

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	T.L.C. van der Meer
Student number	4876733

Studio		
Name / Theme	Architectural Design Crossovers	
Main mentor	J.P.M. van Lierop	Architectural Design
Second mentor	G. Karvelas	Technical Building Design
Third mentor	A.M.R. van der Meij	Design Research
Argumentation of choice of the studio	I enrolled in Architectural Design Crossovers because the studio uses an interdisciplinary approach to solving design challenges. Throughout my studies, I've explored various courses surrounding the architecture field, and have worked within interdisciplinary teams. For me, architecture isn't an isolated discipline, it is interconnected with many others. In this studio, I hope to discover many more areas where the discipline is interconnected.	

Graduation project	
Title of the graduation project	Beyond Madrid's Heat
Goal	
Location:	Madrid, Spain
The posed problem,	During the summer months, Madrid endures extreme heat. These high temperatures strain both the infrastructure supporting the city and the well-being of its inhabitants, disproportionately impacting marginalized populations. Marginalized populations, such as the homeless, are particularly vulnerable due to exposure to urban heat, lack of adequate shelter, and limited access to infrastructure. Based on the principles of climate justice, the response requires specific measures to address vulnerabilities and promote socio-spatial equity. Addressing Madrid's urban heat is not solely about reducing temperatures, it is about

	rethinking the socio-spatial systems that shape its city, ensuring they are inclusive, resilient, and just.
research questions and	"How can localized architectural interventions and urban infrastructure address the vulnerabilities of marginalized populations in response to Madrid's Urban Heat?"
design assignment in which these result.	<p>During my field trip to Madrid, I observed homeless populations spread throughout the city. This population moves around to find adequate shelter against the elements and sometimes even moves into the neighborhoods. For example, the neighborhood San Cristóbal de los Ángeles, which is located in the southern district of the city Villaverde. Among the homeless population, there are a lot of issues surrounding drug use.</p> <p>For my design assignment, I propose an intervention in one of the central spaces of San Cristóbal de los Ángeles. The design incorporates three primary functions: (1) Dwelling, addressing the inadequacy of the neighborhood's 1960s building typology, which is not prepared for extreme temperatures. An existing building will be renovated and made climate-proof; (2) Healthcare, providing a drug rehabilitation space to support the homeless population in the area; and (3) Community, creating a climate shelter where residents of the neighborhood can seek refuge during extreme heat. This multifunctional space is intended to bring the community together, fostering connection when facing the extreme conditions that previously caused social isolation.</p>
Process	
Method description	
<p>The methodology will be a mixed-methods approach, integrating both quantitative and qualitative research methods. Urban heat cannot be fully understood through its physical dimensions alone, as it represents socioeconomic, -demographic, and technical hybrids. An analysis of one would be insufficient to understand its holistic function. Rather than analyzing the separate domains, these methods investigate their interconnections and influences: Statistical Data Analysis, GIS Mapping & Remote Sensing Analysis, Digital Modeling, Comparative Analysis, Literature review, Policy Analysis and Field research.</p>	

Literature and general practical references

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<https://doi.org/10.1016/j.envres.2020.109993>

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Martín-Consuegra, F., Hernández Aja, A., Oteiza, I., & Alonso, C. (2016). Energy needs and vulnerability estimation at an urban scale for residential neighborhoods in Madrid (Spain). Paper presented at PLEA 2016 Los Angeles - 32nd International Conference on Passive and Low Energy Architecture, Los Angeles, CA.

Martín-Consuegra, F., Núñez Peiró, M., Alonso, C., Sánchez-Guevara Sánchez, C., Pérez, G., & Arranz, B. (2023). Targeting the most energy vulnerable: Deprived neighbourhoods at risk of winter fuel poverty and high summer urban heat island intensity. A case study in Madrid (Spain). Paper presented at PLEA 2022 Santiago - Will Cities Survive?

Mohtat, N., & Khirfan, L. (2021). The climate justice pillars vis-à-vis urban form adaptation to climate change: A review. *Urban Climate*, 39, 100951.

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Philipp, C. H., & Chow, W. T. L. (2020). Urban heat vulnerability analysis for Singapore (D 2.4 – Vulnerability Map). ETH Zurich. <https://doi.org/10.3929/ethz-b-000419689>

Ramly, N., Hod, R., Hassan, M. R., & Jaafar, M. H. (2023). Identifying vulnerable population in urban heat island: A literature review. *International Journal of Public Health Research*, 13(2), 1678-1693. <https://doi.org/10.17576/ijphr.1302.2023.02.07>

Sánchez-Guevara Sánchez, C., Núñez Peiró, M., & Neila González, F. J. (2017). Urban heat island and vulnerable population: The case of Madrid. In P. Mercader-Moyano (Ed.), *Sustainable development and renovation in architecture, urbanism and engineering* (pp. 1-13). Springer. https://doi.org/10.1007/978-3-319-51442-0_1

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 addresses a key aspect of contemporary environmental challenges in the built environment, focusing on designing solutions to combat urban heat in Madrid. This connects to the Architectural Design Crossovers studio theme of Urban Commons, which examines shared resources and spaces within cities. My project provides the opportunity to create a technically driven solution addressing the physical properties regarding urban heat, while also shaping spaces that address social and communal interaction. To me, this is what architecture is all about: the intersection of technical and social aspects. Through this perspective, the project combines architecture with a focus on sustainability, social inclusivity, and community resilience. This interdisciplinary approach demonstrates how architecture helps shape urban environments that meet the collective needs of the users.

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

The climate crisis encompasses a wide range of issues, with global warming being a central concern. In urban areas, the dense concentration of people places pressure on these environments, making cities especially vulnerable. To adapt, various strategies have emerged, including those aimed at mitigating the urban heat island effect. However, much of the research so far has focused on the physical aspects of this phenomenon. My project, explores urban heat from a broader perspective, highlighting its importance not just as an environmental challenge but as a social issue. Architecture can play a vital role in addressing urban heat by creating spaces that are not only technically resilient but also socially, contributing to a more holistic understanding of sustainability. This approach, I believe, is essential for the discipline to fully engage with the complexities of climate adaptation.