The graduation project started with my fascination for mycelium-based materials, ecology and the circular economy. Circularity by integrating the ecology within the existing build environment and society is the main goal I strive to incorporate within the design project. This made me choose for the Harvest studio of Architectural Engineering chair, because this studio is focused on the synergy between technology and design to solve societal issues. Within this studio we work through all scales, from region to object, in which I tried to close waste streams to incorporate circularity within my graduation project. Which gave me the feeling to contribute to a better and sustainable future.

The objective is to research and design with the possibilities of applying fungi though different scales within the build environment of the region Parkstad in Limburg. By making use of different organic waste streams of local industries in Parkstad, the "roots" of this living organism called mycelium, can transform this waste into valuable new building materials. In this way a symbiotic entanglement with the ecosystem can be arranged by literally implementing living organisms within the architectural design. By investigate the qualities of mycelium-based materials, the production process and how to grow a modular building objects that eventually can disappear back within the ecosystem after its use instead of harming the planet.

The design project is located in two vacant steel construction halls in Schinveld. The goal of this project is to revitalize this abandoned industrial terrain into a "Fungi Factory"; a factory for the production of mycelium-based materials. I tried to add a positive value to these halls by designing a factory and a place where people work, meet and learn about new innovations. The factory offers jobs and is financially feasible by the production of new building materials and other products. The factory is leaving a positive footprint on the environment because it is not depending on fossil fuels but is closing organic waste streams within the region. In this way I tried to create a balance between ecology and economy. Within the hall I designed a dynamic landscape of flexible units that can easily adapt to the growing scale of the production process and de needs of the users. Within the materialization of the design project will form a showcase of the variety of the applications of mycelium-based materials. With the help of mycelium I tried to design an example toward a sustainable future.
The Fungi Factory

Phase 1
Floorplans
1:200

Phase 2
Floorplans
1:200

Production hall
South elevation
1:100

Production hall
East elevation
1:100

Production hall
Section AA
1:100

Legend
= Growing room for mycelium-based products
= Lab
= Sanitary
= Coffee bar
= Growing room for mushroom cultivation

Atelier
CAMLab
Workspace
CNC mill
3D Printer

Floorplans
1:200
Climate plan within production hall
Section BB
Scale 1:50

+/- 25˚C
The Fungi Factory

Facade fragment: AA 1:20
Vertical section AA 1:10

Horizontal section BB 1:20

Vertical detail 1:5

Corner detail

Modular wall layers:
1. Panel
2. Mycelium board
3. Mycelium insulation
4. Mycelium board
5. Blended mycelium (MOGO) topcoat

Floor layers:
1. Mycelium (MOGO) flooring
2. Mycelium board
3. Thermal insulation
4. Wooden beam, steel base plate
5. Existing concrete flooring

Substrate cleaning
Sterilization
Inoculation

High pressure boiler