

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	Joyce Maria de Louw	
Student number	5326486	

Studio		
Name / Theme	AR3AP100 2024-25 Public Building Graduation Studio "Public Condenser, Copenhagen"	
Main mentor	Paul Kuitenbrouwer	Project Design
Second mentor	Elina Karanastas	Technical Building Design
Third mentor	Stefano Corbo	Theory & Delineation
Argumentation of choice of the studio	<p>I like to approach architectural design from a standpoint that emphasizes not only aesthetics and functionality but also the human experience.</p> <p>This also led to my interest in Public Buildings. I see public buildings and spaces as a common good that reflects who we are as a community and as people. Public buildings embrace connections between people in ways that people can also define and support their community. So, I was excited to learn more about public architecture and to research how connections and bridges can be built between people.</p>	

Graduation project	
Title of the graduation project	The Water Hub: Celebrating diversity through water and providing a water infrastructure for Bispebjerg, Copenhagen
Goal	
Location:	Nordvest / Bispebjerg Bakke, Copenhagen, Denmark
The posed problem,	In the last two decades, Copenhagen and its city authorities have been experiencing problems with pluvial flooding, negative biases to migrants and water service disruption. These problem statements are touching three different levels: environmental, cultural and health.

Pluvial Flooding

In the summer of 2011, Copenhagen faced the most devastating cloudburst in its history causing approximately 1,6 billion euros in damage (State of Green, 2023). Copenhagen's Cloudburst Management Plan, introduced in 2012, is a comprehensive strategy aimed at tackling the growing threat of extreme rainfall and urban flooding (Cloudburst Initiative Copenhagen, n.d.).

Negative biases to migration

The "Ghetto plan" in 2020 received a lot of criticism that it is discriminatory and potentially racist in its targeting of non-Western immigrants (Denmark: UN Human Rights Experts Urge Halt in Sale of "ghetto" Buildings, 2020). Targeting non-Western immigrants as one of these set of laws to define a "ghetto", can be explained by negative biases of the Danes towards migrants. Research shows that three in four Danes believe that integration is far less successful than facts show (Denmark: Majority Strongly Overestimates Integration Problems, 2024).

Water service disruption

This year, a study revealed that more than half of Denmark's drinking water resources are contaminated with pesticides and other toxins (Euronews, 2024). In Copenhagen, all drinking water is produced from groundwater and there are multiple polluted sites because of its industrial harbour history (Overblik: Her Ligger 61 Farlige Giftgrunde Nær Hovedstaden, n.d.).

Focusing on Bispebjerg, all three environmental, cultural and health problems are extremely applicable. This area is experiencing a lot of flooding issues, it is very ethnically diverse and there are residential places without water service for a bath or a toilet.

	<p>However, these problems all share a unique relation with water. Architecture can tackle these three problems on environmental, cultural and health levels through water as common theme.</p> <p>With regard to pluvial flooding by heavy rains, rainwater can be collected and reused by a public condenser. With regard to negative biases to migration, it is important to celebrate water as the common ground between different cultural groups. With regard to service disruption, providing an accessible water infrastructure can overcome health problems.</p>
research questions and	<p>Main question: How can a public condenser celebrate cultural variety through water and at the same time provide a water infrastructure for the neighborhood in Bispebjerg, Copenhagen?</p> <p>Sub questions:</p> <ol style="list-style-type: none"> 1. How can rainwater be reused through design in architecture? 2. How do different cultures use water as a common ground in architecture? 3. How can architecture provide water accessibility to address neighborhood issues? 4. How can public architecture address climate, integration, and health issues in general?
design assignment in which these result.	[Design Assignment]
<p>The overall goal of this project is to design a Public Condenser connected through water. A place where people can identify themselves through water, a place that connects people by water and a place that gives accessibility to water as valuable source of life. It will address a more pragmatic side of water by providing a water infrastructure, but it will also address the more symbolic and cultural side of water by creating a waterscape.</p> <p>How? It will collect rainwater through a variety of project surfaces and roofs in the neighborhood. This rainwater will be reused to provide clean water for the local community in the form of a public condenser. This public condenser provides</p>	

functions like a laundry room, a public bath house and a multi-cultural steam room. It will find the common ground between different cultures, how we all use water. Besides that, the local community can benefit from the free use of a clean water infrastructure, based on rainwater collection.

Process

Method description

This proposal is a combination between quantitative (literature review) and qualitative (case study examples) research, leading to a multi-method approach. Above this, the research that I am conducting is also defined by my studio's approach: "research by design".

The literature review establishes a theoretical foundation for this research. Sources include peer-reviewed journal articles, seminal books, and recent reports, with a focus on works that address how rainwater can be reused through design, how different cultures use water in architecture, and how architecture can provide water accessibility. Moreover, reviewing literature gives this research a broader academic context by highlighting theoretical frameworks and relevant concepts for these topics. This will also help me selecting case studies and formulating the interview questions. Literature is found by identifying sources from databases such as JSTOR, Google Scholar, and TU Delft Catalog, using keywords such as "Architecture AND Rainwater" or "Water AND Culture".

Moreover, this research includes an analysis of selected case studies to bridge the theoretical insights gained from the literature with practical applications. Each case was chosen based on its relevance to the three themes. These case study examples will provide contextual and spatial understanding by analysing design in its environmental and cultural context.

Research by Design is a methodology that goes hand-in-hand with my studio's approach. In this approach, the process of designing and creating is both a means of exploring research questions and a way to produce insights, rather than just a way to create a final product. This approach is commonly used in fields such as architecture. Also, because of this approach I am currently doing research by design through mapping, diagramming, using ArcGis, etc.

Literature and general practical references

Books

Balzer, G., & Schorn, C. (2015). *Asset management for infrastructure systems : energy and water*. Springer. <https://doi.org/10.1007/978-3-319-17879-0>

Blair, S., Bloom, J., Virginia Commonwealth University School of the Arts (Qatar), & Hamad Bin Khalifa Symposium on Islamic Art and Culture Dawhah, Qatar) 2007 : (2009). *Rivers of paradise : water in Islamic art and culture*. Yale University Press in ass. with the Qatar Foundation, Virginia Commonwealth University and Virginia Commonwealth University School of the Arts in Qatar.

Cultural change in post-migrant societies : re-imagining communities through arts and cultural activities. (2024). In W. Sievers (Ed.), *OAPEN (Open Access Publishing in European Networks)*. Springer. <https://doi.org/10.1007/978-3-031-39900-8>

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Murotani, B. (1981). *Architecture and water space*. Process Architecture Publishing.

Novak, C. A., Van Giesen, E., & DeBusk, K. M. (2014). *Designing rainwater harvesting systems : integrating rainwater into building systems*. John Wiley & Sons. <http://swbplus.bsz-bw.de/bsz405673906cov.htm>

Rahman, M. S., & Islam, R. (2020). *Sustainable water purification*. Wiley-Scrivener. <http://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&AN=2530915>

University of Pennsylvania School of Design. (2014). *Design in the terrain of water* (A. Mathur & D. d. Cunha, Eds.; First edition). Applied Research + Design Publishing ; University of Pennsylvania School of Design.

Wright, M. (2015). *Rainwater park : stormwater management and utilization in landscape design*. The Images Publishing Group Pty Ltd.

Wylson, A. (1986). *Aquatecture : architecture and water*. Architectural Press

Journal Articles

Høghøj, M., & Thelle, M. (2023). Material politics: approaching welfare history through urban water in 20 th century Denmark. *Scandinavian Journal of History*, 49(3), 397–419.
<https://doi.org/10.1080/03468755.2023.2289665>

Quitau, M., & Røpke, I. (2009). Bathroom Transformation: From Hygiene to Well-Being? *Home Cultures*, 6(3), 219–242. <https://doi.org/10.2752/174063109x12462745321345>

Singh, R. S., & Ahmad, S. (2021). Water in Cultural Perspective with Special Reference to Islam. *In Sustainable development goals series* (pp. 147–155). https://doi.org/10.1007/978-3-030-57488-8_11

Zarghami, I., Nezhad, J. a. D. M., & Fatoorehchi, D. (2015). The symbolic Role of Water in Iranian-Islamic Architecture based on Spirituality. *European Online Journal of Natural and Social Sciences*, 4, 121–127. http://european-science.com/eojnss_proc/article/view/4462

Podcasts

Innovative Water Solutions (2019, March 26). How to Conserve Water, Harvest Rainwater, and Reuse Graywater. *Hippie Haven Podcast*. https://www.watercache.com/faqs/hippie-in-a-van-podcast?srsId=AfmBOoovZvW3_bIlhpP02grBpCKgU4T7LrXOzQjJJdjCUloqGzp9x__f

Salim Kassam (2023, March 22). Episode 149 - The Intersection of Islam & Environmentalism. *The Muslim Vibe Podcast*. <https://podcasters.spotify.com/pod/show/themuslimvibe/episodes/EP149-Two-Billion-Strong-The-Intersection-of-Islam--Environmentalism-ft--Hamzah-Iqbal-e20su88>

Sound of Green (2023, January). The day Copenhagen flooded - A story of urban water management. *Stories from Denmark's green transition*. <https://open.spotify.com/episode/5k1H0VUchGYxQrkJaxMnUm>

Stormsaver Ltd. (2024, June 13). Episode 1 - The Importance of Rainwater Harvesting & Greywater Recycling. *The Water Reuse Podcast*. <https://www.youtube.com/watch?v=CaXavoEAhaI>

Documentaries

Gomez, J. (Director). (1979). *The Story of Water* [Documentary]. Uisce Éireann.

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 graduation (project) topic tries to find answers to how a public condenser can celebrate cultural variety through water and at the same time provide a water infrastructure for the neighborhood in Bispebjerg, Copenhagen. The overall goal of this project is to design a Public Condenser connected through water. The Public Building studio investigates how public architecture can improve quality of living in city neighborhoods. This is a highly essential topic within architecture. Improving the quality of living by public architecture touches different domains answering technical, social and spatial questions with regard to architecture. This is in close relation with the Architecture master track of the TU Delft, which teaches to develop creative and innovative building projects that use design as a means to deal with the technical, social and spatial challenges encountered in the built environment.

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

By my project topic, I will design a prototype that is relevant not only for my graduation work, but also in the larger social, professional and scientific framework. This research is focused on solving problems of this specific site, but the findings can be applicable at more locations within the future or create more insights into how to tackle these (future) problems elsewhere. It can create a starting point how to connect people and different cultures through water, while finding a common ground. But also, it gives more understanding in how pluvial flooding can be tackled within the future and how to reuse rainwater in a way that is beneficial for the whole local community. Creating opportunities and giving public services and a water infrastructure back to the neighborhood. Also, looking at the future, a looming crisis threatens the health and livelihoods of billions: the scarcity of clean drinking water. Despite being fundamental to life, access to safe water is becoming an increasingly precarious privilege. Experts warn that this challenge, driven by climate change, population growth, and mismanagement of resources, could define the global narrative for the decades to come. Thus, examining how rainwater management can provide a clean water infrastructure creates more insights for future social, professional and scientific research.