Graduation Plan

Master of Science in Architecture, Urbanism & Building Sciences

MSc Landscape Architecture 2024 - 2025

Lara Kamperman

Graduation Plan

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), your mentors and delegate of the Board of Examiners one week before the P2 date at the latest.	

I   Personal information

Full name	**Lara Kamperman**
Student number	6061370

II   Studio / Lab information

Name / Theme	FLOWSCAPES	
Main mentor	René van der Velde	Landscape Architecture
Second mentor	Maurice Harteveld	Urbanism
Argumentation of choice of the LA graduation lab	My choice for the graduation lab comes from my own fascinations for forests and trees. These are the spaces and landscapes that I'm drawn too whenever I need a break from my daily life. It's a good place to cope with stress, to enjoy the company of friends or to take a nice reflective walk. Nowadays, we are losing this connecting to the forest. Urbanization is taking up space that once belonged to these forest landscapes. The forest is getting fragmented and buildings, infrastructure and urban development are often prioritized over trees and urban green. In this thesis, with as key topic urban forests and mental health, I want to take a look at this human – forest relationship; which is something that really fascinates me.	

III Graduation project

Title of the project	**From Concrete to Canopy;** *The Therapeutic Power of Urban Forests*

Context and aim of the project

Location (region / area / site)	The Greater Paris Metropolitan Area
Problem statement	Mental health challenges, such as stress, anxiety and depression are increasingly prevalent in our modern world. Urban areas, characterized by high population density, noise, and limited access to green space are particularly vulnerable to these issues. In Europe, over 70% of the population lives in cities, where mental health problems are more common compared to rural regions that usually provide more opportunities for connection to green spaces and immersion in natural environments (Sørensen, 2013). The design of modern cities is often focused on efficiency and economic growth. This had led to environments that contribute to chronic stress causing a higher risk for mental health issues for its residents (Stokols, 1992; Evans & Wener, 2007).

One of the most critical resources for mental well-being, green spaces, have suffered significantly due to rapid urbanization. These green spaces, intended to offer areas for e.g. physical activity, social interaction, and relaxation play a vital role in mitigating the stressors or urban life. However, urbanization has led to the loss, fragmentation and degradation of these important green spaces, leading to feelings of isolation, frustration and anxiety (Vujcic et al., 2017). This reduction in qualitative green space does not only affect human health but does also intensify environmental stressors, such as rising temperatures and deteriorating air quality, which further exacerbates the mental health challenges faced by the urban population (Fenger, 1999; Lungman et al., 2023). The absence of green space, especially trees, limits to potential for e.g. urban forests to cool the cities, improve the air quality, and provide much needed psychological restoration (Li et al., 2019). With the absence of these crucial ecological buffers, city environments become even more harmful to both physical and mental well-being.

Furthermore, urban residents face heighted exposure to stressors such as noise, air pollution and traffic. These stressors are particularly prevalent in cities with a high population and dense urban fabric, like Paris, where they contribute to chronic psychological stress, also further increasing the risk of mental health issues (Moser & Robin, 2006).

At the same time, urban forests themselves are threatened by factors like pollution, invasive species, habitat fragmentation, and climate change. These pressures reduce their resilience, making it difficult for urban forests to thrive and provide their restorative benefits to both people and the environment (Fenger, 1999; Lungman et al., 2023).

Thus, urbanization not only negatively impacts the health of city residents but also weakens the potential of urban forests to promote ecological sustainability and provide restorative benefits. Urbanization is creating a vicious cycle: not only contributing to poor mental health outcomes by removing essential green spaces and increasing environmental stressors, but it also weakens the potential of urban forests to mitigate these challenges. As the health of urban forests and tree cover continues to decline, so too does the mental health of their inhabitants. Addressing this issue requires a closer look at the connection between urban forestry and mental health, in order to create healthier urban forests and residents in cities.

In this thesis a framework for different restorative urban forest typologies will be developed. This framework will be applied to the Greater Paris Metropolitan area. Paris, a major global city, faces challenges in terms of a dense urban fabric, poor environmental quality and mental health. The combination of low tree cover, poor air quality, noise pollution, and high traffic congestion has been shown to contribute to worsened mental

health outcomes (Lungman et al., 2023). Paris has relatively limited green space compared to other cities. According to the Urban Atlas, 2018 from Copernicus (calculated by author in GIS), urban green space in central Paris is estimated at just 16.75%, with a large portion—10.26%—concentrated in the two major (urban) forests, Bois de Boulogne and Bois de Vincennes. This uneven distribution leaves many areas with limited access to nature. Additionally, the city's air quality, with an average AQI of 43, is considerably worse than other major cities such as London (28 AQI) and Amsterdam (34 AQI) (Air.Plumelabs, n.d.).

Paris also ranks poorly in the European Union's 2023 Quality of Life Report, particularly for indicators like satisfaction with air quality, noise levels, and cleanliness. These environmental stressors are reflected in the city's residents' perceptions, with Paris landing in the bottom 10 for these measures. The city also scores low on the graph showing the percentage of people satisfied with living in their city versus the city is a good place to live in general.
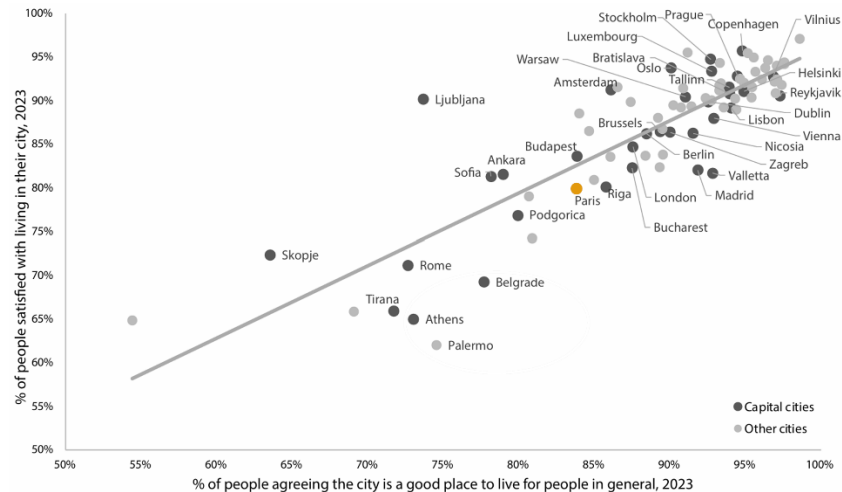
Figure 1

Research by Okulicz-Kozaryn and Valente (2018) also reveals that Paris scores very low in terms of place and life satisfaction compared to other western cities. In this article it is stated that western European cities show way higher than eastern European cities on this scale. However it can be seen that Paris shows up at the bottom of this graph; a livable but unhappy city. Therefore called 'a fool's hell' by the authors.
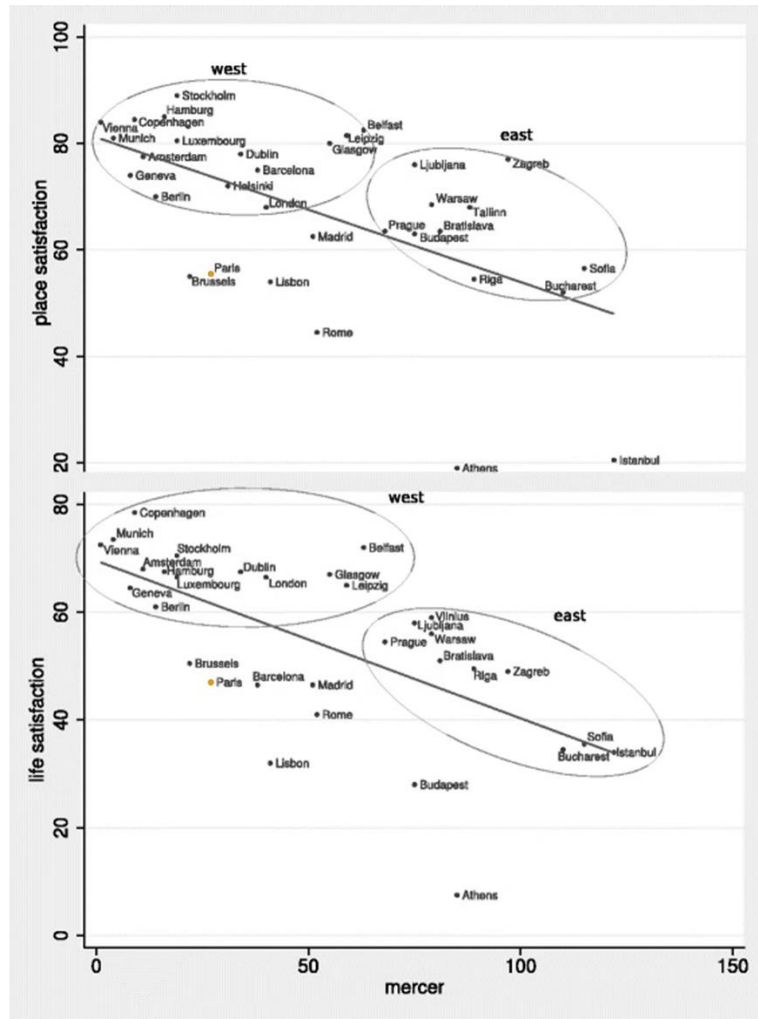
Figure 2

In conclusion, the challenges faced by Paris, makes it an ideal city to test the framework for restorative urban forest typologies developed in this thesis. Paris has the potential to not only improve its ecological sustainability but also promote the mental well-being of its residents.

Research question(s)	**GRQ: How can a framework for urban forest typologies be designed and implemented to enhance human well-being while fostering a healthy forest and a healthy planet, with application in the Greater Paris Metropolitan area?** SRQ1: In what ways can the incorporation of trees into urban landscape designs improve the quality of life and contribute to the ecological and social health of cities and the planet?

| | **SRQ2:** What role do urban forests play in shaping mental health outcomes, and how can their design be tailored to address specific psychological and emotional challenges within urban environments?

SRQ3: What types of urban forests can be conceptualized and developed based on the research on relevant theories and precedent studies?

PROGRESS STEPS (see progress diagram)

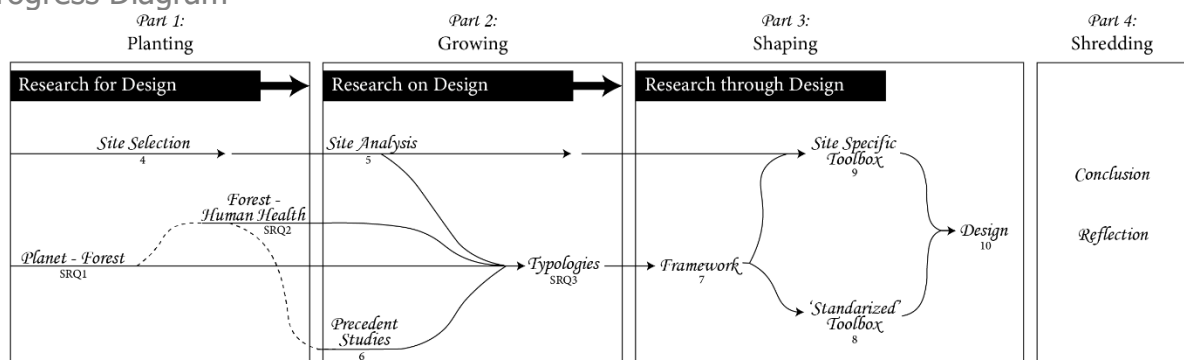*4. What are the conditions in nearby cities regarding tree coverage, mental health, and living environment, and which city would make a strong candidate for the application of this urban forest framework? (outcome Greater Paris Metropolis)*

5. Specific site analysis based on the 3 layers → forest (health), human health and planet health (living conditions).

6. Precedent studies

7. "What are the design aspects of the urban forest typologies and how do they work within the different layers of the healthy human – healthy forest – healthy planet relationship? (creating the framework)

8. "How can a design toolbox be created from the urban forest typology framework to guide the implementation urban forest designs in dense urban environments?"

9. "What are the key challenges and opportunities for applying this (standardized) urban forest framework in the Greater Paris Metropolitan area?

10. "How can the urban forest typologies be designed and integrated into the Greater Paris Metropolitan area to address local environmental challenges and enhance the well-being of its residents?" (on different scales) |
|---|---|
| Design assignment | The aim of this project is to develop a framework for restorative urban forest typologies, each designed with unique spatial qualities and characteristics that address different psychological needs of urban residents. These typologies will work across three distinct layers: the human layer (targeting psychological well-being such as alleviating depression, anxiety, and enhancing focus), the forest layer (responding to ecological (forest) health), and the environmental layer (addressing broader urban environmental stressors). Each typology will cater to different psychological needs such as a need for connection, mental clarity, or relief from stress, while simultaneously contributing to a healthier urban forest and improved living environment for both people and the planet. |

| | This framework will be applied to the Greater Paris Metropolitan area, using a toolbox derived from literature, precedent studies, and site-specific analysis of Paris. The aim is to adapt the framework to the unique context of Paris and integrate it into the existing urban fabric. The design will operate across different scales—city vision, neighborhood scale, and human scale—illustrating how each typology functions and fits within the Greater Paris Metropolis. |
| | At different scales, the framework will emphasize different layers. At the human scale, the "healthy human" layer will take prominence, focusing on creating restorative environments for individuals. On larger scales, such as the city vision, the "healthy environment and healthy forest" layers will be more prominent, aiming to improve urban living conditions and place the design within the broader context of the area. This multi-scalar approach demonstrates how restorative urban forests can address both individual well-being and broader environmental challenges. |

IV Graduation process

Method description

Progress Diagram

The image above shows a Progress diagram. The thesis will consist of 4 parts; planting, growing, shaping and shredding. In the thesis I will work with 3 research methods; research about design (part 1), research on design (part 2) and research by design (part 3).

Part 1: Research for design will focus on the 3 research questions to gain a broader knowledge on the topics and theories that will be used for this thesis this will help to build a strong theoretical foundation. This part will also include chapters as the introduction, methodological and theoretical framework.

Part 2: Research on design will focus on precedent studies and specific site analysis. This will help to cater the knowledge learned in part 1 on the specific contextual problems and site. In part 2 the urban forest typologies will be formed and explored based on research, site analysis and precedent studies.

Part 3: Research through design will combine part 1 and part 2. The art of designing will be used as a research method to create a framework and toolbox for the forest typologies developed in part 2. Here

the hypothesis of the research questions and the potential framework and toolbox will be tested in the form of design.

Part 4: This part will be about concluding and reflecting.

In the image below the methodological framework can be viewed, the numbers correspondent with the progress diagram.
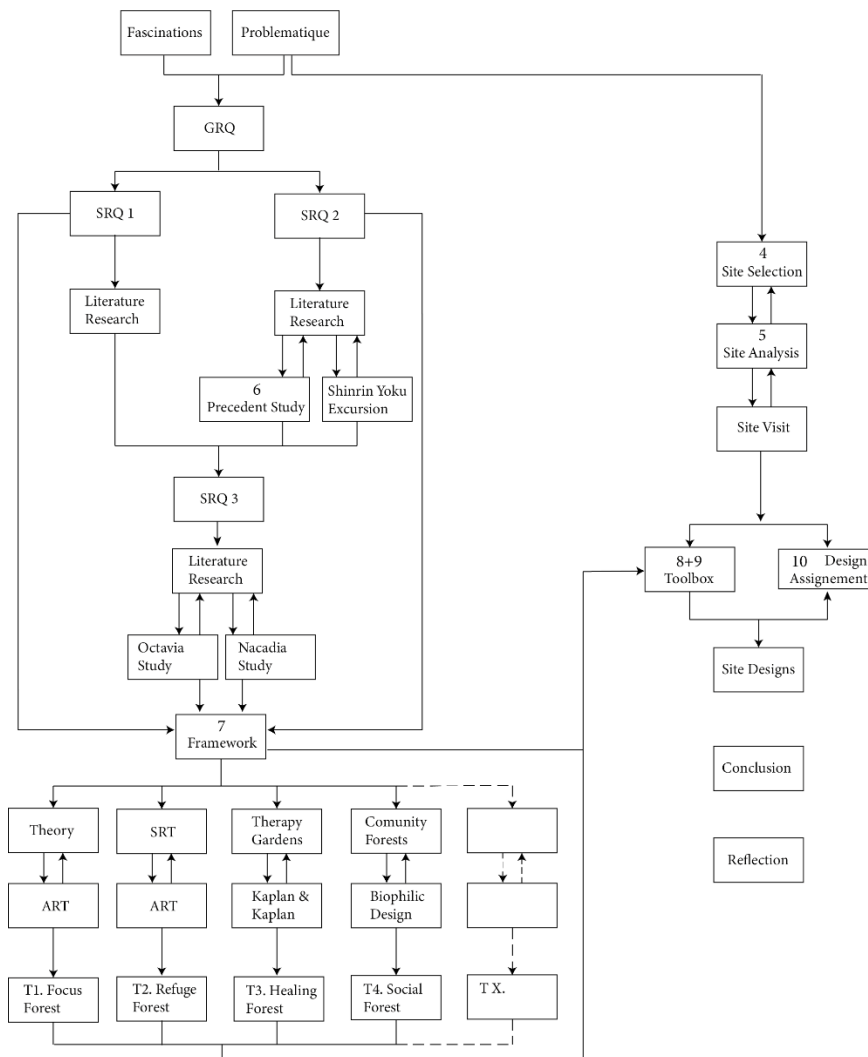
Literature and more applied references
Theories central to the thesis

- ART
- SRT
- Biophilic design
- Shinrin- Yoku
- Perceived sensorial dimensions
-

Reference studies

- Nacadia

- Octavia

Sources used for Theoretical Framework:

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Figures

1. (adjusted from) DG Regional and Urban Policy. (2022). *People satisfied with living in their city versus the city is a good place to live for people in general*. ec.europa.eu. https://ec.europa.eu/regional_policy/sources/reports/qol2023/2023_quality_life_european_cities_en.pdf

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V   Reflection on the project proposal

1. What is the relation between your graduation topic, the lab topic, and your master track?

This thesis links to the chosen graduation lab because urban forestry focuses on integrating trees and forest within an urban context. This is exactly what I am aiming to achieve and design in this project. The greater Paris Metropolis will be afforested by using this framework of different restorative forest typologies. These forest typologies will enhance the social, ecological and spatial qualities of the area. This fits within the broader master track of landscape architecture.

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

My graduation work is relevant whining the larger social context due to the growing interest for solutions for these pressing and upcoming mental health issues. It addresses the need for accessible and high quality green space in dense urban fabrics. As urbanization continues to rise, the connection with nature becomes more and more important to keep residents healthy and connected with nature and trees.

Professionally, this project contributes looking and exploring more how urban forests can mitigate psychological and environmental stressors in our modern city life. It offers practical solutions on how to help mitigate mental health challenges while aligning with global problems to combat the effects of climate change.

Scientifically this project adds to the knowledge on the human – forest relationship, aligning with current research on the therapeutic effects of nature and its role in promoting mental and environmental well-being.