

# Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences



## Graduation Plan

Personal information	
Name	A.M Swart
Student number	4437543

Studio		
Name / Theme	Explore LAB / Biophilic Design	
Main mentor	Peter Koorstra	Design
Second mentor	Engbert van der Zaag	Technology
Third mentor	Perter Teeuw	Research
Argumentation of choice of the studio	I applied for Explore LAB because I wanted to explore the relationship between nature, people and architecture, with the desire to find a way where all these fields support one another. I found that other studios didn't really match with this, and therefore choose to formulate my own graduation project in Explore LAB. This has led to the exploration of Biophilic Design.	

Graduation project	
Title of the graduation project	The Biophilic Design Toolkit
Goal	
Location:	G2 Taylor Yard, Los Angeles, United States / Rio Hondo Confluence, Los Angeles, United States
The posed problem,	The 21 <sup>st</sup> century will see further urbanization, especially around large metropolises as Los Angeles. This means more and more people will live in urban areas, away from natural elements. Urbanization also contributes to the climate crises, through the emission of greenhouse gasses, and the heat island effect, among other things. People spend an average of 90% indoors (disconnected from nature), this in a time where stress is called the health epidemic of the 21 <sup>st</sup> century.
research questions and	How can architecture assist the better well being of people and assist the natural environment? Biophilic Design seems to be a possible solution, but clear design strategies seem to be missing. This projects will answer the following question.  "What is the architectural expression of biophilic design, and what strategy should be used to correctly implement them into a design?"
design assignment in which these result.	The research will explore the architectural expression of Biophilic Design and the way to implement this in architectural projects. I will design a Library along the LA

	<p>river that is guided by the principles and architectural expressions of the '15 patterns of biophilic design' by Terrapin Bright Green. The library will therefore be an example of how to design a building that promotes peoples well-being, introduces nature into the build environment on different levels.</p>
<p>In order to fully realize and understand the implementations of Biophilic Design the project site is in Los Angeles, a large metropole, where there is very limited green space and that is dominated by cars. The project site is located along the LA river, a place that was once, because of fear, industrialized, eliminating nature. Current efforts are reintroducing nature back into this concrete oasis. The site offers the opportunity utilize a natural recourse, and reevaluate peoples relationship with nature.</p> <p>The program of the building will be a library, a public program derived from the desires of the location, and ties in with the principles of the civic commons. Biophilic Design aims to create architecture that fosters human connection. The program of a library lends itself perfectly for this, as it holds the power to mix people from different socio-economic backgrounds, ages, race and ethnicities. It also has a diverse program that allows for the implementation of a wide range of patterns.</p>	
<p><b>Process</b></p>	
<p><b>Method description</b></p>	
<p>The research consists of both literature research and case study research. The literature research creates a clear understanding of what biophilic design is, and what the patterns of biophilic design entail. Giving a general overview, but also exploring the psychological effects, and the principles of application. The case study research follows. For each case study the present Biophilic patterns are identified, and the way they interact with each other is explored. The identification of patterns allows for the architectural forms (tools) of these patterns to be derived. These tools are then simplified in such a way, that they can be applied in any project. Seeing the application of biophilic design in the case studies also allows to formulate a strategy on how the patterns and tools can be applied, both in my own design as well as that of others.</p> <p>The location research will partially consist of regular location research (infrastructure, approach, surrounding functions, etc) but will largely be led by the patterns of biophilic design. The identification of natural elements and local flora and fauna of pattern 1. The climate conditions, not only to utilize them from a technological perspective, but also to make them visible and experience them throughout the building, this relates to pattern 4, 5, 6 and 7. And for example, the innovatory of local materials that can be used in the building, pattern 9.</p> <p>The program will use president research to divine the different program elements. For these different program element, user profiles will be created. These can then be used to the select the Biophilic patterns that match the needs of the user and program.</p>	

The building will be designed from the inside out, by making various design studies that will implement different combinations of patterns. The focus will be on the experience of the space and inherent values that they should hold.

## Literature and general practical preference

### Research

#### Biophilic Design

- Kellert, S. R. (2018). *Nature by Design: The Practice of Biophilic Design*. Yale University Press.
- Kellert, S. R., Heerwagen, J., & Mador, M. (2008). *Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life*. John Wiley & Sons.
- Kellert, S. R., & Wilson, E. O. (1995). *The Biophilia Hypothesis*. Island Press.
- Wilson, E. O. (1984). *Biophilia*. Harvard University Press.
- Zhong, W., Schroder, T., & Bekkering, J. (2022). Biophilic design in architecture and its contributions to health, well-being, and sustainability: A critical review. *Frontiers of Architectural Research*, 11(1), 114–141. <https://doi.org/10.1016/j.foar.2021.07.006>

#### 15 Patterns of Biophilic Design

- Browning, W. D., Ryan, C. J., & Clancy, J. P. (2014). 14 Patterns of Biophilic Design: Improving Health and Well-Being in the Built Environment. *Terrapin Bright Green. Rooted In Nature: Biophilic Design*. (n.d.). Rootedinnature. Retrieved April 8, 2023, from <https://www.rootedinnature.org/>

#### Case Studies

- Windhover Contemplative Center – Aidlin Darling Design
- Van Dusen Botanical Garden Visitors Center – Perkins & Will
- Winter Park Library & Event Center – Adjaye Associates
- H.C. Andersen Hus Museum – Kengo Kuma
- Oodi Library – ALA Architects
- Naturalis Biodiversity Center – Neutelings Riedijk Architects

### Location

- Beatley, T. (2016). Handbook of Biophilic City Planning and Design. *Island Press/Center for Resource Economics eBooks*, 1–48. <https://doi.org/10.5822/978-1-61091-621-9>

#### LA River revitalization plan

- LA County Public Works. (2022). *LA River Master Plan*. County of Los Angeles. <https://pw.lacounty.gov/uploads/swp/LARiverMasterPlan-FINAL-DIGITAL-COMPRESSED.pdf>
- Home / Taylor Yard G2 Projects. (n.d.). <https://tayloryardriverprojects.lacity.org/>
- Loekman, M. (2020, October 8). *Rio Hondo Confluence Area Project - LOWER LA RIVER REVITALIZATION PLAN*. LOWER LA RIVER REVITALIZATION PLAN. <https://lowerlariver.org/riohondoconfluence/>

### Program

Lushington, N., Rudolf, W., & Wong, L. (2016). *A Design Manual Libraries* [Online Publication]. Birkhäuser. [https://issuu.com/birkhauser.ch/docs/libraries\\_-\\_a\\_design\\_manual\\_9c96a9287b50b7](https://issuu.com/birkhauser.ch/docs/libraries_-_a_design_manual_9c96a9287b50b7)

#### Civic Commons

Studio Gang Architects. (2016). Civic Commons : Reimagining Our Cities' Public Assets. In *publications@studiogang.com*. Retrieved May 25, 2023, from <https://studiogang.com/publication/civic-commons>

#### Precedents

- Calgary Central Library – Snohetta
- Oodi Library – ALA Architects
- Billie Jean King Main Library / Skidmore, Owings & Merrill
- Austin Central Library

## Reflection

1. In my graduation I want to explore how I can apply the principles of Biophilic Design. In this, architecture is central, and reflects on its position in relation to the natural environment, as well as its effect on people. This is an integral design project that combines design with the experience of people, while also focusing on the technical aspects, in passive design, materiality, net-positive energy and water.
2. Biophilic Design is a relatively new design stream within architecture, despite the fact that the term was first introduced in the 1970s. An understanding of what biophilic design is, and its effects on nature and people has started to take form. Yet on its application within architecture, information is limited, as only in the last 10 to 20 years projects have started take shape. With my research I want to add to this body of knowledge, making it more clear on how to apply the theoretical framework that has already been formed, and what the architectural elements are that can be used. The topic of Biophilic Design also relates very well to the way to trend of sustainable architecture, even taking it a step further. The effects on nature are an integral part of the design process, and nature is brought into the design to increase peoples connection to it. The focus on people and their position within the design, increasing their well-being thought design is also an aspect that I believe should stand more central within the profession of architecture.