Urban Furniture 2

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The design takes **functional, structural, material, and operational** aspects into account.

It integrates **sensor-actuators** into the urban furniture enabling direct and indirect communication with users via **sounds, lights, etc. and web based apps**, respectively.

1. Parametric design and robotic production

2. User-IUF interaction, sensor-actuator operation, and web-based communication.

Students are asked to design interactive urban furniture to be placed along the rivers **Maas** and **Song Sai Gon** in Rotterdam and Ho Chi Minh, respectively. An alternative to Rotterdam is Delft with its **Delftse Schie.**
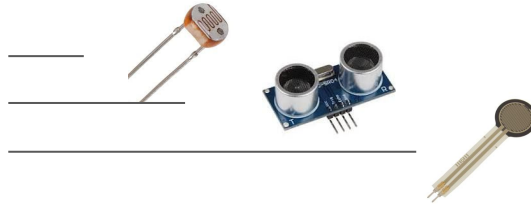

Maas

Song Sai Gon

Delftse Schie

The 3D printed pieces of furniture such as stools/chairs, benches, pavilions, moorings and water taxi/info/food booths with integrated sensor-actuators will be proof of concept for:

(a) Process- and material-efficiency achieved through smart robotic (i.e. selective) material deposition.
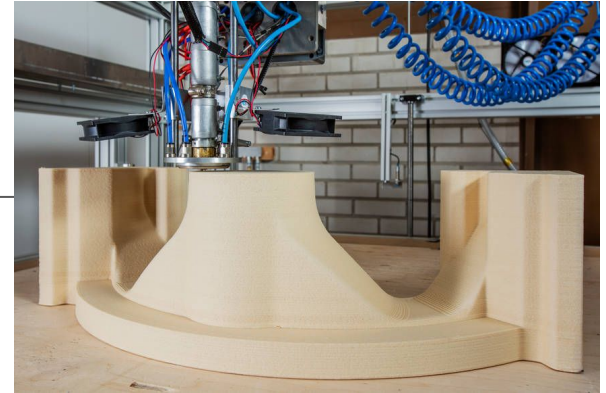Material considered is **3D printed wood polymers.**

(b) Smart operation by integrating **sensor-actuators** such as

light dependent resistors,
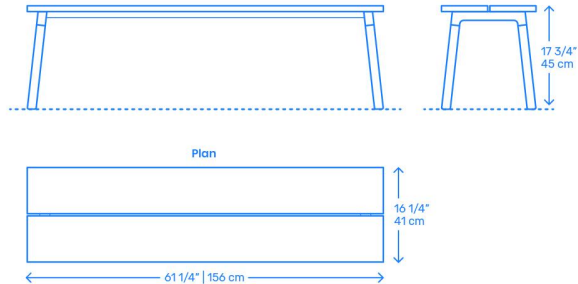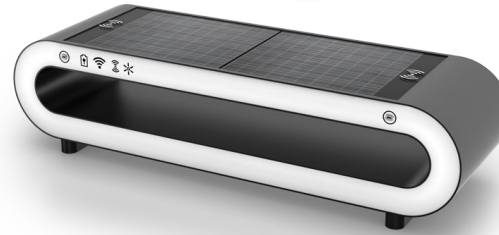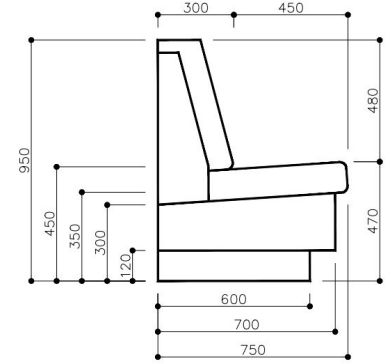infrared distance sensor,
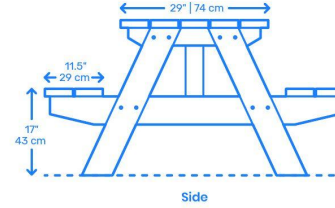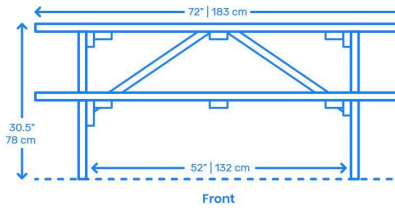pressure sensor, etc.

informing lights,
speakers,
ventilators, etc.
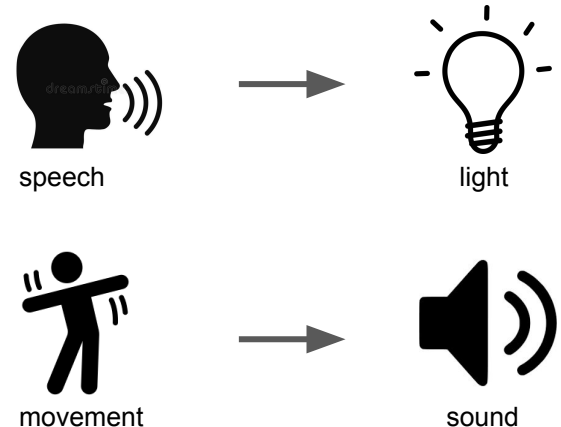in order to allow users to customize operation and use of the urban furniture.

References

Properties of the average bench

Brainstorming

- Sound, light installation: interaction with other people, elements making sounds
- Movement: Floating movements, data collection and conversion of natural movements (wind, humidity, temperature,...)/ human movement , mechanical moving components
- Interaction: Interaction with a person on the other side of the world, abstract forms of communication (speech -> light, movement -> sound), embracing interaction from different places through sensors
- Design: Referencing existing shapes, not something foreign, futuristic shape, not obviously 3d printed/ voronoi shaped
- Social issues - shelter for homeless people (Weather shelter), loneliness

speech → light

movement → sound

References

Water Reference

Sound installation that reacts to natural movement

The Sea Organ in Zadar, Croatia was created by the architect Nikola Bašić in 2005. It is a public sound installation that interacts with nature (waves) through 35 tubes located underneath a resonating marble tribune.

https://www.youtube.com/watch?v=n86pF-wQKrw

Water

Floating islands / interactive movements react on activities (walking, sound … ect)

Installation/performance/ interaction

Screens connecting cities / interactive reference

In the frame of the Guangzhou Light Festival (China) there will be sharing screens between the Northbridge Piazza in **Perth (Western Australia) and Guangzhou**

Occupy the Screen during Connecting Cities event #3 Urban Reflections in September 2014 connecting audiences in **Riga and Berlin.**

http://connectingcities.net/news/connecting-cities-light-festival-guangzhou-and-northbridge-piazza-perth
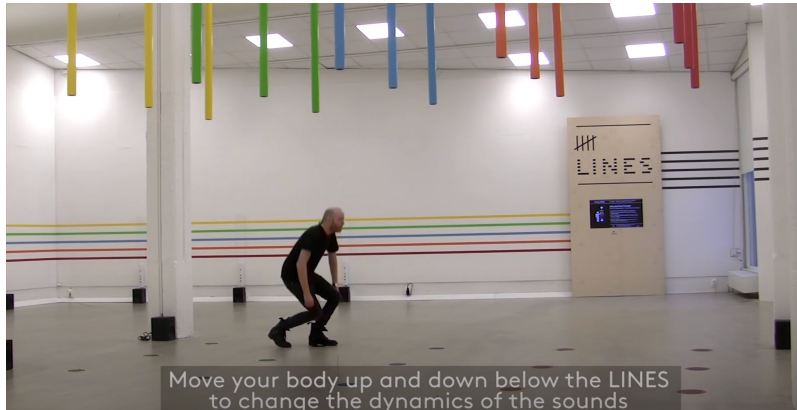
https://vimeo.com/ 107784956.

Installation

"Lines" - interactive sound installation

Sensors measure the distance to an object along a line. This information is used to change volume, pitch or tempo of preset sounds.

The installation can be played like an instrument and encourages the interaction between multiple people.

Move your hand up and down to change the pitch of the sound

Move your body up and down below the LINES to change the dynamics of the sounds

Walk in sideways on the LINES to change the tempo of the sounds

https://www.youtube.com/watch?v=hP36xoPXDnM&ab_channel=VoicesofU

Furniture & analog sound

Double function
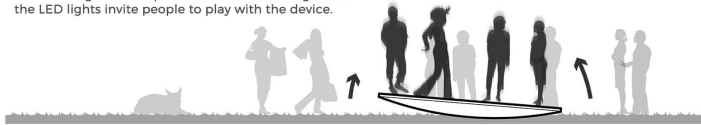https://dornob.com/acoustic-decor-modular-interactive-music-making-furniture/

Installation

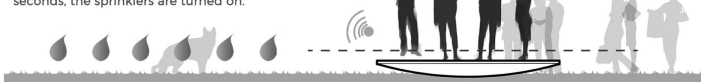During daytime, the device is charged through the photovoltaic system.

When a long time has passed since the last irrigation, the LED lights invite people to play with the device.

They have to interact with each other and the swinging device in order to set it in balance.

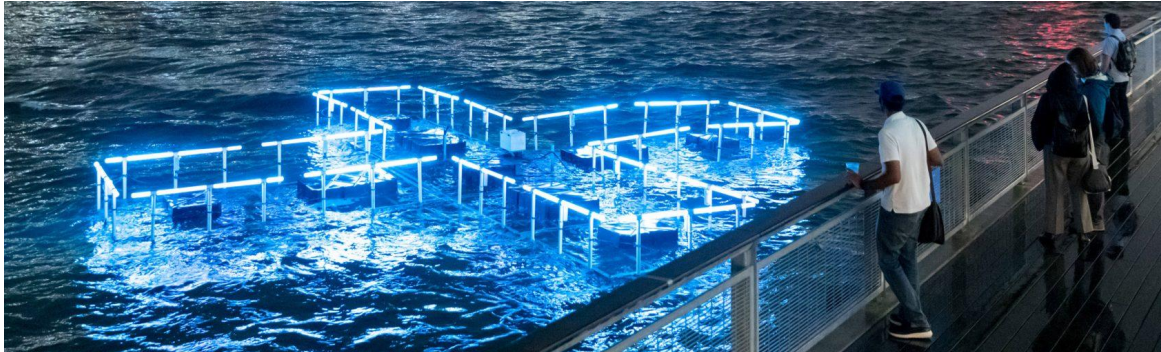When they manage to mantain balance for three seconds, the sprinklers are turned on.

The device needs the input of minimum two individuals who playfully collaborate to balance the spherical remote. When equilibrium is reached, a WiFi signal triggers the local irrigation system, showing users that collaborative action can have a direct and immediate positive effect on their environment.

http://www.iungostudio.com/3%20project%20-%20reACT.html

Installation

+ Pool Light is a public installation. It tracks and reports the physical conditions of the water off Pier 17 in real-time.

Data collected is displayed on an online dashboard designed by Reaktor that reports whether or not the current water conditions are safe for swimming.

Furniture

Benches + Light

Seating area that uses PV panels and lights up
https://nl.pinterest.com/pin/421438477606266689/

Swings that light up

https://collabcubed.com/2014/09/18/swing-time-howeler-yoon-architecture/

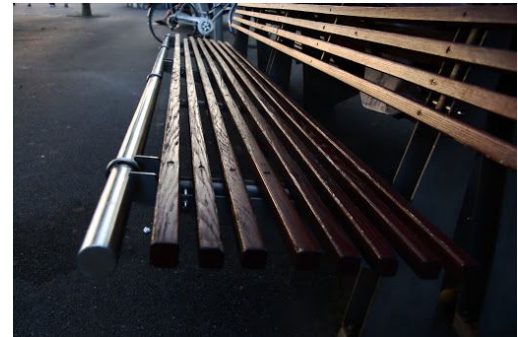Double function
https://www.trendhunter.com/trends/parametric-bike-stand

Rotating bench: to avoid wet surfaces
https://popupcity.net/observations/rotating-bench-offers-dry-buttocks-after-rain/

Furniture & inclusivity

Hostile architecture

Furniture

Enzo Furniture by MN*LS - Vienna, Austria

This piece of urban furniture was designed by MN*LS in 2010 and can be found all over Vienna. Its simple design has since become a trademark for the city.
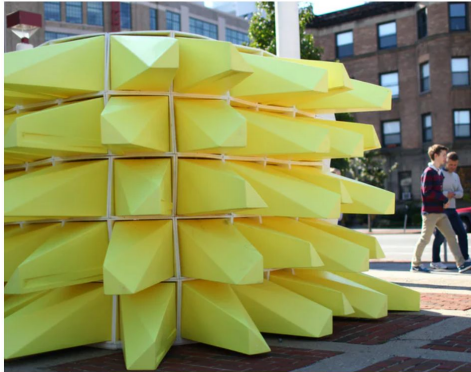
The bench can be converted into a weather shelter easily through its low weight and encourages random people to get into contact with each other.

https://www.domusweb.it/en/news/2010/11/09/enzo-furniture-by-mn-ls.html

Furniture

Project UNI by Höweler + Yoon

Mobile solution for community spaces in urban environments by creating in this case a portable library. System consists of two basic elements: seats and shelves, which can be combined as one. Modular, flexible, portable & accessible.

https://architizer.com/blog/inspiration/collections/portable-architecture/#.WGWXNXlVK6Y.pinterest

Possible Location: Rotterdam

Existing/planned floating furniture/ architecture in Rijnhaven

https://www.bartelsvedder.nl/portfolio/floating-hdpe-bodies/?lang=en

Possible Location: Rotterdam
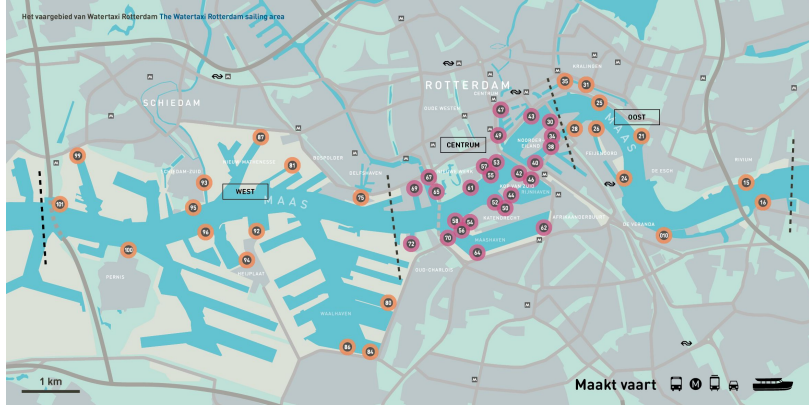
Existing floating furniture/ architecture in Rijnhaven

https://www.designboom.com/architecture/powerhouse-floating-timber-office-building-rotterdam-port-netherlands-01-22-2020/

https://www.lonelyplanet.com/articles/rotterdam-set-to-go-green-with-a-floating-forest

Possible Location: Rotterdam

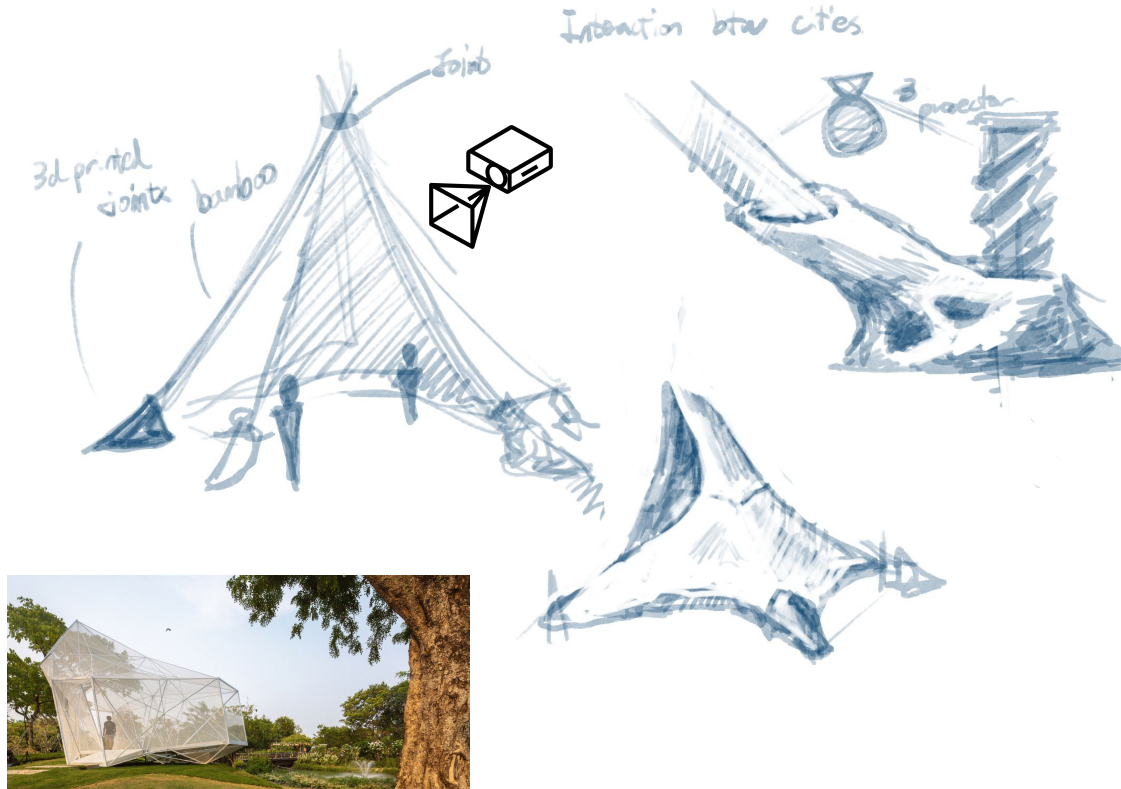Rotterdam Water taxi stops: replacement for current situation

https:https://www.stoopmanvos.nl/portfolio-item/watertaxi-rotterdam/

https://www.rotterdammaritimecapital.com/insight/rapid-digital-developments-water-taxis

Ideas that we want to continue with

- Addressing an issue:

  Social (inclusion of homeless, skaters)

  Climate (pollution, weather shelter)

  Environment (collecting water for plants)

  Privacy (data collection)

  pandemic & isolation (communication)

- Extending the public space towards water (river, canal, lake)
- Water Taxi - a piece of furniture that improves the waiting experience?
- Incorporating sound & light installations - interactivity
- Transformability of form (adjusting to climate, movable)
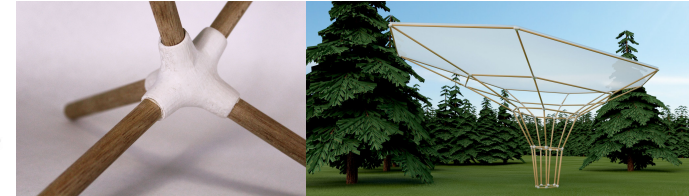
Individual sketches & ideations

Visiting other tribes in the world installation

Interacting with other cities

Post corona interaction between people, cities
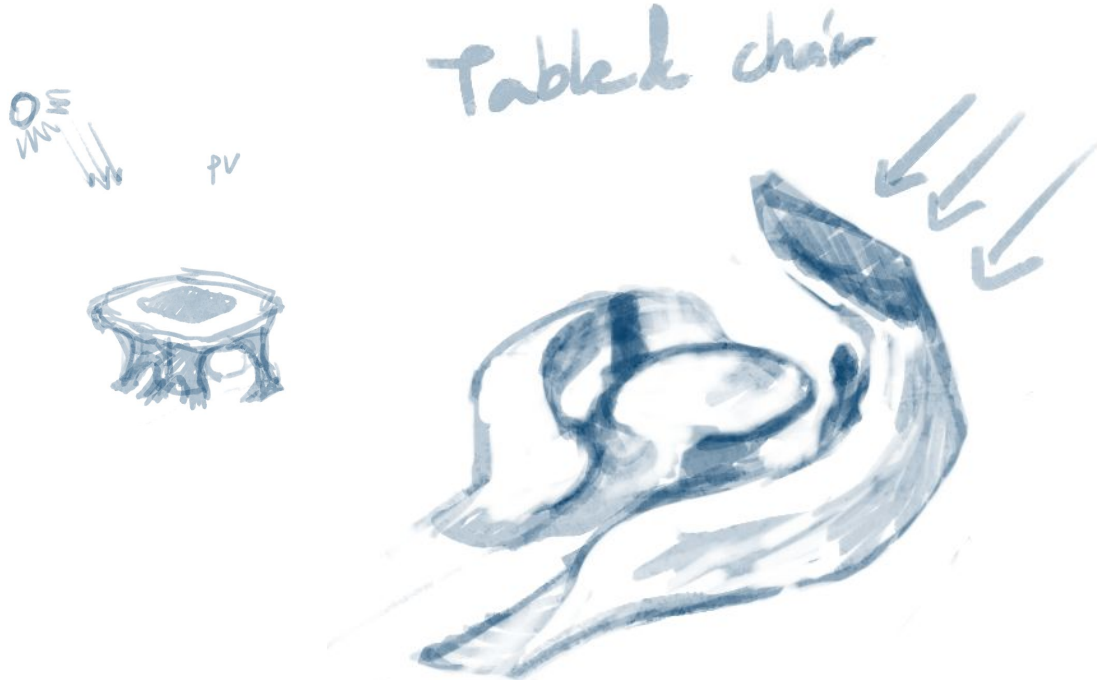
Vornoi shaped structure or just joints using 3d printing.

Can also think about anchoring on the ground?

PV energy generations and shading inside is also needed

Location can be anywhere

Bench & table for outdoor eating
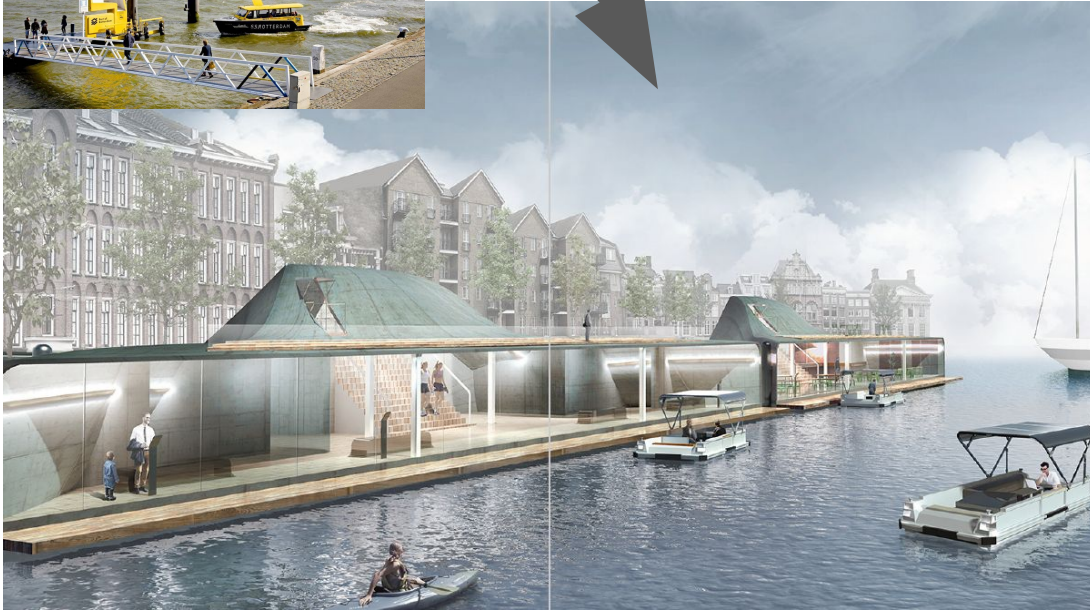

Table & chair

PV

It's difficult to find benches with tables for public uses.

More people eat outdoor because of corona. But not enough spaces where they can sit and eat comfortably.
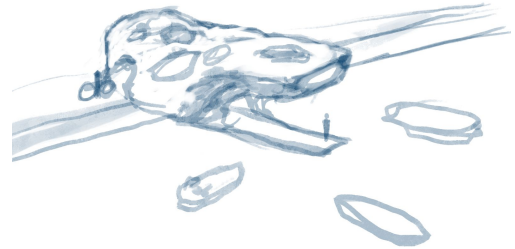
This is an urban furniture to help that. Using photovoltaic panels can provide shade and energy needed to light at night.

Waterfront.. Taxi? Boat booth

Less interaction between people but app uses can be highlighted more.

Base of the building will be floated but the structure can be made of wood polymer and coated later

Weather protection

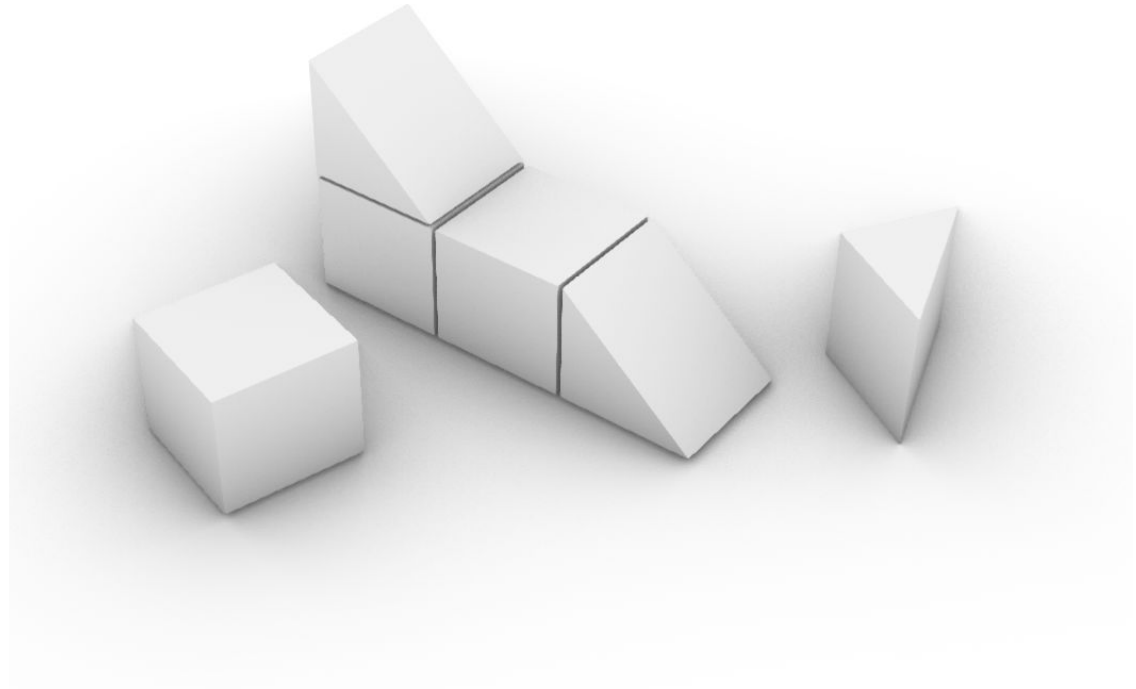Both sketches are based on bad weather conditions, creating a protective shell.

Extra possibility option 1: Water absorption through the material makes the furniture close, when raining stops furniture will be more open.

Sensors: informative light, indicates when it stops raining.
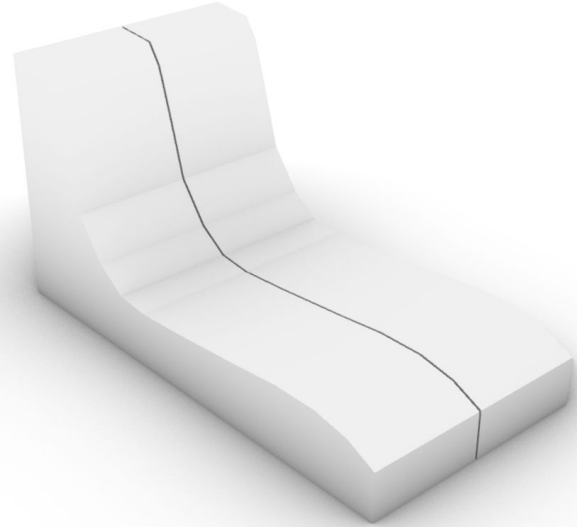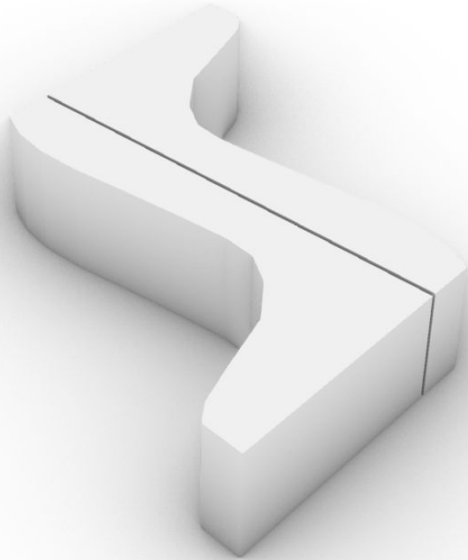
App: weatherdata, water collection?

Seating without a preset form

A modular system. Each module could have a different kind of actuator, Tactile finish, ...
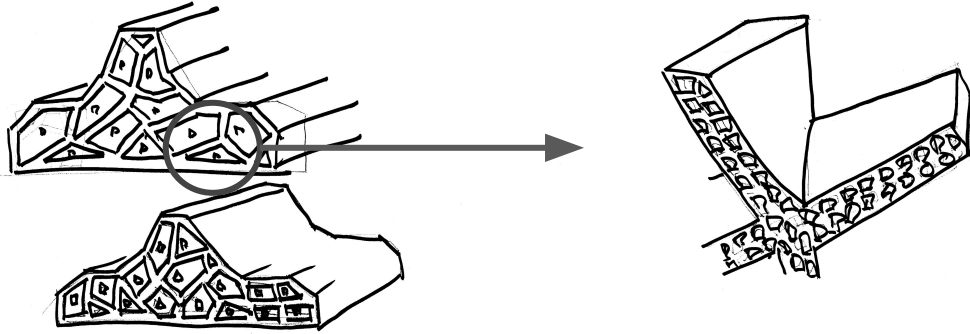
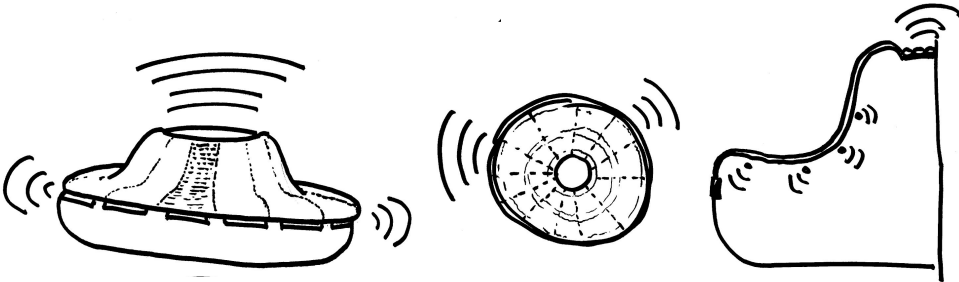# Floating park in Rijnhaven with awareness of environment

Shapes that allow for transformation that can be initiated by a passerb-by

Voronoi as infill - Sound & light installations

Using a wide grid for the point cloud of the main object and reducing weight by creating a voronoi structure as infill

Pressure sensors in the seats create sounds

Sound sensors create light patterns

Floating park in Rijnhaven with awareness of environment

Path

cluster, seating area

2 islands

Location
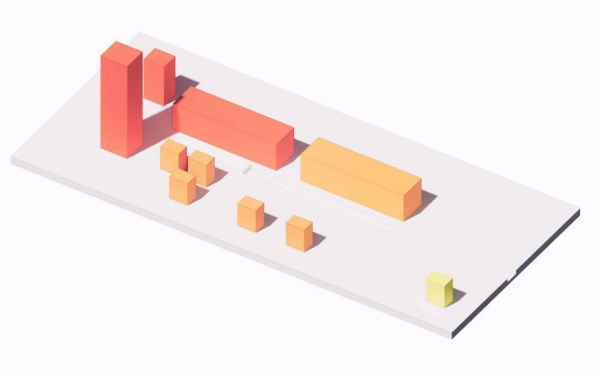

inspiration, porous wall & plants

Location: Rijnhaven

Idea: porous structures, that are used as a path, seating area and a garden/park. The porosity allows these structure to become one with plants, which wrap around the furniture.
Interactivity: A light depending on its colour informs about the air quality, or water quality, or something else
Interactivity 2: irrigation system & drainage

Furniture and rotterdams maquette to indicate location

1. Incorporate City maquette map elements within the furniture
2. Use lights and collect environmental data over city on certain locations and light up each location in different colours depending on the results

Possible idea for connection to water

Hanging porous structure, that might light up during night, but the main goal is to connect to the water area