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	Geneviève Shymanski
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Studio		
Name / Theme	Global Housing: São Paulo – Repair and Consolidate	
Main mentor	Harald Mooij	Architecture
Second mentor	Stephan Verkuijlen	Building Technology
Third mentor	Nelson Mota	Architecture
Argumentation of choice of the studio	As the Global South continues to rapidly urbanize, and the population that is vulnerable to the effects of climate change increases, finding affordable and sustainable housing solutions is paramount. The Global Housing Graduation studio provides the opportunity to design new housing typologies, using environmental and social lenses to tackle these challenges. This studio combines two strong interests of mine – design that builds social resilience, and sustainable building methods that will mitigate the effects of climate change.	

Graduation project	
Title of the graduation project	**Risk or Displace:** Mitigating the displacement of vulnerable São Paulo residents from areas of ecological risk without proper infrastructure
Goal	
Location:	São Paulo, Brazil
The posed problem,	São Paulo's challenges with rapid urbanization and social inequality has left more than a million residents vulnerable to the impacts of water scarcity, lack of public infrastructure, and environmental risk. Urban growth in the 1970s began pushing low-income residents outside the city center, where land was inexpensive and easier to occupy. This movement towards the outskirts persists with a population which is growing exponentially. The development of the informal settlements formed in the peripheries thus supersedes the speed at which proper public infrastructure for potable water, sanitation and electricity can be implemented. Residents in these neighborhoods cannot access publicly supplied water or

	sanitation and must rely on water cisterns, illegal connections or self-made sanitation disposal to acquire the necessary infrastructure to lead a healthy life.[1] In the process of urbanization, desirable and safe land is taken first, leaving low-income families arriving later with less choice, for example, open land that is in an area of environmental risk, like soil degradation, flooding or landslides. In particular, there are informal settlements in São Paulo that are formed alongside city reservoir banks, which not only puts residents at risk of flooding, but also health risk, since the close proximity to the water's edge and the aforementioned lack of public infrastructure leads to the contamination of reservoir water.[2] These risks, in addition to the future risks as a result of climate change, disproportionally impact those living in informal settlements, due to their social vulnerability and socio-economic status. Development-induced displacement, otherwise defined as internal displacement as involuntary population movement resulting in coerced resettlement within cities or among neighborhoods,[3] is a method used by the São Paulo municipal government to rehouse residents living along reservoir water banks or in at-risk areas. Furthermore, the displacement of residents within informal settlements permits the implementation of public infrastructure such as water lines, sanitation, drainage, street paving, etc. While the intent of this displacement is towards a positive outcome – upgrading neighborhoods with much-needed services, or rehousing residents in homes located in a safer environment – the social impact of displacement is palpable. Forced displacement may move residents away from their sources of income and social networks, considerably impacting their mental well-being or exposing them to financial precarity. Readaptation to new neighborhoods or lifestyles can also be difficult for residents.

[1] Sally Cawood, Noura Wahby, and Luciana Nicolau Ferrara, 'Hybridity in Practice: Responding to Water Insecurity in São Paulo, Dhaka, and Cairo' 15, no. 3 (2022): 21.
[2] Ana Paula Pimentel Walker and María Arquero de Alarcón, 'The Competing Social and Environmental Functions of Private Urban Land: The Case of an Informal Land Occupation in São Paulo's South Periphery', *Sustainability* 10, no. 11 (November 2018): 4160, https://doi.org/10.3390/su10114160.
[3] Robert Muggah, 'Os Deslocados: Conceptualizing Internal Displacement in Brazil', *HASOW Humanitarian Action in Situations Other Tham War, July*, 2014.

research questions and	This research problem demonstrates a need to balance the risks of displacement and the risks derived from lack of public infrastructure or living in ecologically fragile areas. Therefore, the main research question is: How can design mitigate the impact of displacement on São Paulo residents that live without proper access to public infrastructure in ecologically fragile areas? To understand the impact of the risks on the residents, these two sub-questions are first asked: What are the effects of environmental and climate risks, as well as water scarcity and lack of public infrastructure on São Paulo's informal neighborhood residents? What are examples of safe and ethical processes to displace and rehouse at-risk residents of São Paulo? Two sub-questions that investigate possible solutions on how to mitigate impacts are as follows: How can an integrated approach to housing and urban public space connect displaced residents to their new place of settlement, socially, culturally, and ecologically? How can urban spaces within informal neighborhoods promote climate resilience?
design assignment in which these result.	This complex problem thus requires a multi-faceted approach that prioritizes the well-being of residents living in informal settlements who are facing the risk of displacement, while also embracing climate resilience. Given that the Global Housing graduation studio design will be carried out in a pre-determined site, namely a ZEIS 4 zone - environmentally vulnerable vacant land that is designated for social housing developments for low-income groups in São Paulo - the project presents an opportunity to develop a new residential neighborhood that accommodates and rehouses displaced people. Development-induced displacement is unavoidable for some cases such as removing housing located in dangerous, ecologically at-risk areas. Therefore, this site becomes a proposal to demonstrate how design can mitigate the impact of displacement on relocated populations by providing a desirable community.

	The housing scheme must reinforce social community and economic opportunities. The scheme should also be replicable outside of the site, given that the problem posed is not unique to the neighborhood of the site, but applies to residents across São Paulo and globally. These following points should also be met by the final design: -integrating greenery/parks and public infrastructure with public space -spaces to promote leisure and community contact -opportunity for incrementality and growth -emphasizing responsible building practices that adapt to the climate

Process

Method description

The primary research method for this graduation studio is research-by-design. The main four methods - literature review, case study analysis, mapping, and ethnographic research - will be accompanied by visualization methods such as modelling, photography, and drawing.

Literature Review: The theoretical framework for the research is separated into four topics, to organize the research and respond to the research sub-questions.
-Water scarcity, sanitation, and public infrastructure
-Climate resilience in informal settlements
-Development-induced displacement
-Rehousing and displacement urbanization case studies
The intent of the literature review is to address the four topics through an integrated approach. The literature will address these issues on a global scale and in the context of São Paulo.

Case Study Analysis: Various precedents, provided by the course instructors or otherwise found during the literature review, will be evaluated using a correlational approach to reveal how the projects deal with public space, infrastructure, or the challenges of displacement and resettlement. This includes analyzing the floor plan, urban strategy, typological and morphological patterns, or density of the case study. These case studies can be used as inspiration towards the graduation studio design, or to identify certain patterns that could be perceived as harmful to residents. However, the "success" of the case studies will continuously be called into question to avoid analyzing the projects through a strong bias.

Mapping: Following the research-by-design approach, a contextual analysis of the site will be carried out using Google Earth historical imagery, GeoSampa (São Paulo

Municipality online application), and graphical syntheses of urban activities and relationships present on the site and its surroundings.

Ethnographic Research: The three-week field trip I took along with my studio colleagues provided an invaluable experience to learn and understand the issues presented in my research topic on a first-hand basis. The ethnographic research offers a new lens through which to analyze the case studies, and to form a better understanding of São Paulo's culture and built environment.

The field research included:
-interviews with residents and city employees
-morphological analysis through photography, film and audio
-note-taking on urban atmosphere and sensory experiences
-case study site visits

Literature and general practical preference

Water and sanitation infrastructure literature should address the impact of water scarcity, what is required to provide proper public infrastructure, and what factors may be limiting its installation in informal settlements.

1. Cawood, Sally, Noura Wahby, and Luciana Nicolau Ferrara. "Hybridity in Practice: Responding to Water Insecurity in São Paulo, Dhaka, and Cairo," 2022.
2. Secretaria Municipal de Habitação. "Programa Mananciais." Prefeitura da Cidade de São Paulo, 2022.
3. Singha, Sumita. Architecture for Rapid Change and Scarce Resources, 2012.

Climate resilience literature should look at climate risks in São Paulo and how to build housing in anticipation of climate disasters and extremes.

1. "Addressing Displacement and Migration Related to Disasters, Climate Change and Environmental Degradation." European Commission, 2022.
2. Burgess, Rod, Marisa Carmona, and Th (Theo) Kolstee. The Challenge of Sustainable Cities: Neoliberalism and Urban Strategies in Developing Countries, 1997.
3. Campello Torres, Pedro Henrique, Demerval Aparecido Gonçalves, Flávia Mendes de Almeida Collaço, Kauê Lopes dos Santos, Katia Canil, Wilson Cabral de Sousa Júnior, and Pedro Roberto Jacobi. "Vulnerability of the São Paulo Macro Metropolis to Droughts and Natural Disasters: Local to Regional Climate Risk Assessments and Policy Responses," 2021.
4. Satterthwaite, David, Diane Archer, Sarah Colenbrander, David Dodman, Jorgelina Hardoy, Diana Mitlin, and Sheela Patel. "Building Resilience to Climate Change in Informal Settlements," 2020.
5. Soares, Mariana Corrêa. "Parques lineares em São Paulo: uma rede de rios e áreas verdes que conecta lugares e pessoas." Universidade de São Paulo, 2014.
6. Young, Andrea. "Urban Expansion and Environmental Risk in the São Paulo Metropolitan Area," 2013.

Development-induced displacement literature should discuss the risks of displacement and its subsequent impact on residents and urban space, as well as how public policy influences displacement processes.

1. Barbosa, Luciana Mendes, and Robert Coates. "Resisting Disaster Chronopolitics: Favelas and Forced Displacement in Rio de Janeiro, Brazil," 2021.
2. Millington, Nate. "Linear Parks and the Political Ecologies of Permeability: Environmental Displacement in São Paulo, Brazil," 2018.
3. Muggah, Robert. "Os Deslocados: Conceptualizing Internal Displacement in Brazil," 2014.
4. Pimentel Walker, Ana Paula, and María Arquero de Alarcón. "The Competing Social and Environmental Functions of Private Urban Land: The Case of an Informal Land Occupation in São Paulo's South Periphery," 2018.
5. Robinson, W Courtland. "Risks and Rights: The Causes, Consequences, and Challenges of Development-Induced Displacement"
6. ZEIS Maps: Comparing Areas to Be Earmarked Exclusively for Social Housing in São Paulo City." Land Use Policy, 2016.

Case studies

1. Areião Complex Urbanisation, Boldarini Arquitetos Associados, São Paulo, 2014.
2. Cantinho do Céu Complex Urbanisation, Boldarini Arquitetos Associados, São Paulo, 2012.
3. Chácara Do Conde Social Housing, JAA Arquitetura, São Paulo, 2018.
4. Comuna Urbana Dom Helder Câmara. Grupo Usina. São Paulo, 2012.
5. Doedijnstraat Schilderswijk, Alvaro Siza, Den Haag, 1991.
6. Gleba A Heliópolis, Hector Vigliecca & associados, São Paulo, 2012

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)?

My graduation topic can be split into two main goals – building social and climate resilience. These goals will be achieved through an urban masterplan for a social housing scheme in the peripheries of São Paulo, fulfilling the studio requirement of addressing affordable housing in the Global South. Since my graduation topic tackles the challenges of social inequalities, and difficulties surrounding displacement due to unsafe informal housing conditions, this directly reflects the Architecture master track, which regards socio-spatial relationships in the built environment. The project goes beyond housing as it should tie together dwellings, urban public space, natural environment, and community into a cohesive plan. The graduation topic thus targets several scales, the individual dwelling, the relationship between dwellings and communal space within a cluster, the overall neighbourhood that integrates housing and urban activities, and the city-wide scale, by relating the neighbourhood to its surroundings.

This regards urbanism design, as part of the overall Master programme MSc AUBS, since the affordable housing scheme developed in my graduation project should relate to urban fabric of the site's neighbourhood and to the greater city of São Paulo. Furthermore, the focus on climate resilience relates directly to the Building Science aspect of the MSc AUBS, since the housing scheme will include the design of

building technologies that adapt to climate using ventilation, thermal mass, and site drainage strategies, and that address flood, drought, and landslide risks.

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

Seeing as rapid urbanisation across the globe is not going to significantly slow down in the next few decades, it is important that policy makers, designers, and community leaders engage in finding ways to accommodate this growth and ensure that the global population has access to clean water, sanitation, and affordable housing in a safe and healthy living environment.

The purpose of this research studio is to propose a sustainable housing strategy that addresses the challenges of infrastructure, climate change, public space and affordable housing through a multi-disciplinary approach. The research will also be applicable to both the context of São Paulo and globally. The literature and case studies that cover these topics which will be used for the research tend to be singularly focused on one issue, since it is difficult to thoroughly cover several problems altogether. However, the graduation studio work will attempt to use an integrated design approach to begin a discussion on how the interplay of different aspects, such as climate design with public space, or infrastructure with community, can enable and produce meaningful housing schemes that ensure overall social well-being. Ultimately, this thesis will use architecture and urban design research to address the difficult challenges associated with climate and social resilience, through the lens of the socio-spatial relationship between people and environment.