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	Sanika Charatkar
Student number	5499984

Studio		
Name / Theme	Transitional Territories	
Main mentor	Taneha Kuzniecow Bacchin	Urbanism (Urban Design)
Second mentor	Geert van der Meulen	Urbanism (Urban Design)
Argumentation of choice of the studio	I view this thesis as an opportunity for me to investigate ways of looking at the co-habitation of human and ecological processes in the context of a developing city, Mumbai. Having personally witnessed the morphing of the inland and coastal edges of Mumbai's estuarine territory, followed by the manifold of socio-ecological impacts it has on the region- the opportunity to study this condition through a new lens like that of its geomorphology over time will enable me to comprehend this condition to its fullest extent. Which very strongly aligns with the idea of "accumulation'' addressed by the studio. As the studio is based on the "transition between land and sea" I see it as a fitting opportunity to apply the alternative methodologies and perspectives inculcated to further my understanding of the complex edge conditions that manipulate the hydrological cycle in the region. Especially, how these temporalities influence the region at a macro scale. Furthermore, to ground the project in reality it would be of acute importance for me to situate concepts and solutions in the complexities(tangible and intangible) that come along with a developing region. Since this studio constitutes mentors with immense experience in the field of water crisis in an Indian/ Asian context, it would be incredibly valuable to develop this project under their guidance. And lastly, I have an innate inclination towards working with audio-visual techniques of storytelling or analysis. Since this studio would provide a platform to further this medium of	

	study, I am particularly peaked to opt for it. And not to mention the allied intensives that will introduce me to methodologies of research, analysis and design that are very unlike most approaches I have had in the past. I strive for this graduation project to be a confluence of my technical background and ethical values, matured over time. The combination of technical/design solutions from water experts and the importance given to ethics, in all of the previous projects has truly resonated with me. And hence would be beyond thrilled to develop my topic under the Transitional Territories Studio.

Graduation project	
Title of the graduation project	(De)landing Growth : Framing alternative perspectives to growth in hyperdense regions, a case of Mumbai
Goal	
Location:	Mumbai, India
The posed problem,	Currently, development in Mumbai is defined by anthropogenic processes aimed at building more. Manifesting in the form of inland architectonic augmentations or outward reclamations into the sea, these interventions are dissociated/incongruently positioned in the territorial ecosystem. Thereby altering natural cycles, disrupting habitats ,and ultimately rendering critical ecological systems spatially and functionally marginalized. The resultant instability in the territory is evident as large volumes of humans and non-humans alike are lost, set-back or displaced, by the catastrophic floods, that are further exacerbate by climate change.
research questions and	<u>Primary Question:</u> What forms of new **territorial practices** can redefine paradigms of growth in Mumbai?

	That respond to the fluctuating dynamics of its population and their neo-liberal/globalization ambitions whilst abating to the crisis of recurring monsoonal floodings and the insurgent sea level rise exacerbated by climate change. So as to foster an **evolutionary**, **symbiotic relationship** between **its critical ecosystem cycles (geological and hydrological)** and **habitation patterns** as a means to safeguard the existence of humans and more than humans alike. <u>Sub-Questions:</u> TRACING TERRITORIAL MOVEMENTS 1. What are the critical drivers of territorial transformation in Mumbai? a. Which are the critical natural cycles of the ecosystem that terraform the region and how do they manifest in time? b. What are the political, economic, ecological and social goals that shape the trajectory and time frame of development in the city? And to what extent? i. What are the tools and agencies used to implement the aforementioned intentions? 2. In what form are the development ambitions physically manifested in space and how do they respond to the existing structures and movements of the territory.? a. What is erased, replaced, repaired, transformed or

	added into the material/static environment? Consequently what constitutes the long durée of the city?(life span) b. How does the built form interact with the natural cycles of the territory? What are the resultant negative externalities? OUTCOMES AND LEARNINGS 1. What and how are the gradients of incongruency observed in time between the human(elaborate) and non-human processes shaping the landform? 2. Consequently what are and how can the limits of these conflicting processes be determined? 3. Which habitats / sectors of the territory are rendered critically vulnerable to urgent monsoonal flooding and insurgent sea level rise as a negative externality to conflicting movements influencing the territory? And how can this vulnerability be graduated/ parametrised as a method for evaluation in scenario building? SCENARIOS 1. What is the nature of the scenarios established? a. What and how are the preconditions determined that compose the static foundations of the scenarios? b. How and what are the ethics and systems of care that define the intent of the scenarios?’

	c. Based on the out comes and learnings how can path dependencies be created between different parameters of territorial movements to establish a condition of homeostatic coexistence between the human and more than human occupants, with vital focus on the role of indigenous systems of knowledge? 2. What forms of action would ensure a socio-ecologically just implementation of the scenarios? 3. FEEDBACK a. What thresholds of the scenarios or time frames would initiate a parametric re-evaluation of the externalities arising from conflicting land making practices? b. How can feedback as a medium of design and planning create an inclusive system of planning that reveal potentials for asserting rights to non-human biotic systems, generating societal awareness and agency as well as sectoral collaboration across the territory.
design assignment in which these result.	• The **land as a palimpsest** – **a diachronic documentation** of the process and circumstances that led to the formation of Mumbai from

	the anonymous 7 islands to the unified land mass that exists today. • An **atlas of critical cartography** charting the complex relationships between human and more than human movements occurring at varying temporalities and scales that are influential in shaping and re-shaping the territory of Mumbai. With particular focus on points of incongruency between their current habitation processes (including biophysical as well as social) that cause disturbances in the hydrological cycle resulting in floods that will be amplified by climate change in the near future. • **An adaptive strategic framework** for identifying and evaluating critical zones in the territory. Through a parametric analysis of the prevalent path-dependencies, externalities, limits and vulnerabilities across scales and time to formulate prospective scenarios of development. As a means to position urgent amidst insurgent socio-ecological crisis and develop. • **Scenarios** that construct a gradient of research backed narratives of growth, taking into account the variabilities of population and hydrological upheavals in the form of flooding and sea level rise and their implications on the re-territorialization of the city. Thereby defining a spectrum of possibilities and designing for uncertainty. An • A **hybrid feedback system** as a strategic as well as an implementation methodology that functions along two axes. The horizontal integration of research knowledge and goals of the relevant

	disciplines of earth sciences and socio-political structures to streamline and define trajectories of growth for the city. Coupled with the vertical tran-scalar inclusion of local agents in the critical zone as a bottom up response system, in the periodic re-evaluation of the critical zones and accordingly altering the forms of action or determining the scenario to be furthered. • An **evolutionary trans-scalar design praxis,** which is to translate and implement the scenarios as forms of action integrated across the meso(territorial), macro(municipal) and micro(local) scale. They are determined for each kind of scenarios which are defined by the research and assessment methodology. These manifest as a combination of tangible interventions, policy frameworks and bodies of knowledge that contextualise these practices especially at the local critical zones to ensure a just transition. • An atlas constituting mix-media **visualisations and speculations that through the lens of its terrain, present an alternative narrative to the flooding crisis in Mumbai. As** a method to generate awareness and incentivization for socio-ethic changes.

[This should be formulated in such a way that the graduation project can answer these questions.
The definition of the problem has to be significant to a clearly defined area of research and design.]

Process

Method description

[A description of the methods and techniques of research and design, which are going to be utilized.]

Research Aim:

To reframe growth for Mumbai to be founded on systems of **care** and **symbiotic co-habitation** of its human and more than human occupants. As a means to ensure a **resilient habitat** against the externalities of its unprecedent growth specifically on the **altered hydrological cycle**, giving rise to **urgent and insurgent socio-ecological vulnerabilities.**

Goals:

- To mark a shift in the prevalent interpretation of Mumbai as a static territory bounded by its administrative outlines. By **decentralizing human positioning** and understanding the city concurrently -as an act as well as a resultant of **territorial socio-ecological dynamics**.
- To delineate its development trajectory from neo-liberal and modernism paradigms of growth to becoming cognizant of the complex path dependencies between the biotic and abiotic agents of its land transformation. Thereby initiating an **ethico-political redefinition of ecological relations** in the region.
- To project growth as **moving target** that can **mediate** and **respond** to fluctuations in the society as well as the resultant urgent and insurgent externalities that manifest in the altered hydrological cycle at vary scales and frequencies.
- Reorient development strategies to establish interdependencies between **decision-making and socio-scientific, political, climatic and biochemical processes in the ecosystem,** transforming it into an **adaptive collaboration aimed at achieving a condition of homeostasis in the ecosystem**. One that manifests as **emergent forms and orderings** that will ensure a **resilient territory** capable of safeguarding the existence of humans and more than humans against the impending floods and sea-level rise.
- Develop a critical stance backed by research to **wager socio-economic vulnerabilities** against **ecological liabilities in the critical zone**, given that they persist at varying scales, intensities and rhythms in the territory. Further ensuring their inclusion in the various stages of development planning and implementation as a means to foster a **just transition**.

Methodology:

Analytical mapping- A synthetic mapping and representation of prevalent critical processes that shape territorial formations, identifying points of incongruency within them. Relating social processes on site with their corresponding bio-physical conditions creates basis to derive conclusions and hypothesis that help synthesis some of the complexities of the site, that substantiate the problem field as well as reveal prospects for collaboration.

Diachronic mapping and Literature- To develop an in-depth understanding of Mumbai's colonial past, relating changes in its physical land mass to the prevalent socio-political conditions in time. Touching upon- the power structures, governing norms, and ambitions that prevailed under the British rule and how it has transitioned in time to other values of a globalised democratic city.

Terrain and Flow Modelling- As a speculative tool to test the research hypothesis regarding the impacts of altered biophysical cycles on the territory. Furthermore, it will also be helpful in testing hydrological scenarios with proposed terraforming conditions in the later phase of the research.

Critical Cartography- To create a narrative as a tool for awareness and initiative by reflecting upon the hydrological crisis through the lens of the terrain.

Visual Montage and Folksong documentation- As a method to engage with the intricacies of the indigenous and local communities. Since there is limited consolidated data that provides valid information about their practices and bodies of knowledge that has defined them as a community. These cross media methods reflect an attempt to establish their narrative and position in this subject.

Counter Mapping- There are several informal settlements and smaller local communities in the territory that are very often not reflected in official plans or GIS data sets, owing to their organic, ephemeral nature or even illegal status. However in the context of the project they are very essential to be accounted for as these communities often lie in zones most vulnerable to inundation. By aligning formal plans with real time satellite data, alterations have been made in the resultant mapping. This information is particularly vital in quantify and spatially qualifying the critical zones in Mumbai ,thereby developed a holistic understanding of what vulnerability is in the context of the city. This method is also important in determining the underlying power geometries in the society as a stepping stone toward projecting a just transition.

Scenario Mapping- Will be used as a tool to design for emergent uncertainties in the territory. Since the project focuses upon the influence of fluctuations in the hydrological cycle and population as defining factors in shaping the territory, a scenario matrix will provide a spectrum of possibilities to work with. Which can go onto defining forms of action and evaluating the ethics of care underpinning it. They do not define a strict design intervention but processes and systems that unfold responsively, to the varying combinations of extremities in the two variables.

Projective Map- To envision realities based on current trends and can precede or compliment scenario building.

Interviews- Interviews and discussions with researches in the field, local governing bodies and indigenous communities -as an research and assessment method to develop a deeper understanding of the practicalities on site.

Stakeholder assessment and Power interest Matrix- Gives insight into the agencies, communities and institutions involved and or affected by the terraforming of the territory. Grouped and graduated based on their levels of participation, interest and power in this transition, thereby creating a basis for societal evaluation of decisions and forms of action, which can go on to informing the scenario development process.

Case Studies: The scope of the case studies has been define under 2 categories-

a) contextual Case studies that includes research , assessment and design practices in the Asian or Indian contexts. To specifically ground the project to the existing realities and explore ways to practically implement the proposed goals b) Techno-scientific case studies that are relevant to subjects of landscape ecology, terraforming, land reclamation, flooding and disaster management as developing a body of knowledge.

Literature and general practical preference

[The literature (theories or research data) and general practical experience/precedent you intend to consult.]

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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 project is centred around exploring alternative prospects of territorial growth that respond to urgent as well as insurgent socio-ecological crisis in Mumbai. As the project deals with the conflicts and incongruencies between terrestrial practices and the hydrological system, evolving it under the Transitional Territories studio is most fitting. Not only on account of the scale of the project but given that the very theme of the studio is "Inland, Seawards". Where through a series of methods like critical cartography, peer- review, crossover feedbacks and open learning approach of the studio have allowed me to systematically unpack the complexities of the subject- its processes, systems, occupants as well as their their co-relations. Since particular but sensitive focus is to be laid on the prospects of negotiating human and more than human concerns on the site, the ethical and theoretical approach of the studio will aptly guide me into manifesting this goal as a pragmatic design dissertation output.

   Besides being situated in the territorial context of Mumbai the project encompasses domains of urban planning and design, landscape, geology, hydrology, water management as well as humanities at the core of this topic. These fields not only inform

the research of the project but will also shape its outcome. And this interdisciplinary and multiscale approach rightly fits within the Msc Urbanism programme.

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

PROFESSIONAL

The project presents an opportunity to critically position research, design and planning of urban environments within the dichotomy of society vs nature. Something that is particularly prevalent in the profession today as the urban environment is no long restricted to buildings or infrastructure and is heavily influenced by surrounding exosystemic processes . Where although there is no singular stance, it is important to develop an awareness about the institutional, scientific as well as systemic complexities that will evolve to guide the ethical and technical responsibility of Urbanists.

SOCIAL

Most acts of disaster management in developing cities like Mumbai are often nascent in their impacts. Where owing to the politics of the urban environment, goals of adaptation are narrowly framed so as to protect near-term interests of a select few and more superficially framed in attempt to homogenously sustain the interests of society, in the longer frame of time. The project thus attempts to redefine disaster vulnerability within the framework of an evolving city, through two lines of inquiry. One is to develop a holistic understanding of critical zones and vulnerable habitats by taking into account relations across time as dynamic factors of assessment- encompassing social, financial, political as well as spatial realms. And second is to assert greater agency to the marginalised and local communities in the critical zone by recognising their symbiotic relations with ecology and thereby ensuring an aware and just transition.

SCIENTIFIC

While there is a large and growing body of research and technoscientific knowledge that addresses crisis of flooding and sea level rise, there is serious knowledge gap in contextualising this to a dense developing region. Where limited resources, globalisation ambitions, socio-cultural values, complex political or economic constructs ,limited land and inadequate disaster awareness makes it a lot more tedious to effectively implement the available knowledge onto the site. Thus, the project aims to explore new ways of interpreting the crisis, by reconfiguring vulnerability assessments, risk analysis, and developing an adaptive strategic framework that can position the design measures and policies within the contextual complexities.