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	**Carlos Damberg**
Student number	5437288

Studio		
Name / Theme	**Architectural Wood Studio | Timber for Urban Density**	
Main mentor	Loes Thijssen	Architectural design
Second mentor	Pierre Jennen	Technical building design
Research mentor	Stijn Brancart	Academic research
Argumentation of choice of the studio	The tree is the most peaceful form of life. Throughout history we have benefited from this life providing us with a reliable and flexible resource. The industrial revolution has distracted engineers, designers and other creatives from the use of timber in favour of metals and stone. Over time, this revolution has led to some incredible architecture and engineering. A more recent revolution has inspired us to seek this revolutionary and modern craftsmanship using the resource we knew so well. This studio attracted me for its actuality and its embracement of the modern use of timber as a structural component. Timber became a design tool to utilise for architects. As an architects in the making, I wanted to be assertive and start my practice and experience with this tool surrounded by experienced minds and makers. The Architectural Wood Studio was the environment that offered this opportunity and therefore my first choice.	

Graduation project	
Title of the graduation project	**The Hybrid**
Goal	
Location:	**Minervahaven, Amsterdam, The Netherlands**
The posed problem,	Material scarcity is creating tension on the built environment. Renewable materials like timber can relieve some of this tension by offering renewable and sustainable solutions for the built environment. This concept is extended towards the building envelope, utilising biobased locally grown building materials.

	Sick building syndrome (SBS) is an underestimated cause of uncomfortable and unhealthy dwellings. Moisture and Chemicals can find themselves trapped in poorly ventilated spaces and cause fatigue and headaches amongst other issues.
research questions and	How can biobased and vapour-open construction principles increase health and well-being in residential architecture?
design assignment in which these result.	How can the urban fabric of the Houthaven area in Amsterdam be densified with sustainable and comfortable housing and without compromising the harmony between existing and added structures?

Design objective:
The Wood Studio explores timber construction with a focus on urban density and sustainability, emphasizing its structural potential beyond material substitution. Through scientific research, iterative design, and physical experimentation, the studio investigates housing solutions for Houthaven, Amsterdam, prioritizing parasitic and amphibious architecture to densify without occupying ground-level space. Inspired by Copenhagen's sustainability principles, the project seeks to elevate housing on reinforced docking points rather than relying on existing buildings. Timber's lightweight properties and historical significance in Dutch industry make it an ideal material for this vision, which will first be tested in Minervahaven before potential expansion to Nieuwe Houthaven.

Research implementation:
the main form of implementing the research results will be in the building fabric and façade compositions. The aim is to apply the philosophies studied in the research phase in the design phase of the graduation year, creating a fully biobased, breathable and healthy residential design. In addition, principles that have been discovered in the cellular structure of biobased materials that allow vapour to diffuse will be projected on the urban scale. The aim is to experiment with density, porosity and permeability, which turned out to be crucial on a cellular scale, on an urban scale.

Process

Method description

Research: literature reviews to better understand the topic's theory. In the next stage a case study will be introduced to create a more practical perspective on the topic. In addition, the precedent case will be a starting point for simulations into vapour behaviour for different material compositions. A final literature review will result in the final bit of data required to answer the research question.

Design: additional site visit. Sketching & prototyping in mass form, computer drawings, impressions and model making. The first step of the design process will be an additional site visit. At this stage of the assignment the project location has been further specified and therefore more relevant data can be collected. This will be followed up with an extensive creating phase where quick sketching, prototyping, researching, calculating and computer drawing will take place. Finally, it is expected that the complete design phase will also include a good amount of research into site data, material properties and user behaviour. The outcome will be a complete sketch design to be presented during P3. After this milestone the refining phase will start. During this phase all of the established principles of the sketch design will progress to a more definitive status. The engineering will progress and the design will become final.

Literature and general practical references

Delft University of Technology
Wageningen University & Research

TNO

Built by Nature
Material District
Ubakus.de
VPRO Tegenlicht

Werkstatt
Urban Climate Architects
World congress of Architects
Flux landscape architecture

Gemeente Amsterdam
AMS Institute
Metropolitan Region of Amsterdam

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 closely related to the Architectural Wood Studio's focus on increasing density in an industrial maritime area in Amsterdam. By researching and applying vapour-open construction principles, my project explores sustainable, high-performance timber architecture that aligns with the studio's emphasis on wood as a primary building material.

   By investigating vapour-open principles, my project addresses key contemporary challenges in timber architecture, such as moisture management, longevity, and comfort. This research-led approach aligns with the TU Delft ethos of combining design innovation with technical and material research, making my graduation project a relevant contribution to both the studio and the broader field of sustainable architecture.

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

   My graduation work on vapour-open construction principles in a dense, industrial maritime context is highly relevant within social, professional, and scientific frameworks as it addresses urgent contemporary challenges in sustainable architecture, urban densification, and climate adaptation.

   My graduation work is relevant socially, professionally, and scientifically as it addresses sustainable urban densification in former industrial areas. Socially, it promotes healthy living environments by improving indoor air quality, thermal comfort, and ecological responsibility through vapour-open timber construction. Professionally, it aligns with industry trends in low-carbon, circular building practices, offering insights into durable and energy-efficient timber design. Scientifically, it contributes to hygrothermal research and material innovation, advancing knowledge on moisture management in vapour-open assemblies for long-lasting, high-performance buildings. Together, these aspects support the transition toward sustainable, climate-responsive urban development.