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	Jiang Minyue
Student number	5282055

Studio		
Name / Theme	Transitional Territories	
Main mentor	Diego Sepulveda Carmona	Spatial Planning and Strategy
Second mentor	Geert van der Meulen	Water Management
Argumentation of choice of the studio	I chose the studio because my graduation project locates in the Rhine River Basin. And the transitional territories studio provides a platform for students who are interested in the areas of Rhine River basin with its Delta Urbanism team to exchange ideas with each other. Also, the topic of 'inland and seaward' suits my project perfectly well as I am studying the flooding risk which is an issue related to the territory of land and water from inland to seaward. In this studio, with the help of crossing disciplinary experts such as mentors from sector of spatial planning and water management, I can develop my ideas more comprehensively. In addition, the systematic thinking advocated by the studio, such as studying the system from the aspects of atmosphere, surface and subsurface by cartography to describe the current situation at first, then re-construction to understand and analyze, and finally terraforming to propose visions, is also a very good way to study the logic and approach of research, which is very helpful to me.	

Graduation project	
Title of the graduation project	Flooding Resilience Future for the ABC Mega Region - Using nature-based solutions and changing the paradigm of infrastructure to achieve integrated flood management goals of the crossing border and multi-level governance
Goal	
Location:	The ABC Mega Region, Lower Rhine River Basin
The posed problem,	With climate change, sea levels rising and frequent extreme weather events, the flood risk in the Rhine River basin is increasing. The Lower Rhine region is a globally renowned mega region with several mega cities therefore has a large number of inhabitants at risk of flooding. It has the strongest economic cooperation spanning three borders, but due to its political and cultural and historical reasons, the mega region is inevitably fragmented

	when it comes to issues involving social development and environmental issues, for example, flood management. The lack of systematic and scientific spatial planning and governance tools has resulted in the mega region not having integrated flooding management goals. In addition, the natural landscape is fragmented by the urban sprawl in the past few years, and the connection of nature landscape and the value of the ecosystems needs to be utilized and demonstrated in future flood management in the face of the new paradigm.
research questions and	Main Research Questions: How to use Nature Based Solutions and green-blue-grey infrastructure to create a multifunctional and mega-regional network of connectivity to collaborate for the integrated goals of flood control in the sight of future development, and dealing with a series of issues brought about by the crossing border and multi-level governance and forms in the Mega ABC Region of Rhine River Basin? Sub- Research Questions 1.Assessment - 1.1 How is the flooding risk in the ABC Mega Region in the future? - 1.2 What is the situation of the fragmented landscape in ABC Mega Region? - 1.3 What is the Spatial potential of setting up a green-blue-grey network in the region? 2.Systemic integration - 2.1 How to make a balance between creating connectivity of the cities by mobility infrastructure and by green-blue landscapes as these two conflicts with each other especially in the aspects of land use? - 2.2 Until what extent are the mega regional flooding resist plan can enhance nature capacities? - 2.3 Until what extend can the mega regional development be guided by the projection of the flood management? 3.Governance and actions - 3.1 Is there potential to set up the integrated flood management goals of the crossing border governance? - 3.2 How the multi-level polices and governance dealing with the crossing border issues can facilitate systemic integration nature-based solutions?

	4.Mega Regional Spatial Planning and Design - 4.1 How to transform the mega regional core of recognizing flood risk and nature potentialities of green and blue infrastructure in local conditions - 4.2 How to guarantee the flood protections and expand the eco-services in the local content?
design assignment in which these result.	1. Cognize and present the existing conditions of the study site, such as land use, fragmentation of the landscape, flood risk, etc., are comprehensively collated and summarized to present the basic information through mapping and other methods, and to provide information to support the identification of key areas and potential areas for research. 2. Study theories and concepts of nature-based solutions and green-blue-grey infrastructure. 3. Study policies to form a comparative understanding of the multi-level policies of the three countries in the ABC mega region, with a view to identify commonalities and contradictions and find keys to solutions. 3. Project and propose strategies and plans on the base of the basic information of the current situation to be applied in the key areas. 4. Explore between different scales from macro to micro to form a set of overall unified design strategies and logics in the mega region as well as the local conditions.

[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

Literature review:
Summarize and reflect on the previous studies, concepts and theories about the flood management especially aliens with the approach of nature-based solutions or green-blue and grey infrastructure.

Data collection: Collect the data o flooding risks, and search for the different flood management projects or associations in the mega region from the level of international to local.

Visualization: Using drawings, photography, and other media to form a detailed image of the previous and current conditions about the study areas.

Cartography:
-Observing mapping: Mapping the information of previous or current conditions which could be reflect on the map about the study area for better presenting and understanding the basic information of the mega region.
-Projecting mapping: Using the data and drawings from the observing mapping and find out the most crucial areas which faces the higher risks or have more potential to be transformed.

Case study:
Using case studies to show how the theories and strategies can work out in the real situation. Choosing series of projects in critical areas with successful flood management programs to understand how nature-based solutions is applied, how the local and national or international stakeholders are involved and how nature and urban landscapes are terraformed.

Compare and Conclude:
As flooding risk and flood management are very site specific applied, it is importance to compare different types of flooding risks in the whole mega region and conclude the commons and differences. Using charts and diagrams to show these kinds of information. Also, using chart and diagrams to compare different types of the crossing border and multi-level governance and power holders to see the potential of forming an integrated crossing border cooperation.

SWOT analysis:
Using SWOT analysis to identify the socio-eco strengths, weakness, opportunities, and risks in the process of building a flooding resilience future in the ABC mega region.

Scenarios proposing:
Combing the different development goals in the local conditions regarding to the demand of densification or expansion and different level of flooding risks to propose site-based scenarios for the cities in the mega region.

Design:
Using spatial planning and design to form a new type of network in the mega region and to upscale the local conditions.

Reflection:
Reflecting the process and approach of the study to develop a comprehensive research outcome

Literature and general practical preference

Literature:
1. Assessment M E. Ecosystems and human well-being[M]. United States of America: Island press, 2005.
2. Bacchin T K, Ashley R, Sijmons D, et al. Green-blue multifunctional infrastructure: An urban landscape system design new approach[C]//13th International Conference on Urban Drainage, Sarawak, Malaysia. 2014: 7-12.
3. Cardoso R, Meijers E. The process of metropolization in megacity-regions [M]//Handbook of Megacities and Megacity-Regions. Edward Elgar Publishing, 2020.
4. Cohen-Shacham, E., Walters, G., Janzen, C. and Maginnis, S. (eds.) (2016). Nature-based Solutions to address global societal challenges. Gland, Switzerland: IUCN. xiii + 97pp.
5. Forgaci C. Integrated Urban River Corridors: Spatial design for social-ecological resilience in Bucharest and beyond[J]. A+ BE| Architecture and the Built Environment, 2018 (31): 1-382.
6. Gersonius B, Rijke J, Ashley R, et al. Adaptive Delta Management for flood risk and resilience in Dordrecht, The Netherlands[J]. Natural hazards, 2016, 82(2): 201-216.
7. Hartmann T, Slavíková L, McCarthy S. Nature-based flood risk management on private land: Disciplinary perspectives on a multidisciplinary challenge[M]. Springer Nature, 2019.

8. Herk S. BEGIN: Blue Green Infrastructure through Social Innovation[J]. 2018.
9. Labbé, Danielle, and André Sorensen, eds. Handbook of Megacities and Megacity-regions. Edward Elgar Publishing, 2020.
10. Mohtat N, Khirfan L. Distributive justice and urban form adaptation to flood risks: a GIS-based study for the identification of priority areas for the just allocation of GBIS in Toronto[C]//ISUF 2020 Virtual Conference Proceedings. 2021, 1.
11. Redeker C. Rhine Cities-Urban Flood Integration (UFI)[J]. 2013.
12. Schulte-Wülwer-Leidig A, Gangi L, Stötter T, et al. Transboundary Cooperation and Sustainable Development in the Rhine Basin[M]//Achievements and Challenges of Integrated River Basin Management. Intechopen, 2018.
13. Taubenböck H, Wiesner M. The spatial network of megaregions-Types of connectivity between cities based on settlement patterns derived from EO-data[J]. Computers, Environment and Urban Systems, 2015, 54: 165-180.

Geo-data:
1. AMBER (Adaptive Management of Barriers in European Rivers) Barrier Atlas 2020: https://figshare.com/articles/dataset/AMBER_Atlas_of_Instream_Barriers_in_Europe/12629051
2. Elevation/ World_Hillshade: https://services.arcgisonline.com/arcgis/rest/services/Elevation/World_Hillshade/MapServer
3. Flooding atlas of Rhine River: https://www.iksr.org/en/topics/floods
4. Global Land Cover 1992-2019: https://earthobs3.arcgis.com/arcgis/services/ESA_CCI_Land_Cover_Time_Series/ImageServer
5. Nationale Basisbestanden Primaire Waterkeringen (Dutch Primary Dikes) : https://services1.arcgis.com/fpPKDlJ3n8eBtEzb/arcgis/rest/services/Dutch_primary_dikes/FeatureServer

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 project is about the flooding resilience future in the lower Rhine River basin, I need to investigate the river stream from inland to seaward to understand the flooding and other related issues. The studio topic of transitional territories 2021-2022 is 'inland and seaward' fits this topic very well. With a group of students who are interested in studying the areas of Rhine River Basin, I am able to collect and communicate with them on the same subject with different angles and entry points. In this studio, with the help of crossing disciplinary experts such as mentors from sector of spatial planning and water management, I can develop my ideas more comprehensively.
Also, the courses which I took in the first year of my master track is really helpful, especially the research and design studio of the spatial strategies for the global metropolis. The topic is in a larger scale which would involve not only the spatial issues, but also political, social and environmental issues. As an urbanism student, being able to see the world by my graduation project in a more systematical way is what I benefit a lot in my master programme.

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

The societal relevance of the graduation work:
The thesis is going to work on how to build a flooding resilience network in the ABC mega region for the future. Flooding, as we all know, has impact on the social aspects and causes the vulnerable groups to suffer and hinder development at all aspects of the society. This thesis not only mentions traditional technical solutions but also makes use of nature-based solutions, to achieve a flooding resilience and sustainable development of the mega region as well as other societal goals besides flood risk mitigation, such as enhancing the diversity and quality of people's lives by creating multifunctional flooding plains. Managing flood risk is a social responsibility for all of the

social groups, whether government, municipalities or local involvement. Because the ABC mega region, as a mega-city spanning three countries, has a diverse socio-cultural and historical background, which results in a gap between the communication and implementation of policies and measures. One of the research questions of this thesis is to find integrated goals of flooding management in the mega region by seeking common ground while preserving societal differences.

The professional relevance of the graduation work:
As an urbanism student, what I have studied mostly about is the city spaces. However, in this thesis, the crucial study areas are usually the spaces between urban landscapes and nature landscapes. These rural areas should not be the blank spaces in the spatial planning and design as we need to look at issues holistically rather than dichotomizing them. In my thesis, the mentioned nature-based solutions are attempts to solve social, ecological and other complex problems with less costly and more environmentally friendly measures. The environmental challenge should not only be seen as an issue to be solved, but also as an entry point for research and problem solving. As urbanist, we need to take a shaper view of the relationship between man and nature, from where we can ask for resources to where we can find solutions. In the past, perhaps we have over-transformed nature in the construction of our cities, and this is something we need to reflect on. But more importantly, we always need to deal with the relationship between urban development and environmental balance in the process of planning and designing.

The scientific relevance of the graduation work:
In this thesis, I investigate the relationship between spatial planning, governance, and flood management. The concept of nature-based solutions is getting more popular and green-blue infrastructure is also be seen as a great potential to solve the issue related to the eco-system and environmental challenge. However, there is a missing gap between these concepts and actual practice because these solutions should always be site specific and evolves a lot of participants. It is also interesting to see how the multi-level and crossing border influence would play a role in the process of building a flooding resilience future in the mega region. Understanding the different contexts faced by individual cities in the mega regions, why and how to propose flood management strategies adapted to their future development needs, and obtaining a spatially and policy coherent network of these objectives and strategies across the mega region is key to the whole graduation project.