectural design.

These insights underline the significance of precise architectural form and its role in mitigating spatial fragmentation and enhancing the memorability of urban environments.

Framework Application to Chongqing

The theoretical framework guides the project's focus on Chongqing's unique urban conditions. The city's rapid urbanization and fragmented architectural development exemplify the conditions for space leak. The framework helps dissect these issues into actionable layers:

- Building block analysis:
  Examining the relationship between building blocks and the ability to cohesively contain and hold space within the city.
- Architectural form analysis:
  Analyzing how variations in architectural form—height, proportion, governing rule—impact the coherence and memorability of urban spaces.
- Architectural intervention:
  To operationalize the framework, at the time of writing I see two strategies for intervention:
  - Establishing Cohesion: Leveraging Tamburelli's argument for strong geometric forms and overarching governing rule to create architectural coherence. This involves identifying and amplifying common dimensions, proportions, or rules within the built fabric of Chongqing to counteract chaotic accretions.
  - Celebrating Disparity: Drawing inspiration from Christo and his large-scale land art, the project considers ways to transform chaotic spatial conditions into memorable urban experiences. Through targeted interventions—such as large-scale "curtains" or overlays that frame the

existing cityscape—the project explores how to celebrate the existing cityscape.

Defining the Role of the Space Catcher
Central to this theoretical exploration is the development of the *space catcher*: an architectural and urban design solution aimed at counteracting space leak. A space catcher functions by either:

- **Filling Gaps**: Adding architectural mass or operations to fragmented spaces, thereby holding and shaping cohesive urban environments.
- **Introducing Rules**: Imposing or amplifying unifying principles across disparate architectural forms to enhance legibility and memory.
- **Framing Chaos**: Highlighting and celebrating the juxtaposition of chaotic forms to render them relatable and memorable.

Reflection and Synthesis
Evaluate the proposed interventions against the theoretical framework to determine their potential in mitigating space leak.
The theoretical framework, combined with site-specific observations and iterative design experiments, serves as both a lens for understanding Chongqing's urban challenges and a toolkit for intervention. The ultimate aim is to develop architectural strategies that not only counteract space leak but also offer a renewed perspective on how fragmented cityscapes can be reimagined as cohesive and memorable environments.

Literature and general practical references

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Perkins, D. H. (2009). *China's Land system: Past, Present and Future.* Ed. Gregory K. Ingram and Yu-Hung Hong. Lincoln Institute of Land Policy

Tamburelli, P. P. (2022). *On Bramante* (1st ed.). Massachusetts Institute of Technology
(Gehlen, A. (1988). *Man: His Nature and Place in the world* (C. Mcmillan & K. Pillemer, trans.). Columbia University Press (Original work published 1940))

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Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

   The relationship between my graduation project, the studio topic, my master track (Architecture), and the MSc program lies in their shared focus on addressing complex spatial conditions. The *Borders & Territories* studio examines unconventional urban and territorial dynamics, asking in the course outline for a research and design project *"focusing on urban and territorial sites where 'other' spatial conditions have emerged; teeming with suggestive meanings and unexpected potential"*. This aligns with my project, Space Leak, exploring the fragmented urban fabric of Chongqing. Through theoretical frameworks and design interventions, the project investigates how architecture can counteract or celebrate a spatial condition by either fostering coherence or celebrating surprising chaos, reflecting the program's emphasis on research-driven design and architecture's role in shaping meaningful urban environments.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

   Socially, space leak explores how architectural interventions can improve the legibility and coherence of urban spaces, enhancing the lived experience in megalopolises like Chongqing. Professionally, it offers insights into designing within complex urban contexts, emphasizing strategies to counteract spatial fragmentation. Scientifically, the project builds on theoretical frameworks by Tamburelli and Koolhaas, contributing to the discourse on architecture's role in shaping space, memory, and urban identity.
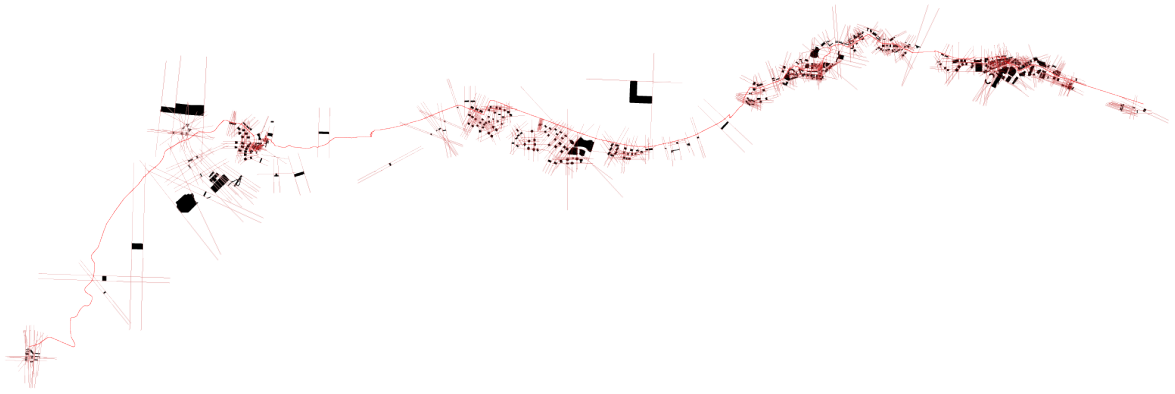
Figure 1; Directionality of the building blocks along a section of Chongqing
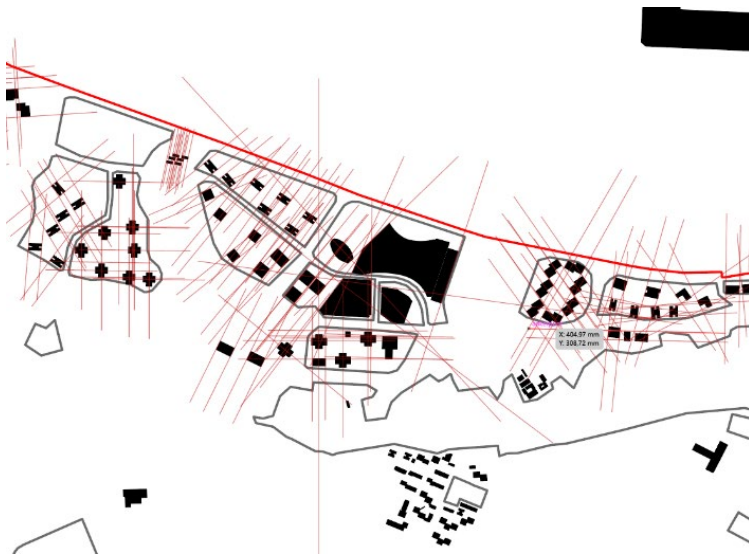

Figure 2; Directionality of the building blocks along a section of Chongqing in relation to plot, zoom in to location 2
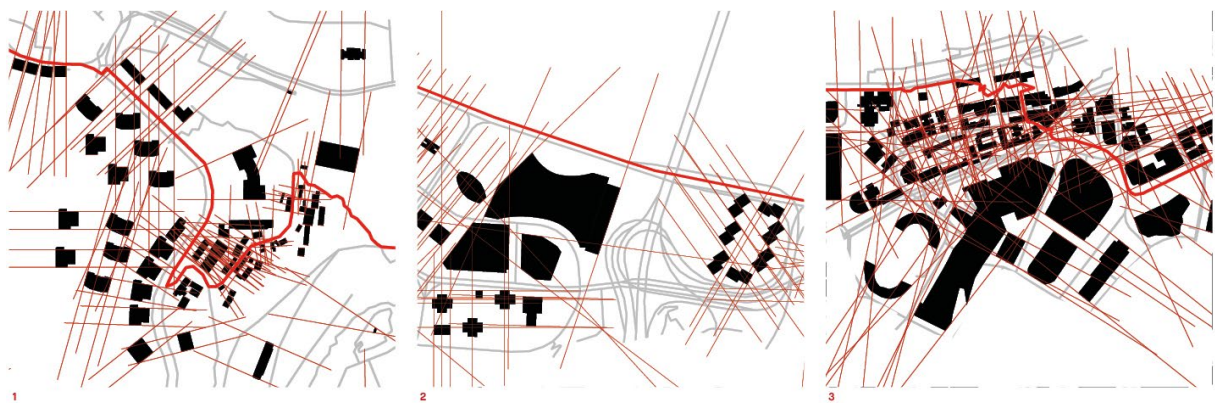

Figure 3; Three sites, from left to right: Mountainous, next to the river and on the central Peninsula
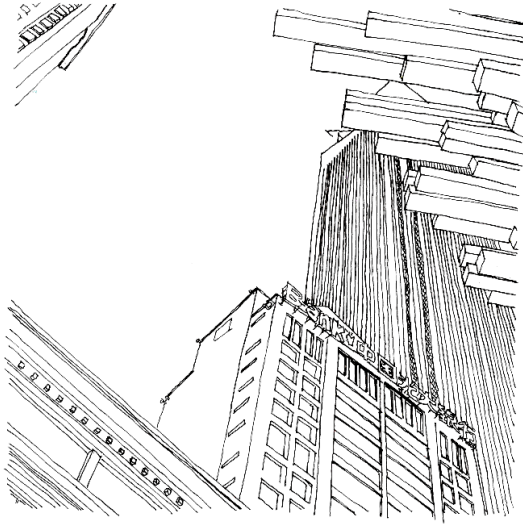
Figure 4; View from the square in front of the Chongqing Art Gallery

Figure 5; View of Shixiao Road (left) and a (nameless) side ally (right)