Design Project 1

Delphine Damiens, Arina Pavlova, Alec De Trogoff

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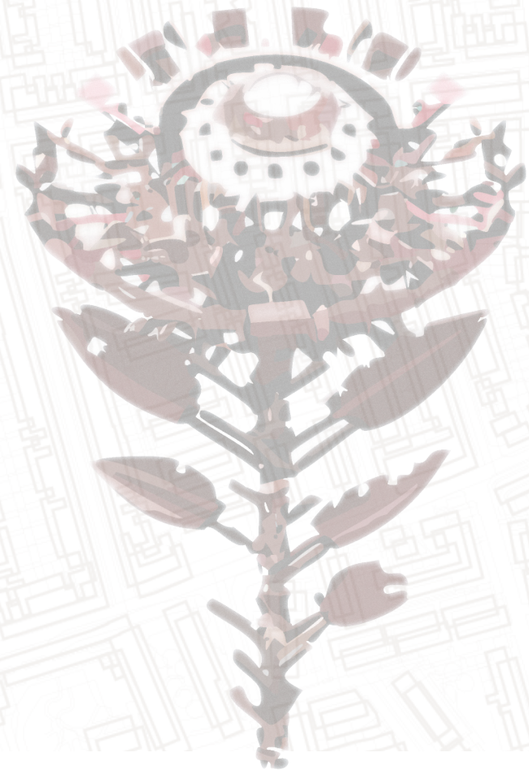
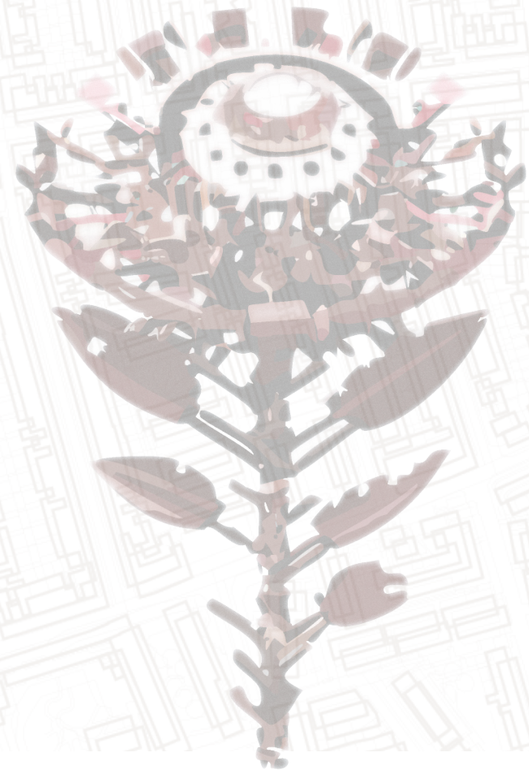
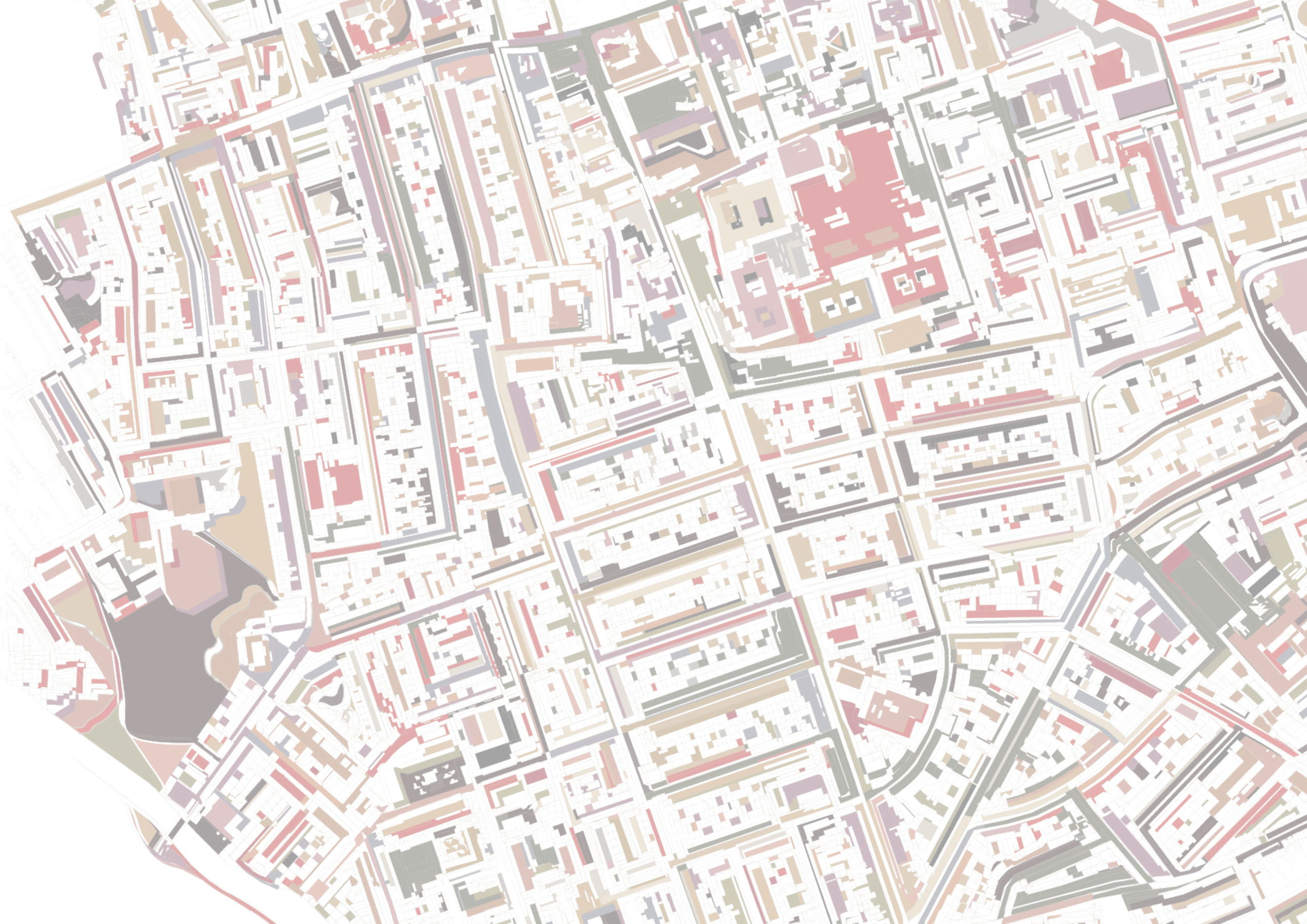
DESIGN IDEA

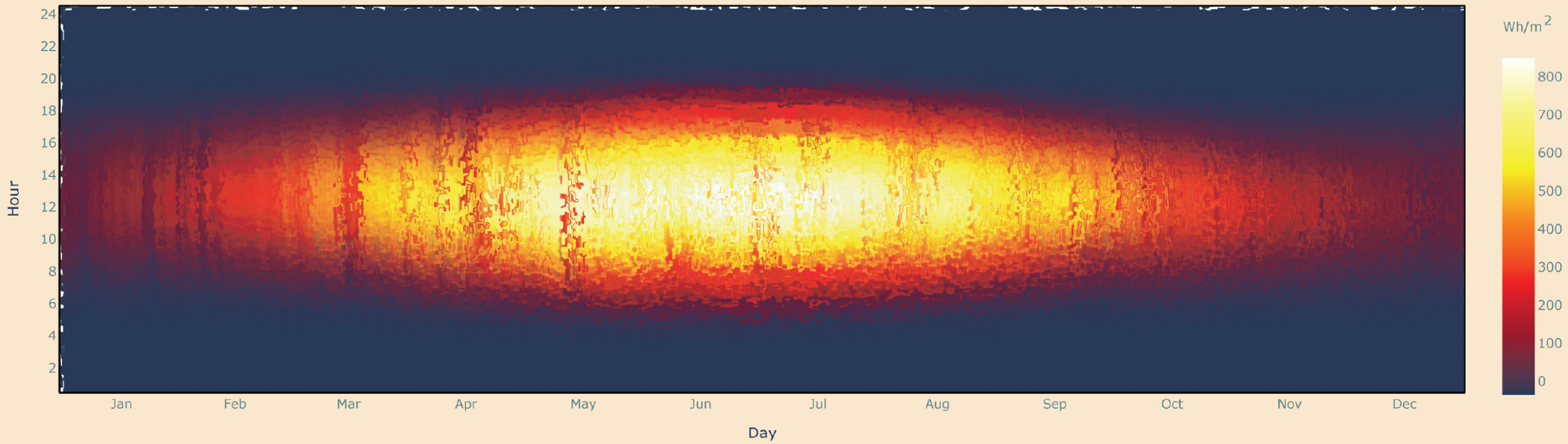


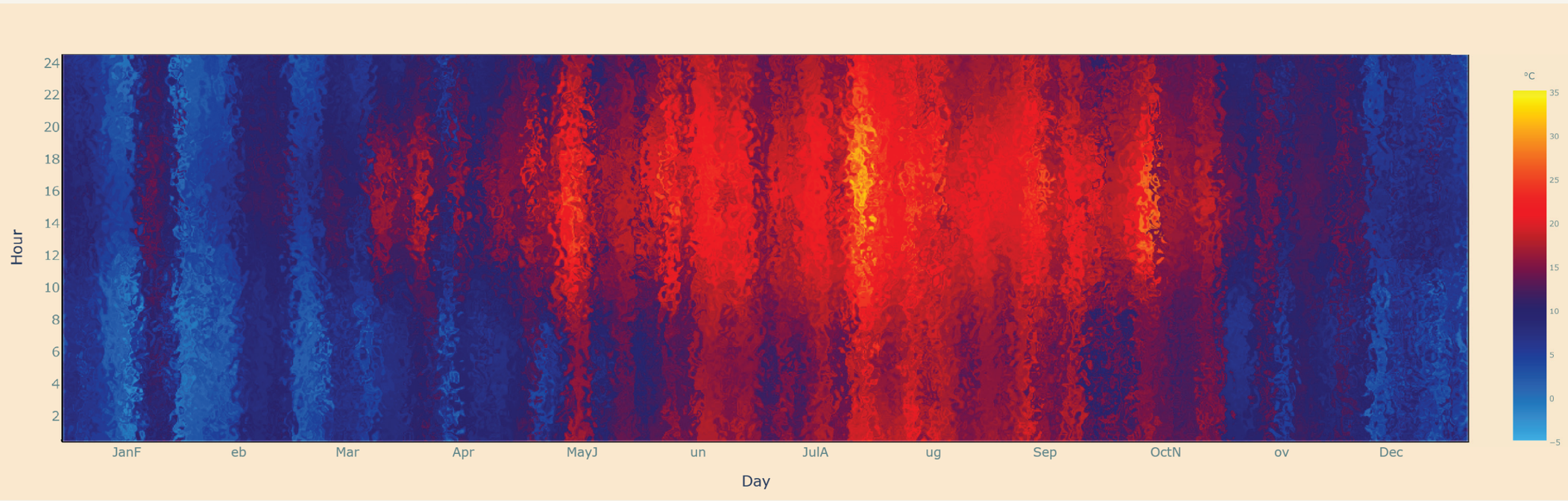
CLIMATE & SITE ANALYSIS

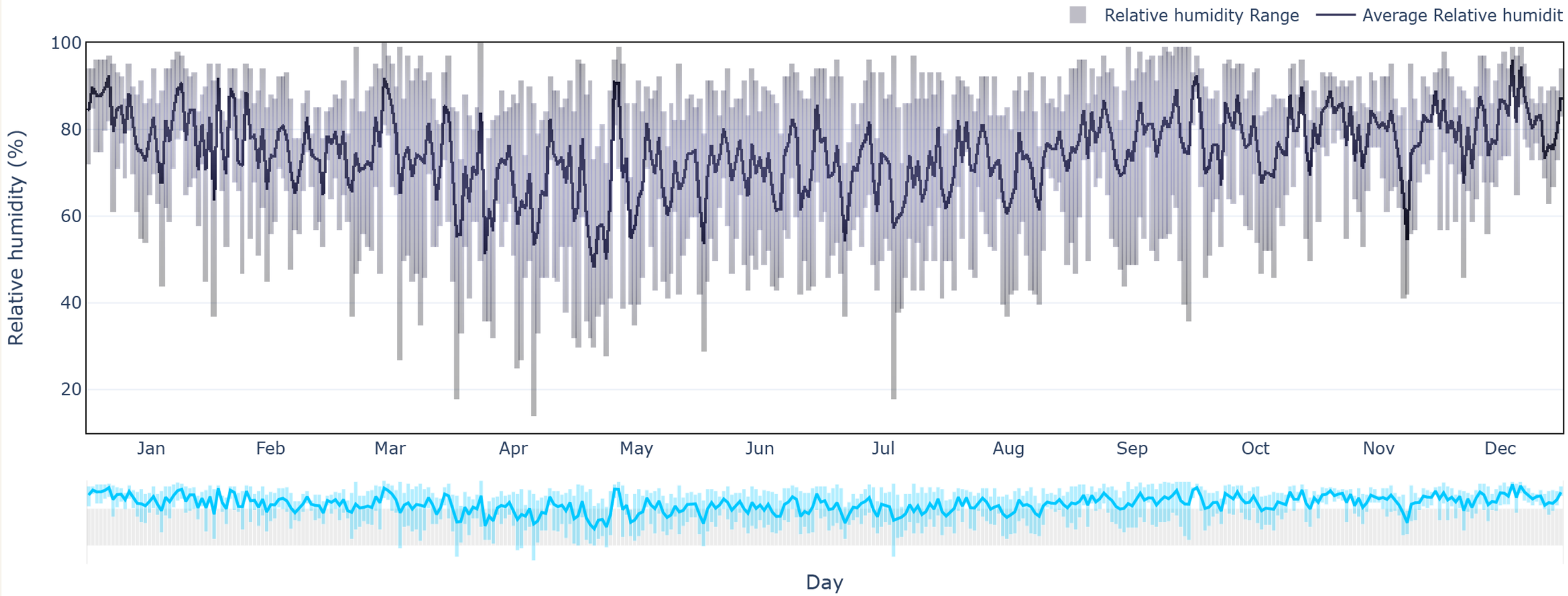




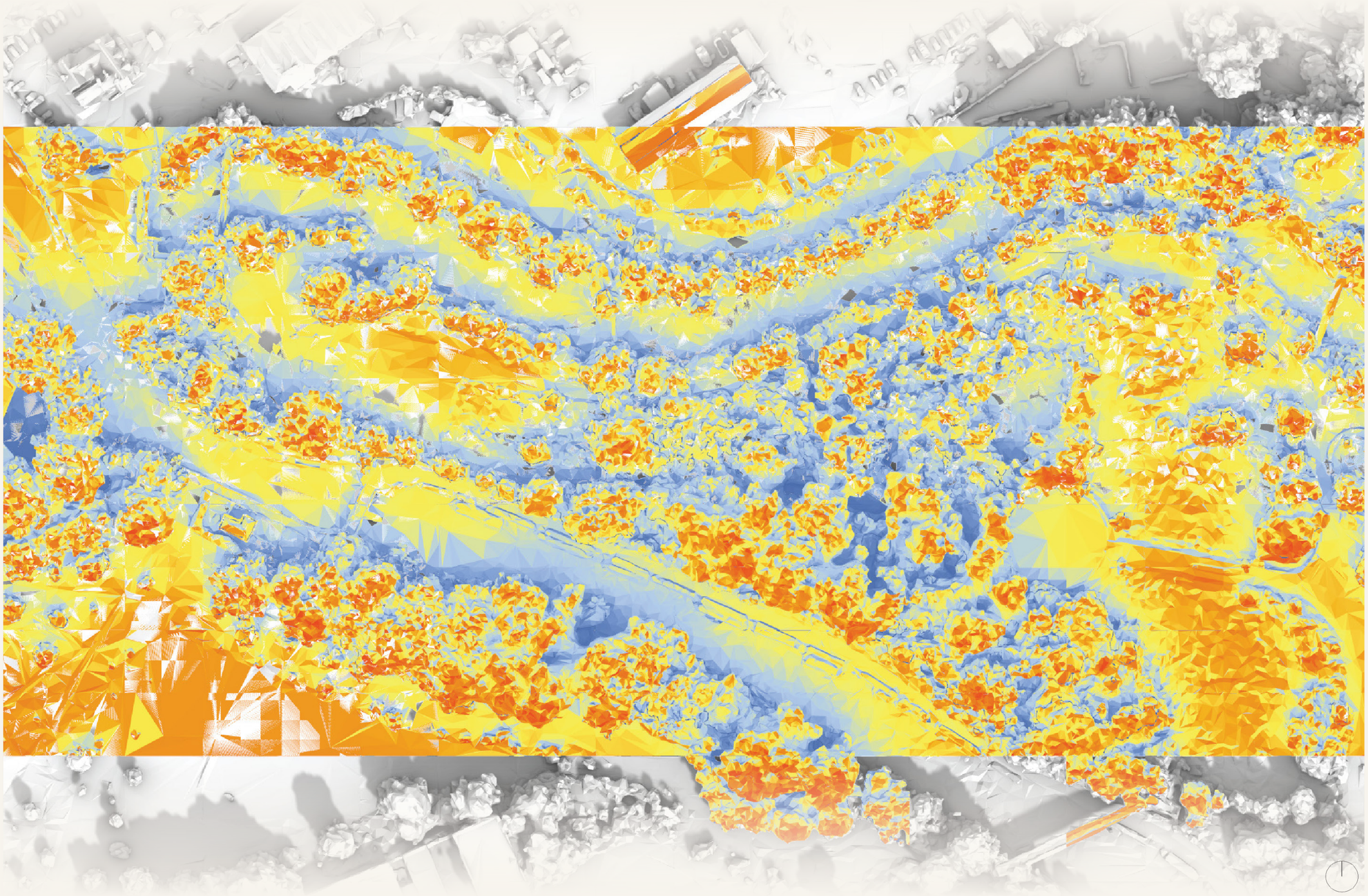
GLOBAL HORIZONTAL RADIATION

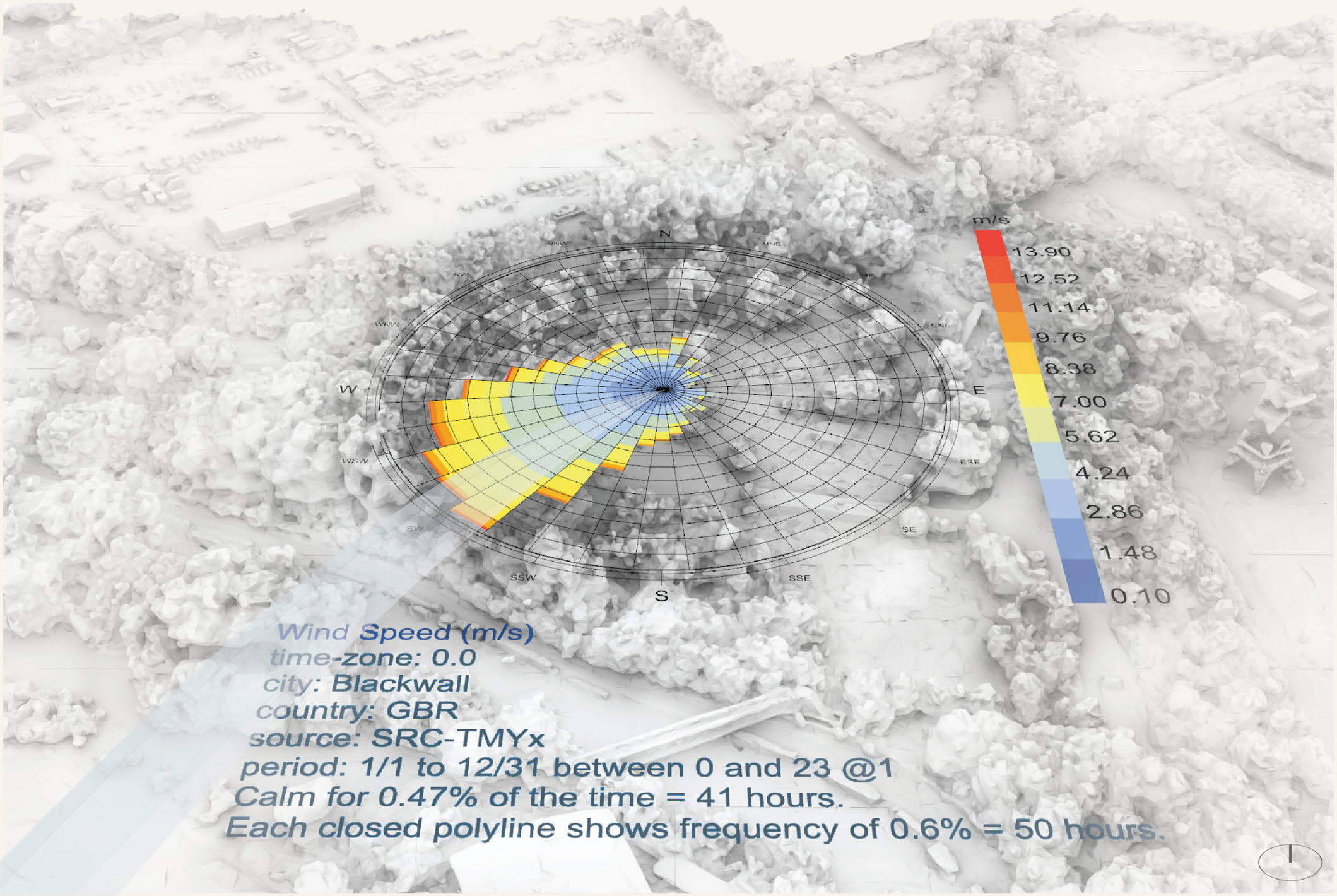





Relative humidity Range
Average Relative humidit
Relative humidity (%)
100
80
60
40
20
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Day

Hackney Marshes Filter Beds
50 m



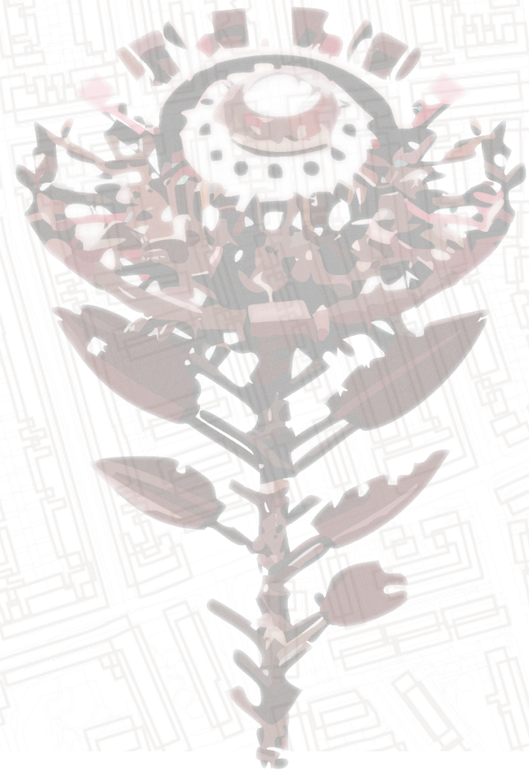

m/s
13.90
12.52
11.14
9.76
8.38
7.00
5.62
4.24
2.86
1.48
0.10
N
NNW
NNE
NW
NE
WNW
ENE
W
E
WSW
ESE
SW
SE
SSW
SSE
S
Wind Speed (m/s)
time-zone: 0.0
city: Blackwall
country: GBR
source: SRC-TMYx
period: 1/1 to 12/31 between 0 and 23 @1
Calm for 0.47% of the time = 41 hours.
Each closed polyline shows frequency of 0.6% = 50 hours.

Summer Solstice

Autumnal Equinox

Hazel
Coot
Smooth Newt
Cuckooflower
Ash
Grey Heron
Common Toad
Purple Loosestrife
Evergreen Oak
Moorhen
Broad-Bodied Chaser
Mute Swan
Lady butterfly
Bird's-foot Trefoil
Water-crowfoot
Snipe
Red Admiral Butterfly
Nightjar
Bumble Bee
Black Knapweed
Oxeye Daisy
Flycatcher
Common Pipistrelle
Firecrest
Black Poplar
London Plane
Reed Warbler
Bramble
Italian Arum
Field Maple
Common Reed
Cow Parsley

CONCLUSIONS & STRATEGIES



CHOSEN SITE

POND

ACCESS 3

NOISE

ACCESS 2

PREVAILING
WIND

ACCESS 1

grammophone

find plant types/flower types that are part of the site's biodiversity

↳ biomimetism

floral gram-ophone

different shapes of plants

=

different data measured?

blooming of a flower

think about roots?

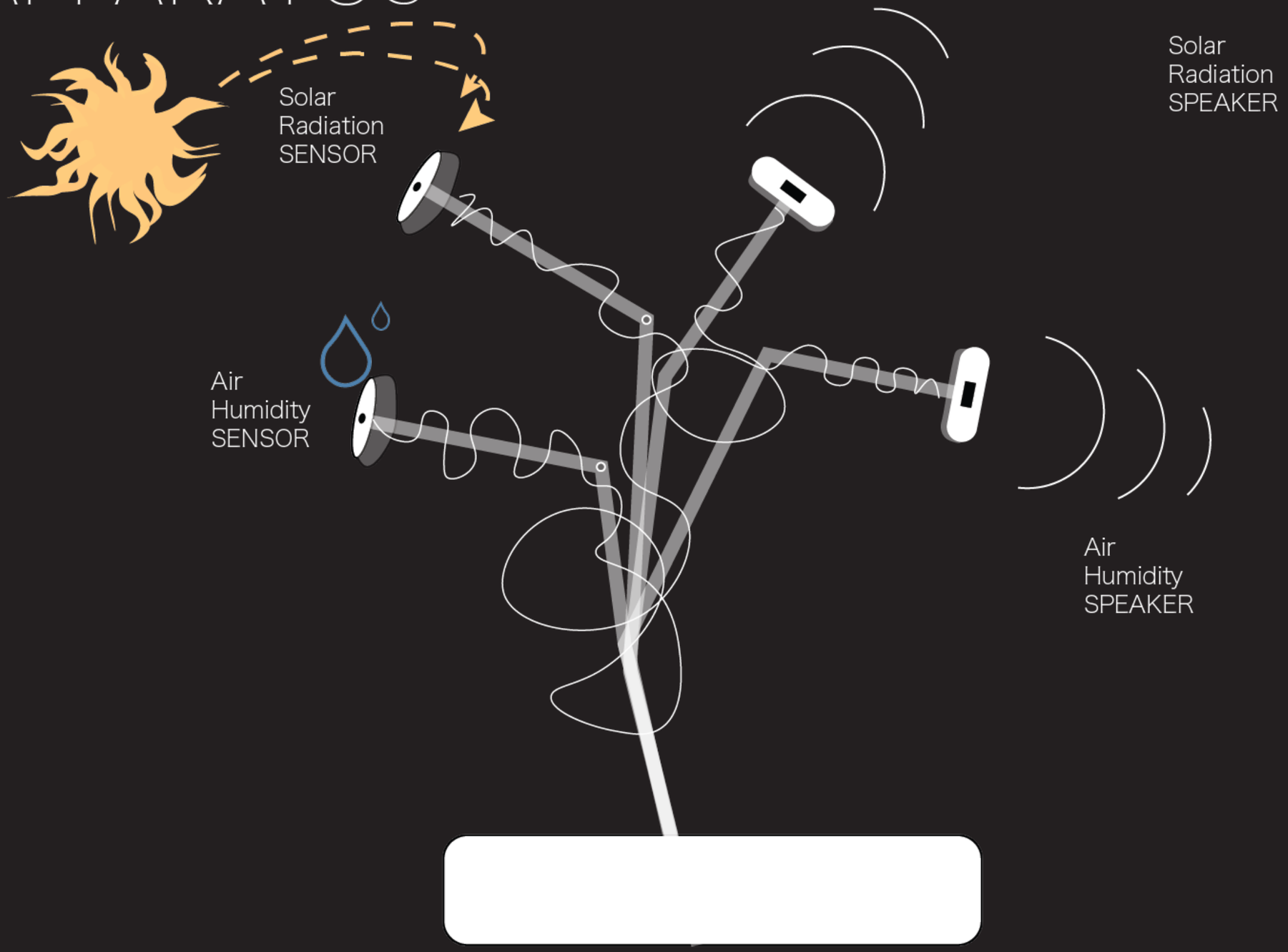
flower shapes that can be found there?

acoustic bouquet

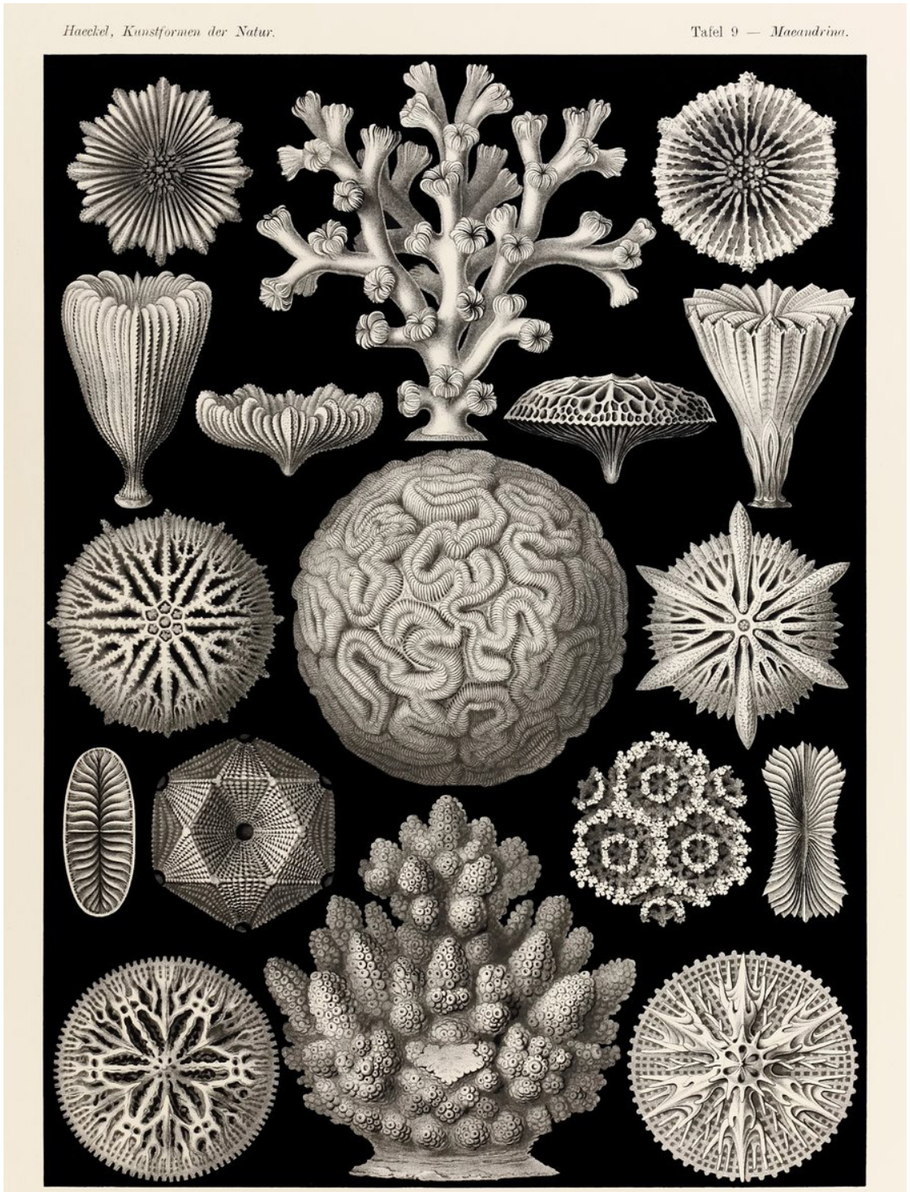
↳ floral orchestra

capturing sounds?
measuring frequencies?
↳ or making sounds?

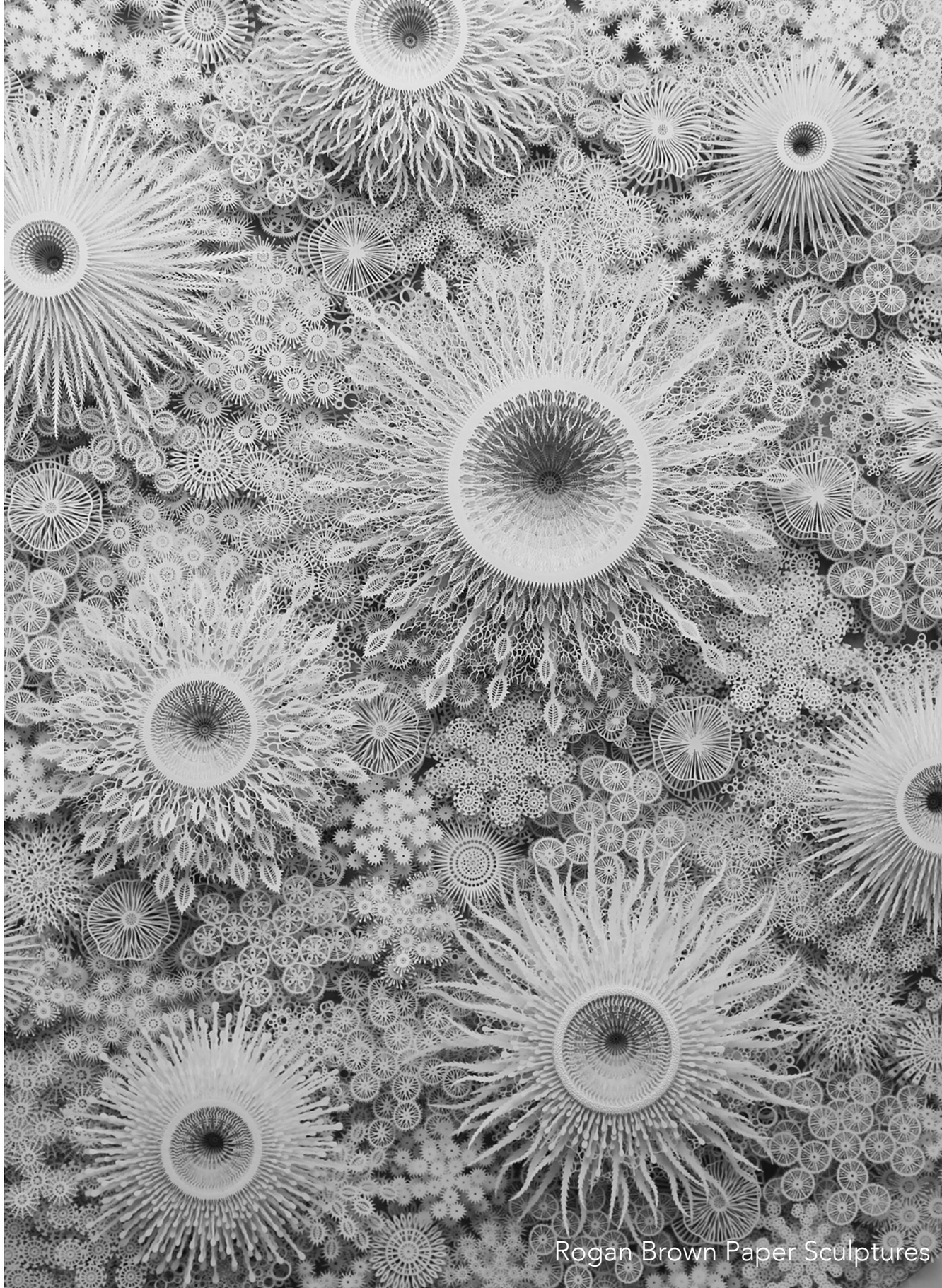
APPARATUS


Solar
Radiation
SENSOR
Solar
Radiation
SPEAKER
Air
Humidity
SENSOR
Air
Humidity
SPEAKER

REFERENCES

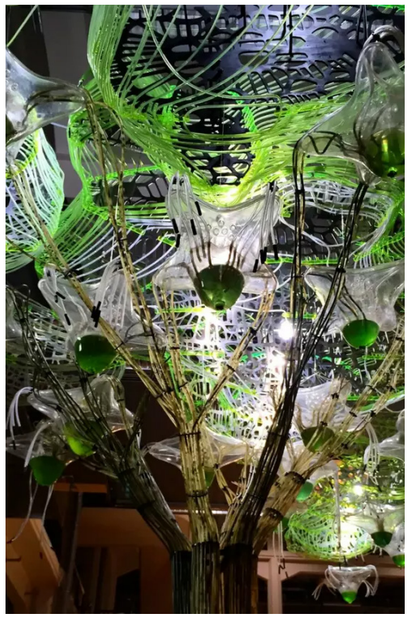


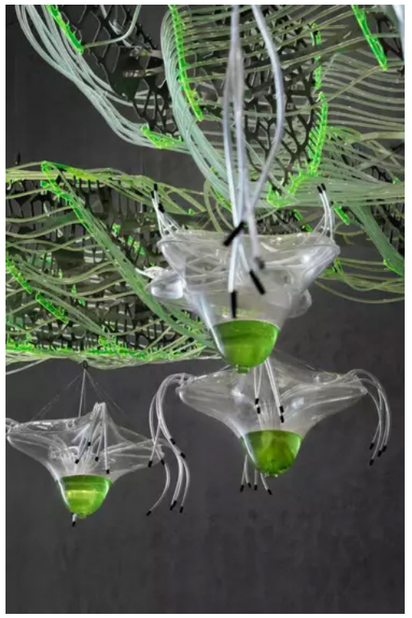
Ernst Haeckel



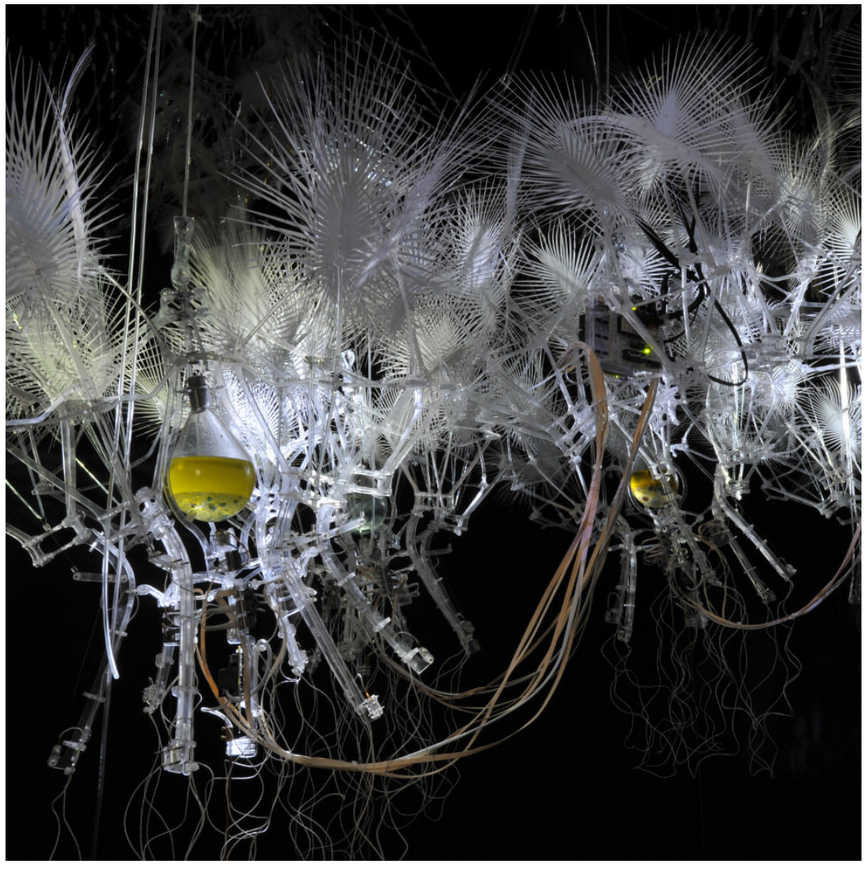
Rogan Brown Paper Sculptures

‘Cloaca’ by Wim Delvoye



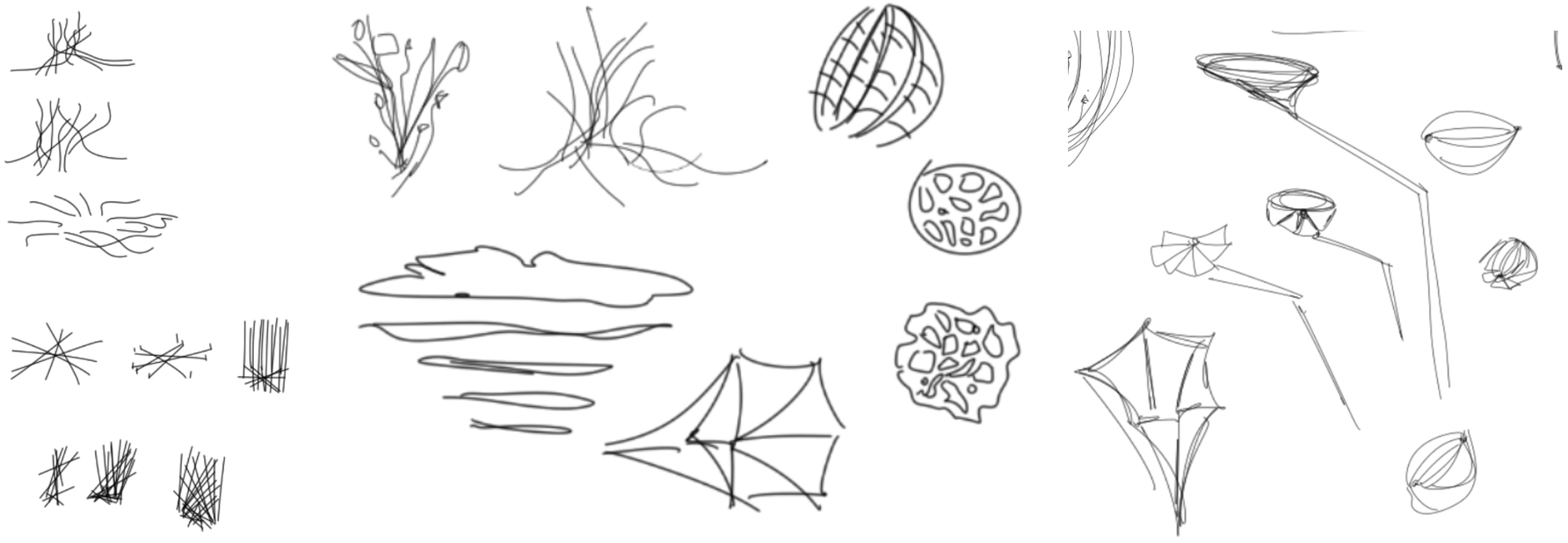


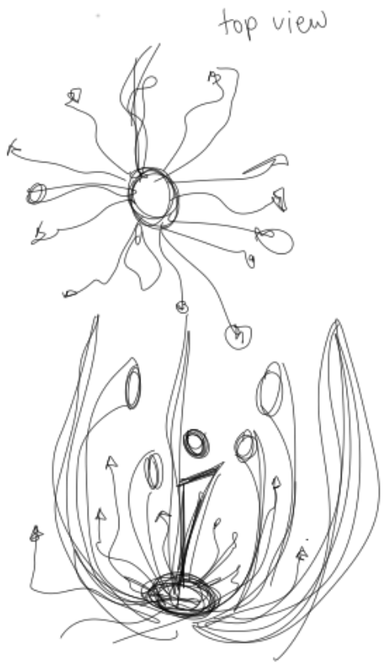
‘HORTUS.PARIS’ Ecologic Studio, 2013



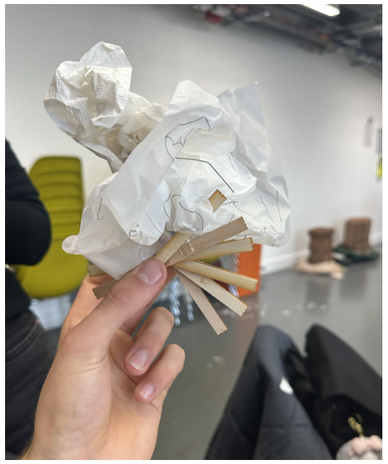
‘Hylozoic Ground’ , Philip Beesley

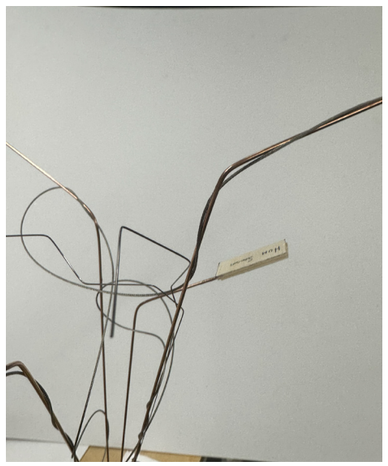
DESIGN PROCESS & ITERATIONS

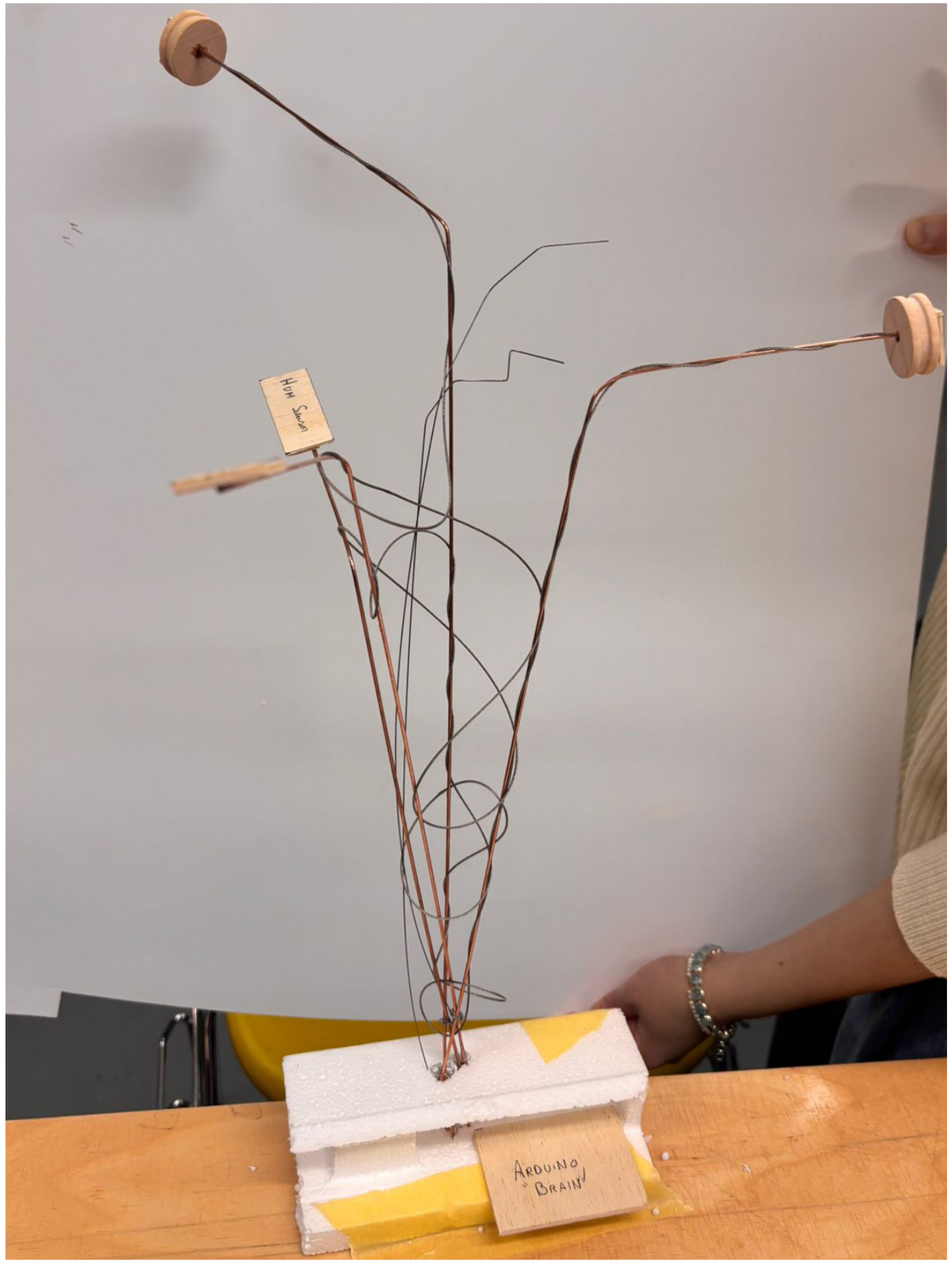


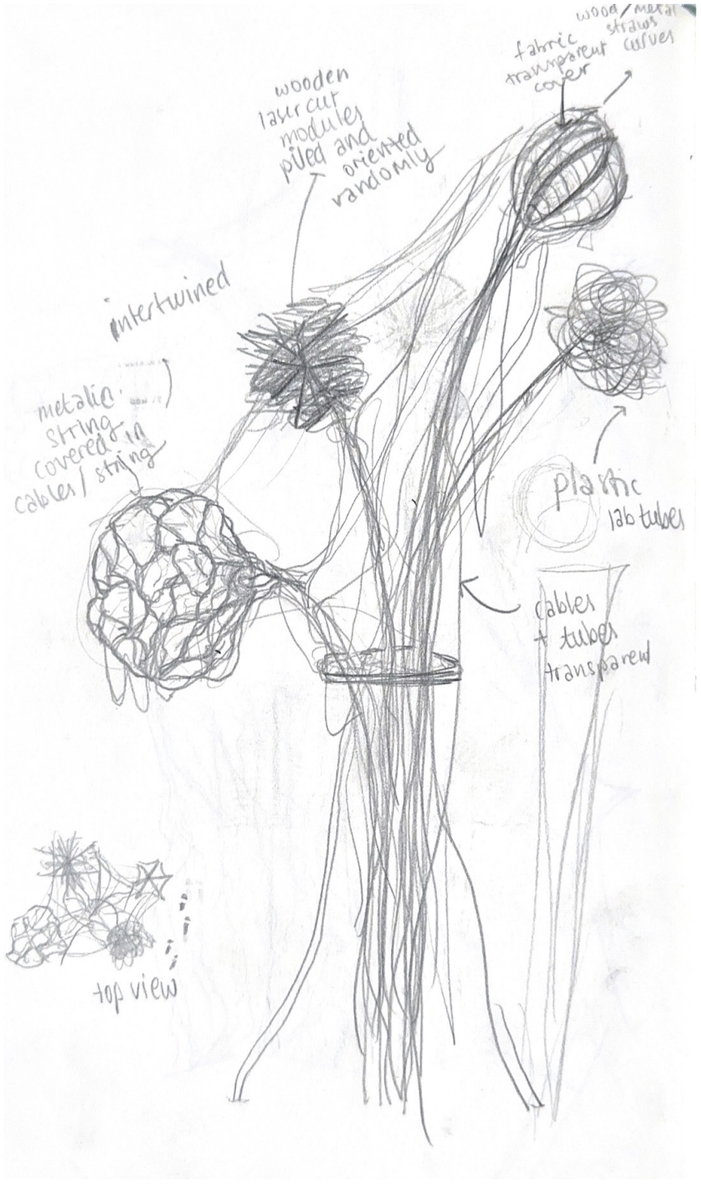

top view

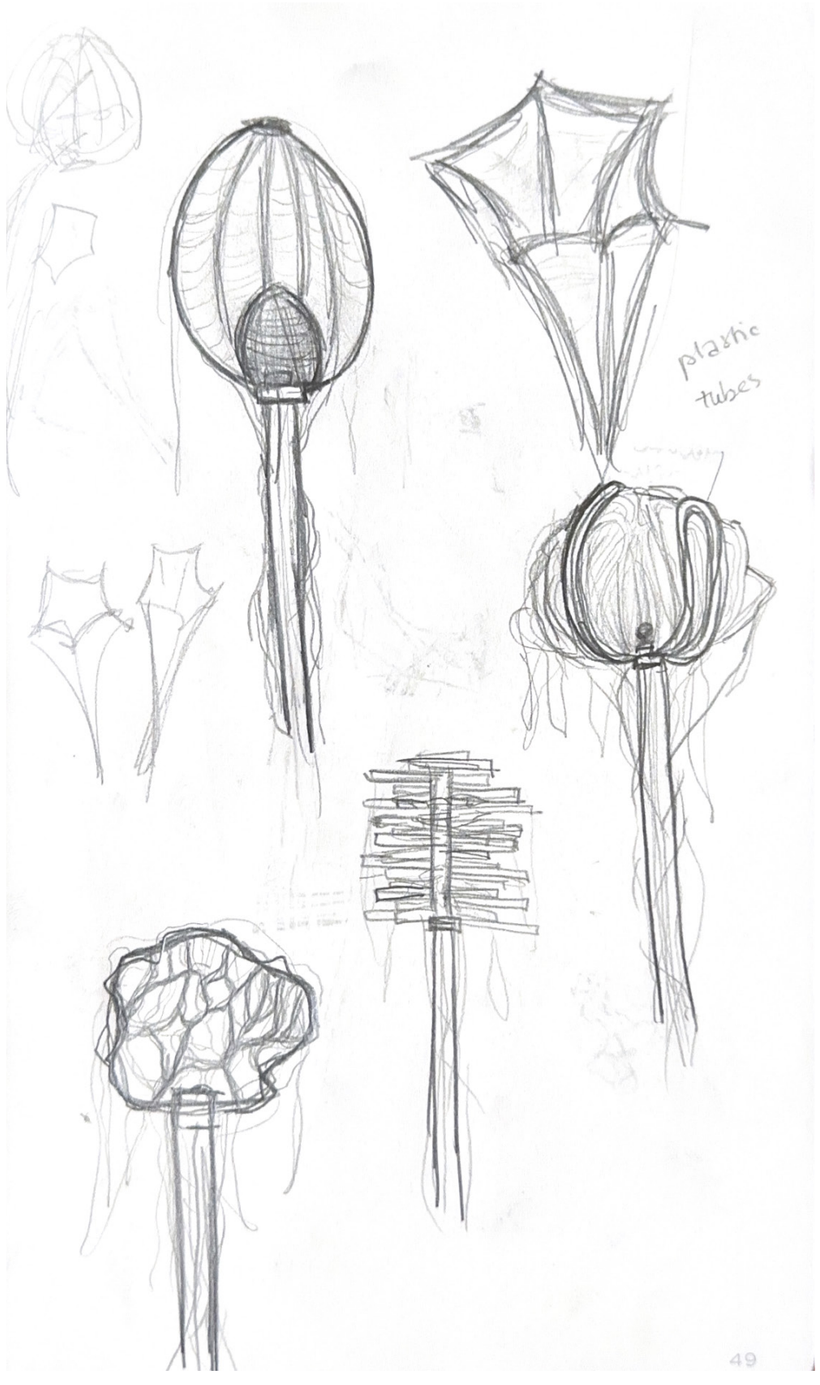
sound
light
sound
humidity

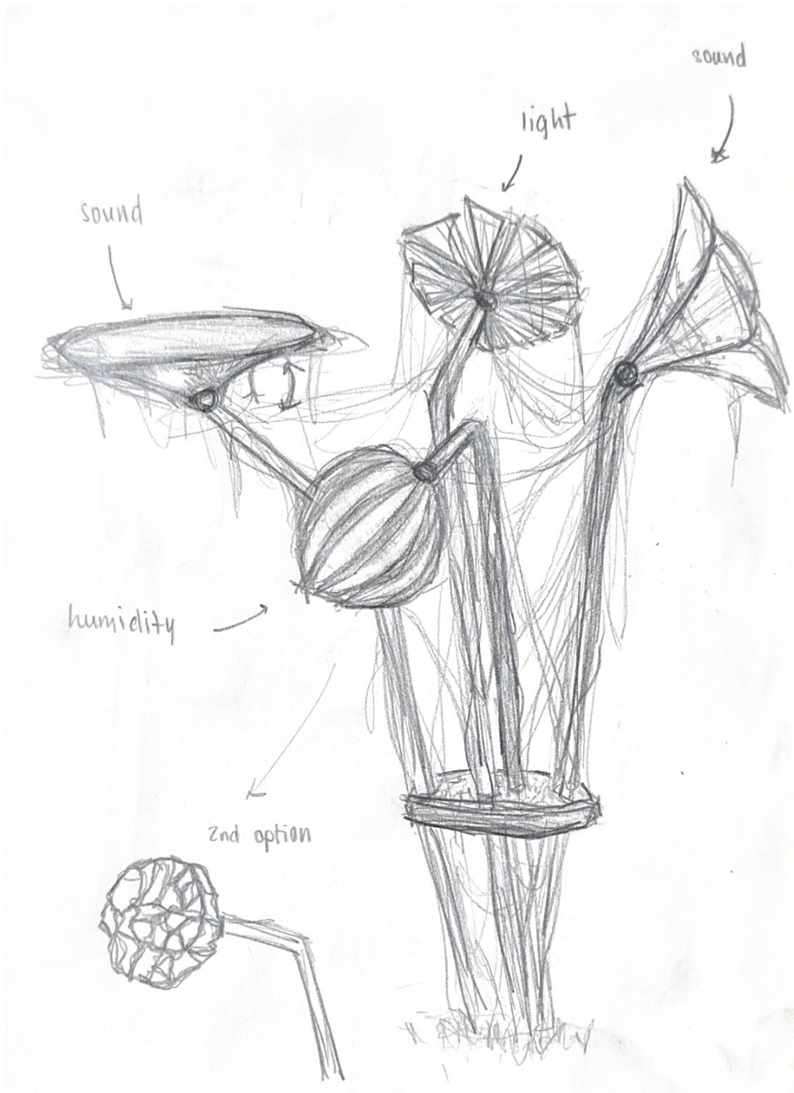




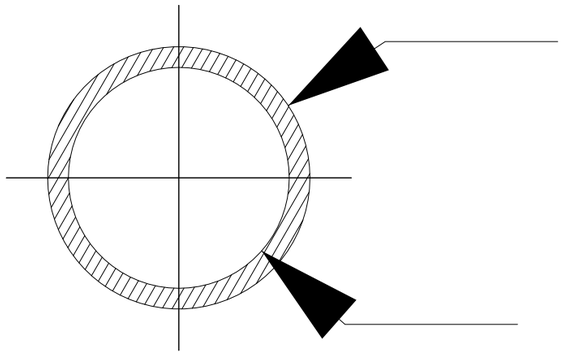

HUM SENSOR
ARDUINO
"BRAIN"

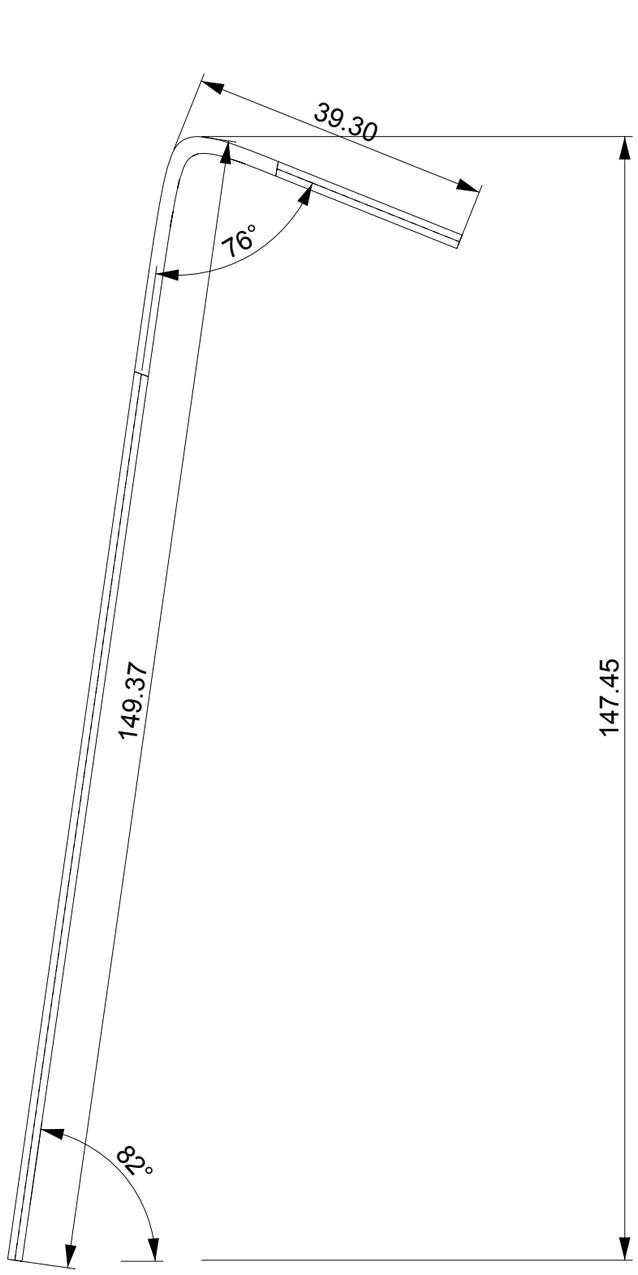

wood / metal
fabric
transparent
cover
wooden
laser cut
modules
piled and
oriented
randomly
intertwined
metalic
string
covered in
cables / string
plastic
led tubes
cables
+ tubes
transparent
top view

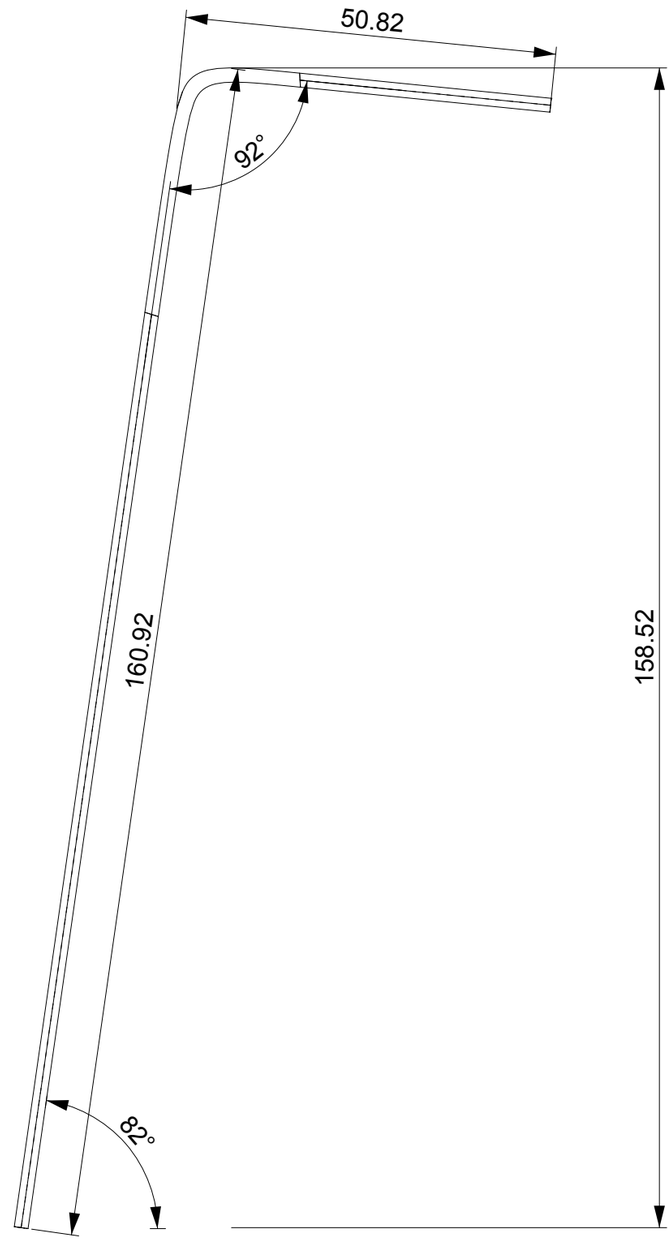

plastic
tubes


sound
light
sound
humidity
2nd option

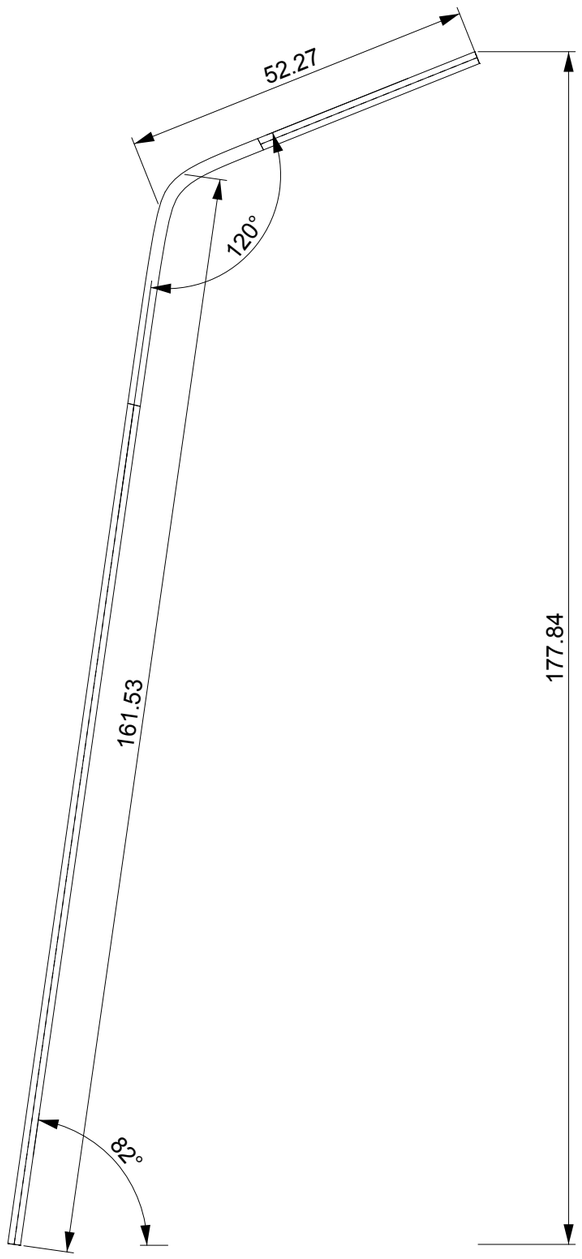
FABRICATION, PROGRAMMATIC DIAGRAMS & MATERIALS

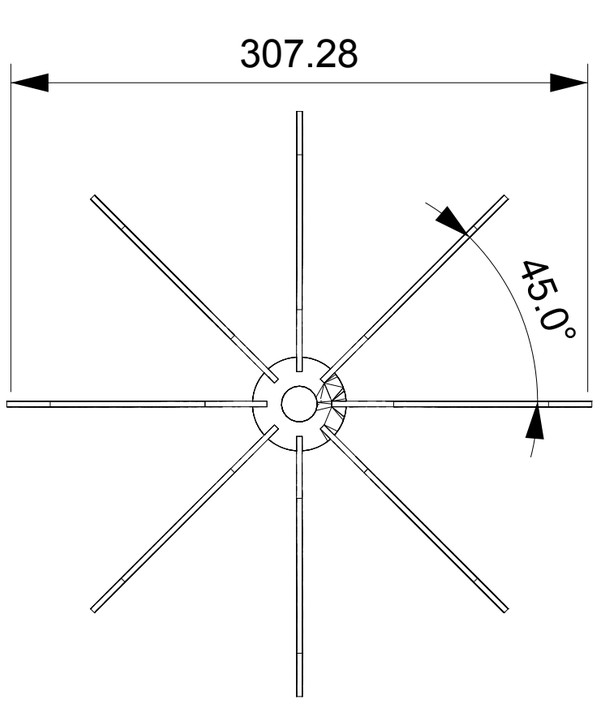

R1.90
R1.60

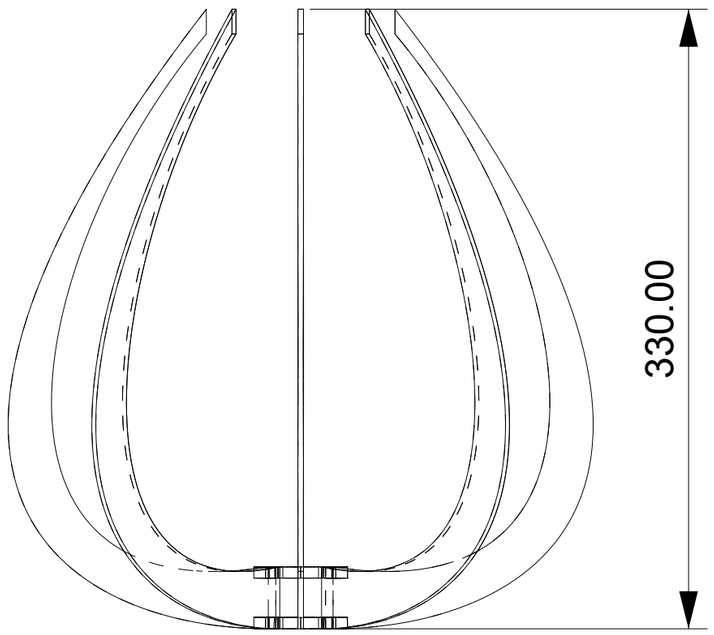

39.30
76°
149.37
82°
147.45

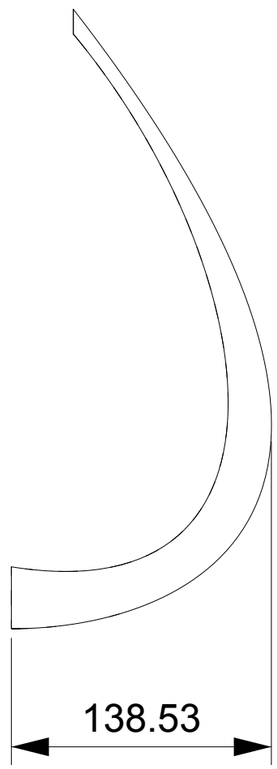

50.82
92°
160.92
83°
158.52

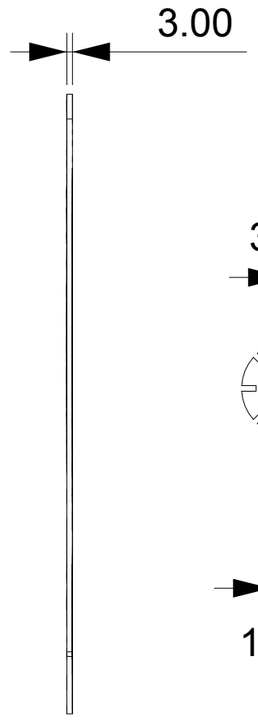
38.66
64°
158.71
82°
156.94

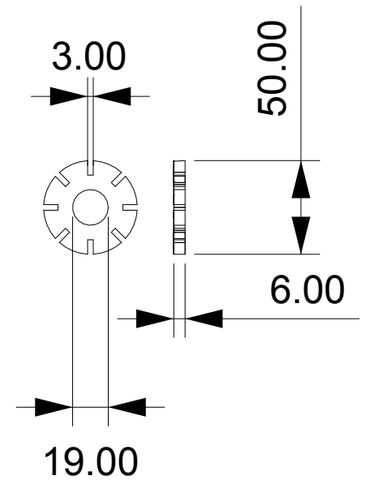

52.27
120°
161.53
83°
177.84

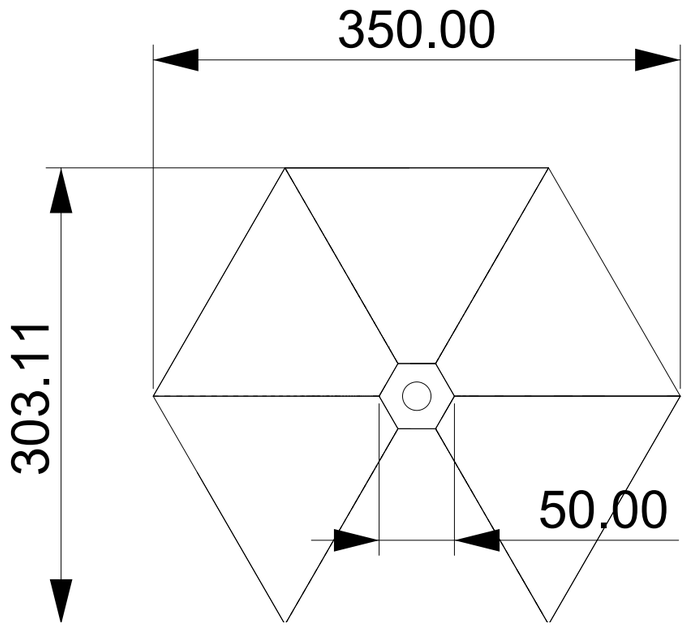

307.28
45.0°

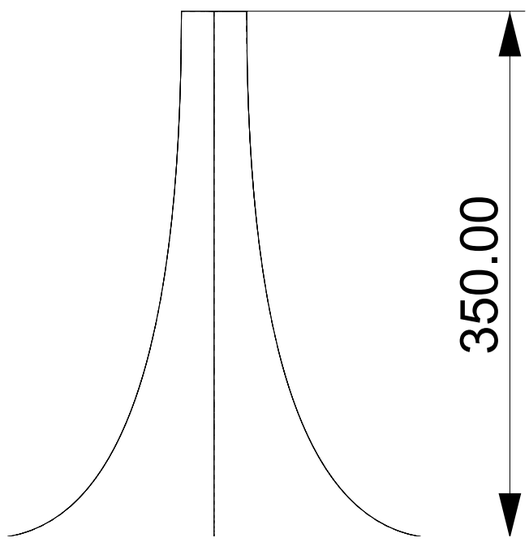

330.00


138.53


3.00


3.00
50.00
6.00
19.00


350.00
303.11
50.00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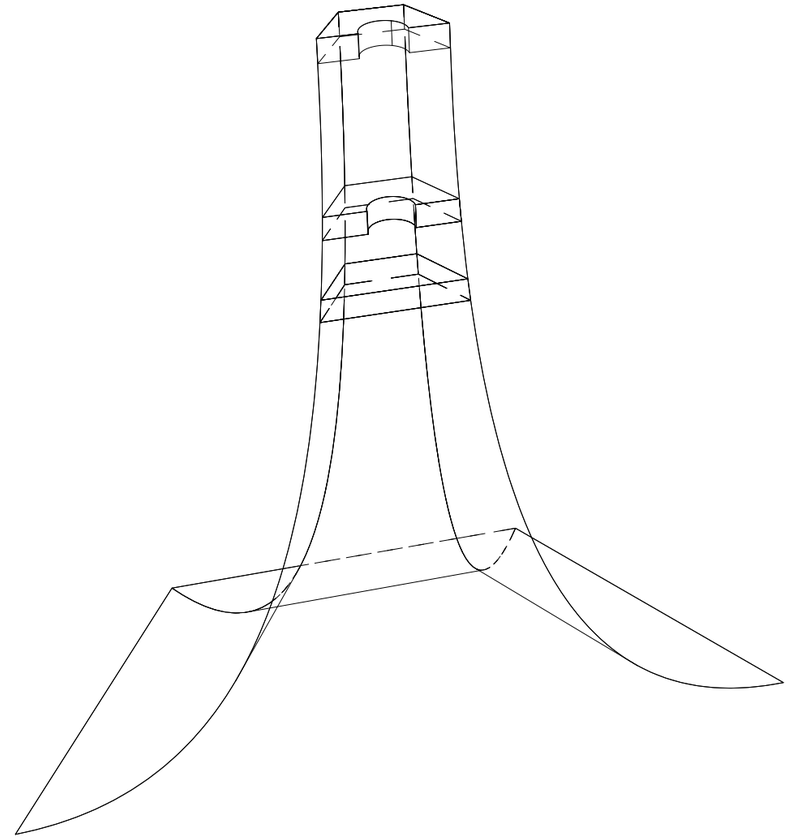
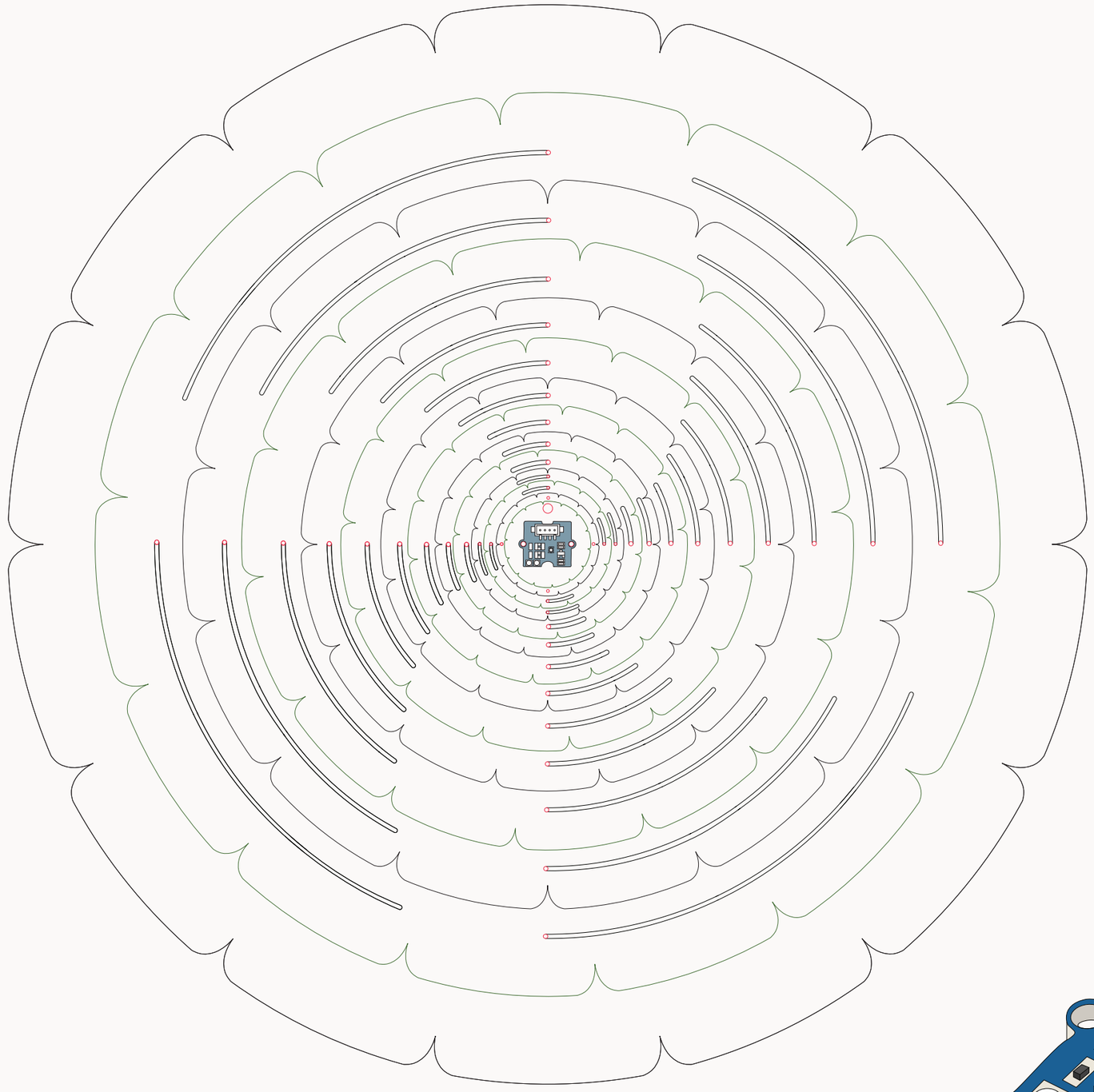
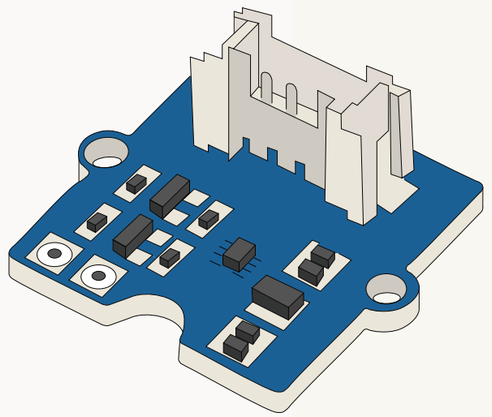
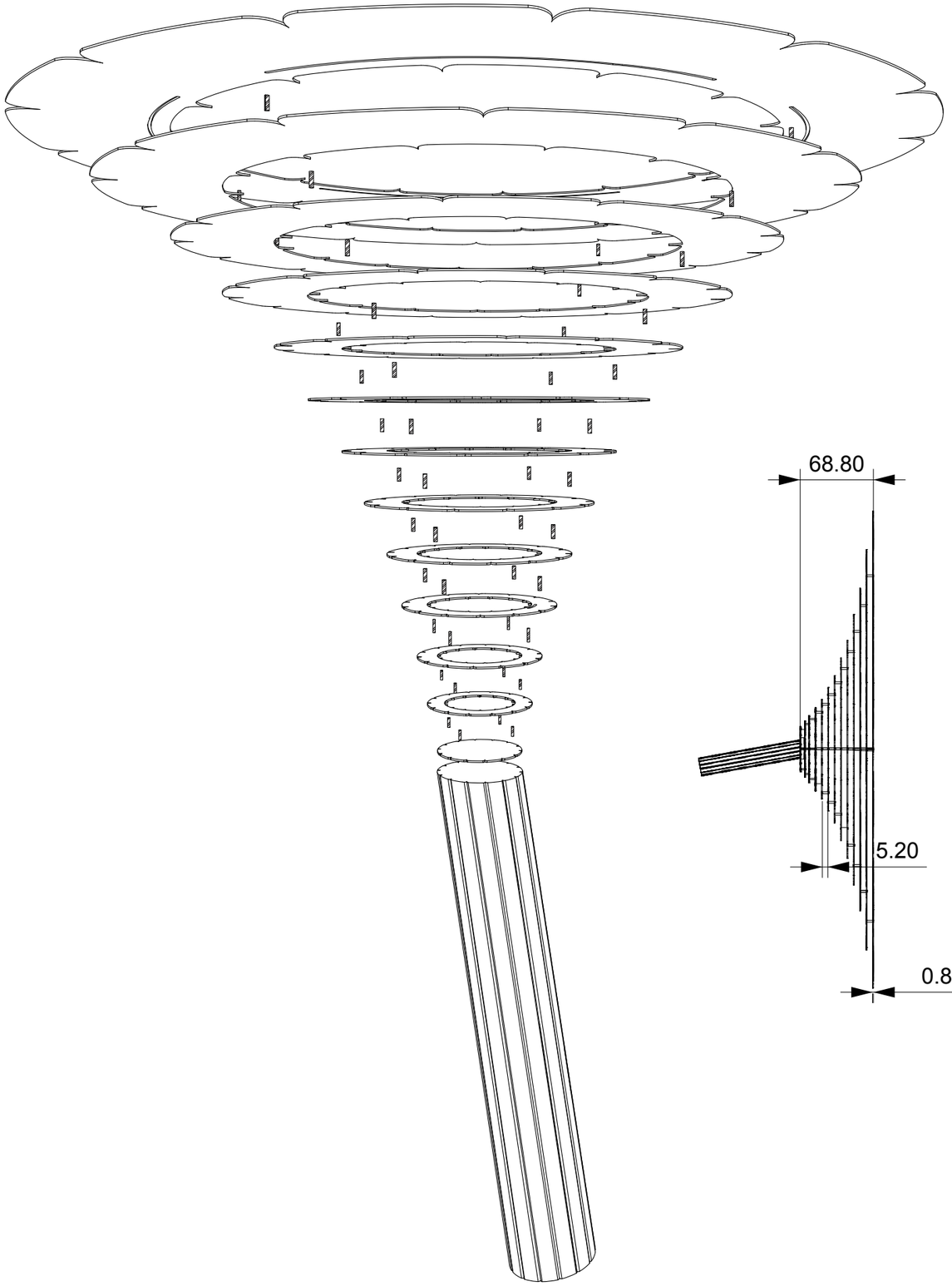
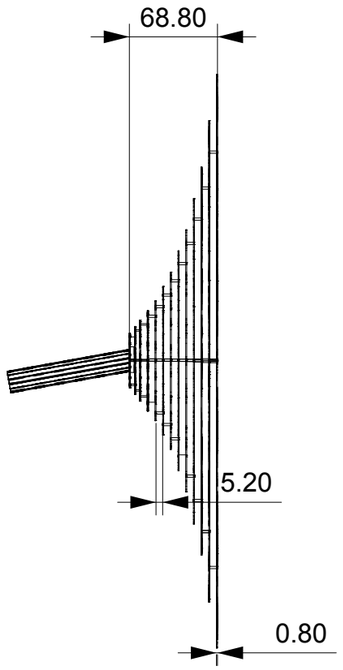


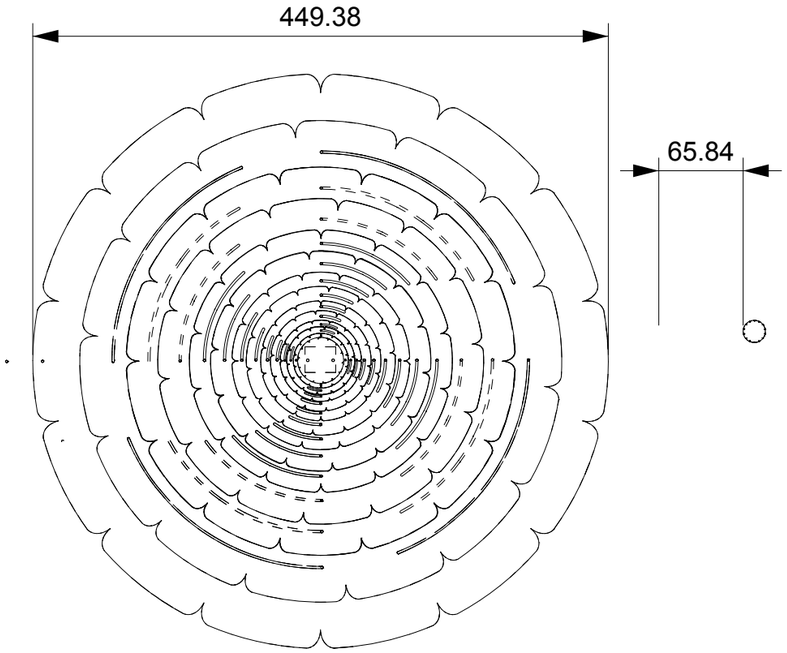




TOP PIECE:
DAYLIGHT SENSOR

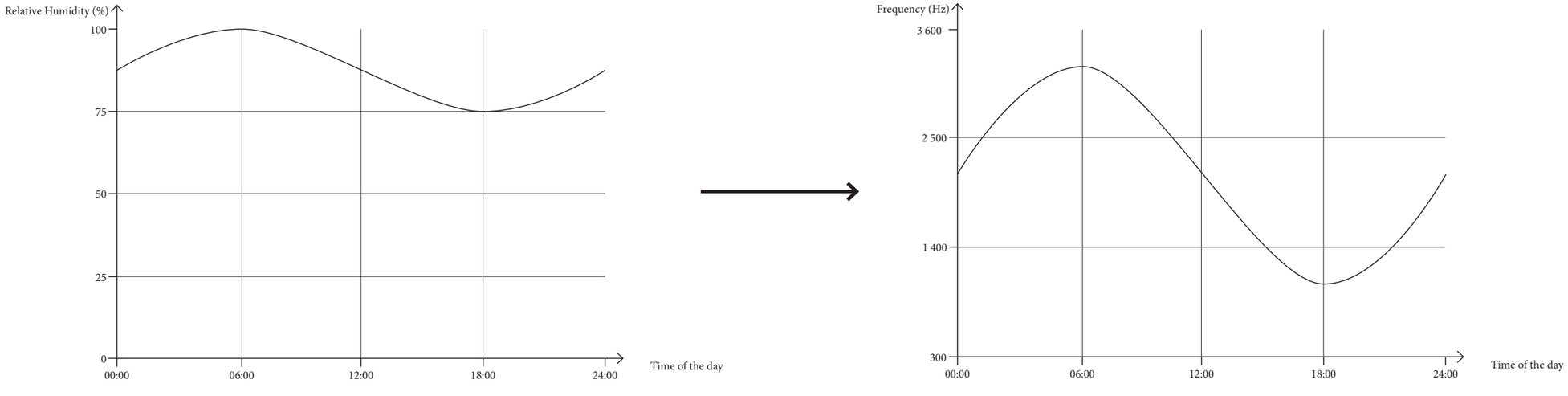


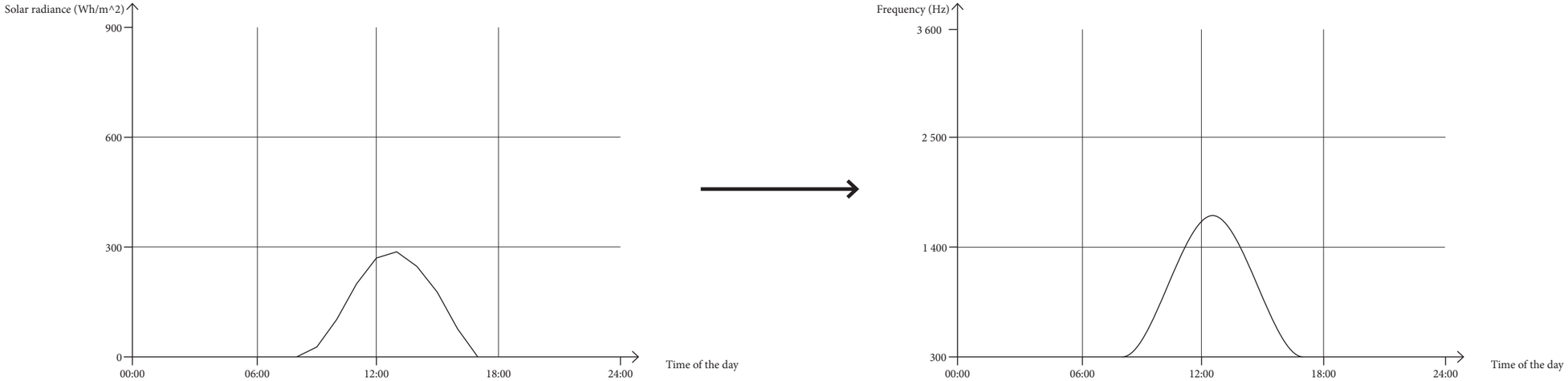

68.80
5.20
0.80


449.38
65.84

10.2°
97.05

Equivalence of measurments to sound produced



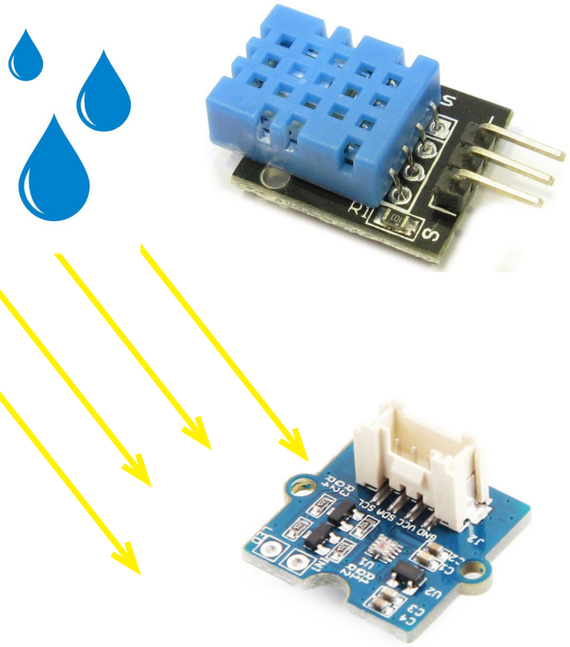


Evolution of the measured information is linear to the evolution of the produced frenquencies, i.e a double in the relative humidity will produce a sound twice as high as it was, and similarly for the evolution of solar radiation.

For relative humidity, a measure of 75% humidity would produce a frequency of 1072 Hz, and a measure of 80% humidity a frequency of 1500 Hz.

For solar radiance, a measur of 0 Wh/m^2 would prduce a frequency of 300 Hz, and a measure 0f 955.5 Hz.

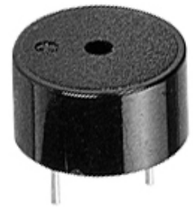
Coding diagram



Collect data from sensors

Remap the data:
the collected data will be from 75 to 100, re-mapping the data means that this range will be proportionally changed for 1000 to 3200.
So a measure of 75 corresponds to 1000 and a measure of 80 corresponds 1500.

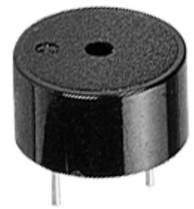
Send the remapped values to the speaker, its will play the values as frequencies



Collect data from sensors

Remap the data from 0-300 to 300-1600

Send the remapped values to the speaker, its will play the values as frequencies



DP1 | Arduino IDE 2.3.3

Arduino Uno

DP1.ino

```ino
#include <DHT.h>

// Define the pin connections
#define DHTPIN 2            // Digital pin for the Temperature & Humidity Sensor
#define DHTTYPE DHT11       // DHT 11 sensor type
#define LIGHT_SENSOR_PIN A0 // Analog pin for the Light Sensor
#define BUZZER1_PIN 3       // Digital pin for the first Grove Buzzer
#define BUZZER2_PIN 4       // Digital pin for the second Grove Buzzer

DHT dht(DHTPIN, DHTTYPE);

void setup() {
  pinMode(BUZZER1_PIN, OUTPUT);
  pinMode(BUZZER2_PIN, OUTPUT);
  Serial.begin(9600);
  dht.begin();
}

void loop() {
  // Read humidity
  float humidity = dht.readHumidity();
  if (isnan(humidity)) {
    Serial.println("Failed to read from DHT sensor!");
    return;
  }

  // Read light intensity
  int lightIntensity = analogRead(LIGHT_SENSOR_PIN);

  // Map the readings to PWM duty cycles (sound intensity)
  int humidityPWM = map(humidity, 20, 90, 50, 255); // Adjust range as per expected humidity levels
  int lightPWM = map(lightIntensity, 0, 1023, 50, 255);

  // Ensure PWM is within a valid range
  humidityPWM = constrain(humidityPWM, 0, 255);
  lightPWM = constrain(lightPWM, 0, 255);

  // Activate the buzzers based on the mapped values
```

Output

Ln 2, Col 1 Arduino Uno on /dev/cu.usbmodem11301 [not connected]

DP1 | Arduino IDE 2.3.3

Arduino Uno

DP1.ino

```
}

// Read light intensity
int lightIntensity = analogRead(LIGHT_SENSOR_PIN);

// Map the readings to PWM duty cycles (sound intensity)
int humidityPWM = map(humidity, 20, 90, 50, 255); // Adjust range as per expected humidity levels
int lightPWM = map(lightIntensity, 0, 1023, 50, 255);

// Ensure PWM is within a valid range
humidityPWM = constrain(humidityPWM, 0, 255);
lightPWM = constrain(lightPWM, 0, 255);

// Activate the buzzers based on the mapped values
analogWrite(BUZZER1_PIN, humidityPWM);
delay(200); // Short pause to distinguish signals
analogWrite(BUZZER1_PIN, 0); // Turn off the first buzzer

analogWrite(BUZZER2_PIN, lightPWM);
delay(200);
analogWrite(BUZZER2_PIN, 0); // Turn off the second buzzer

// Print readings to the Serial Monitor
Serial.print("Humidity: ");
Serial.print(humidity);
Serial.print("%, Humidity PWM: ");
Serial.print(humidityPWM);
Serial.println();

Serial.print("Light Intensity: ");
Serial.print(lightIntensity);
Serial.print(", Light PWM: ");
Serial.print(lightPWM);
Serial.println();

// Delay before repeating the loop
delay(500);
}
```

Output

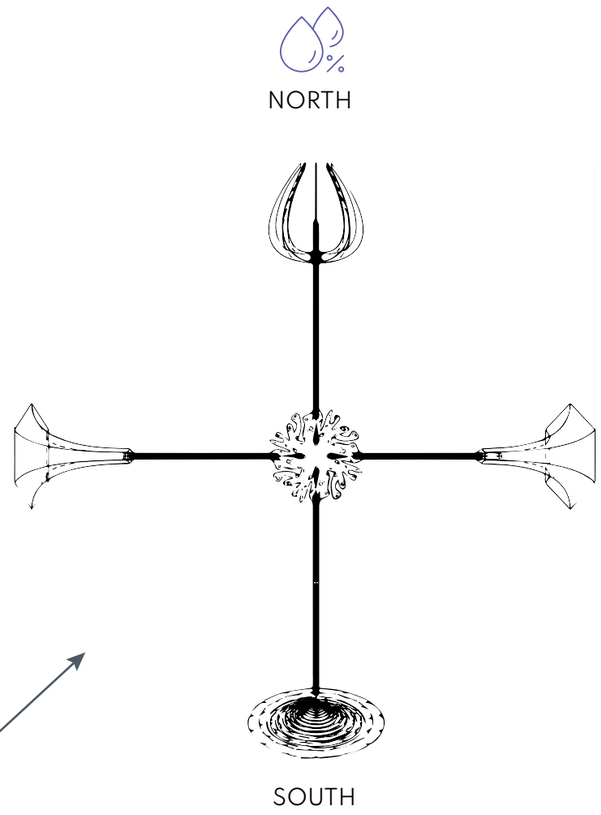
Ln 2, Col 1 Arduino Uno on /dev/cu.usbmodem11301 (not connected)

DIAGRAMS AND SIMULATIONS

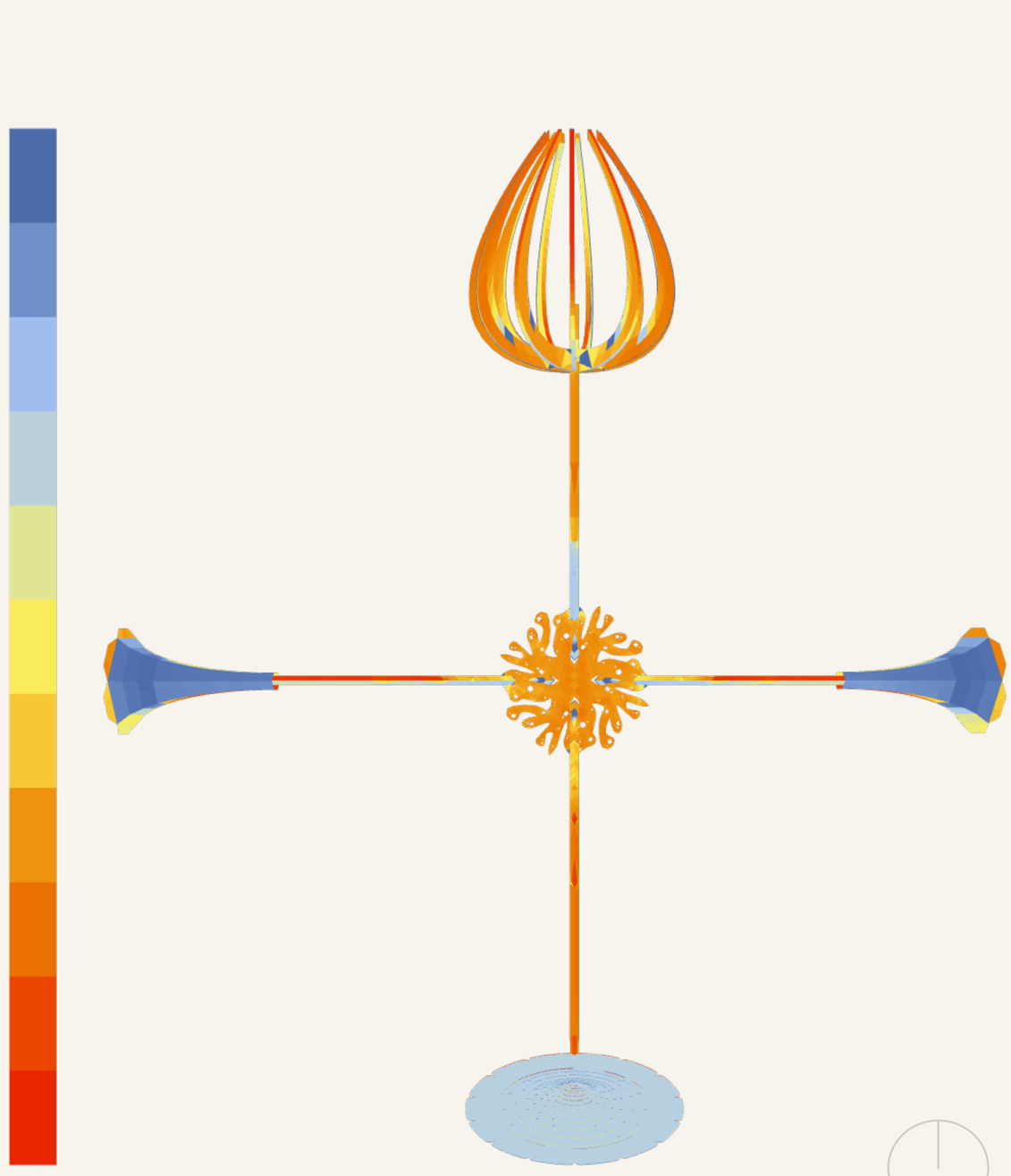
ORIENTATION OF APPARATUS

Optimal time for the use of the apparatus is approximately 12 pm.

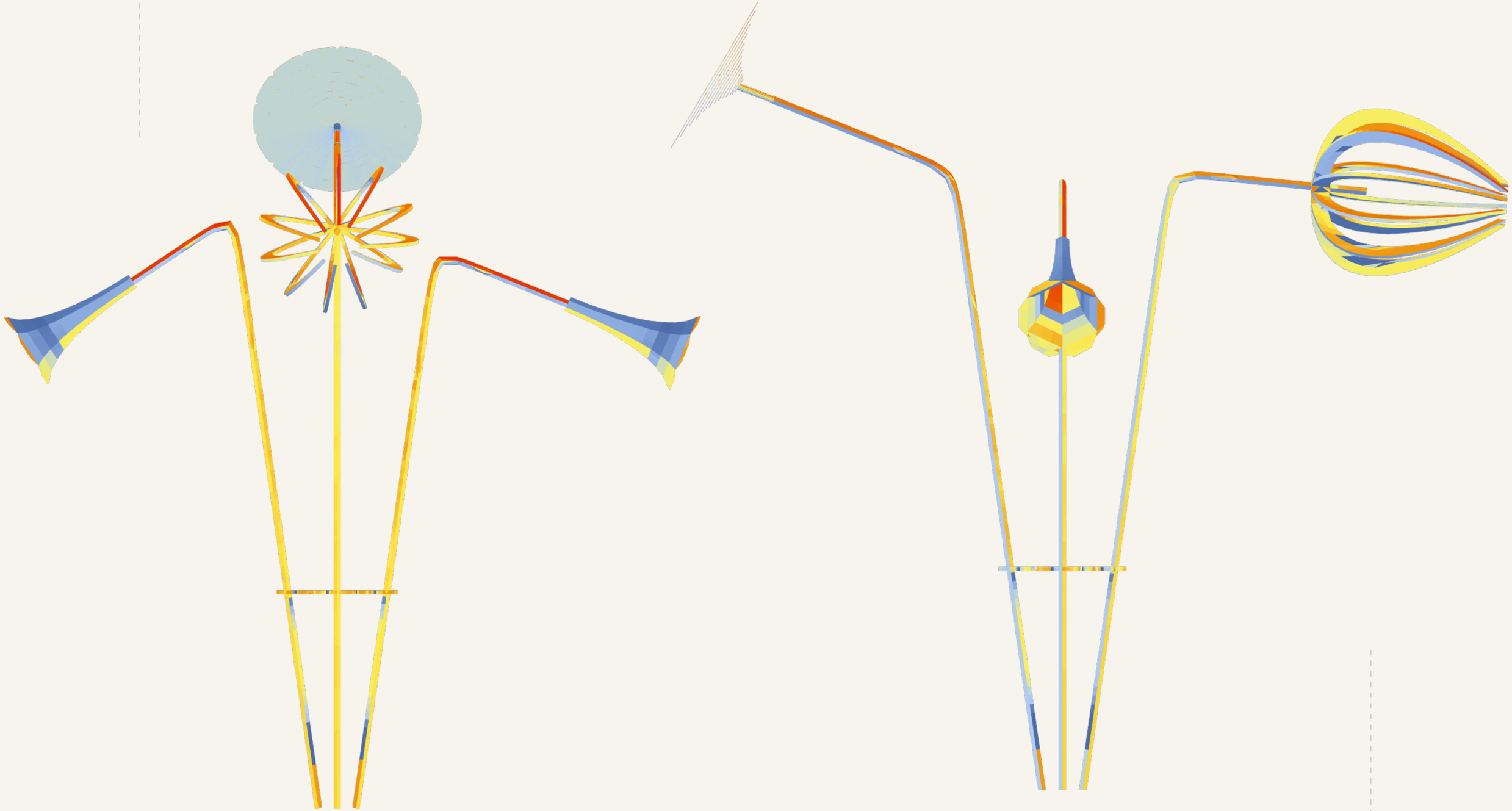
Sunlight should not be measured afrer 3 pm because of the orientation of the sensors.



INCIDENT RADIATION SIMULATION

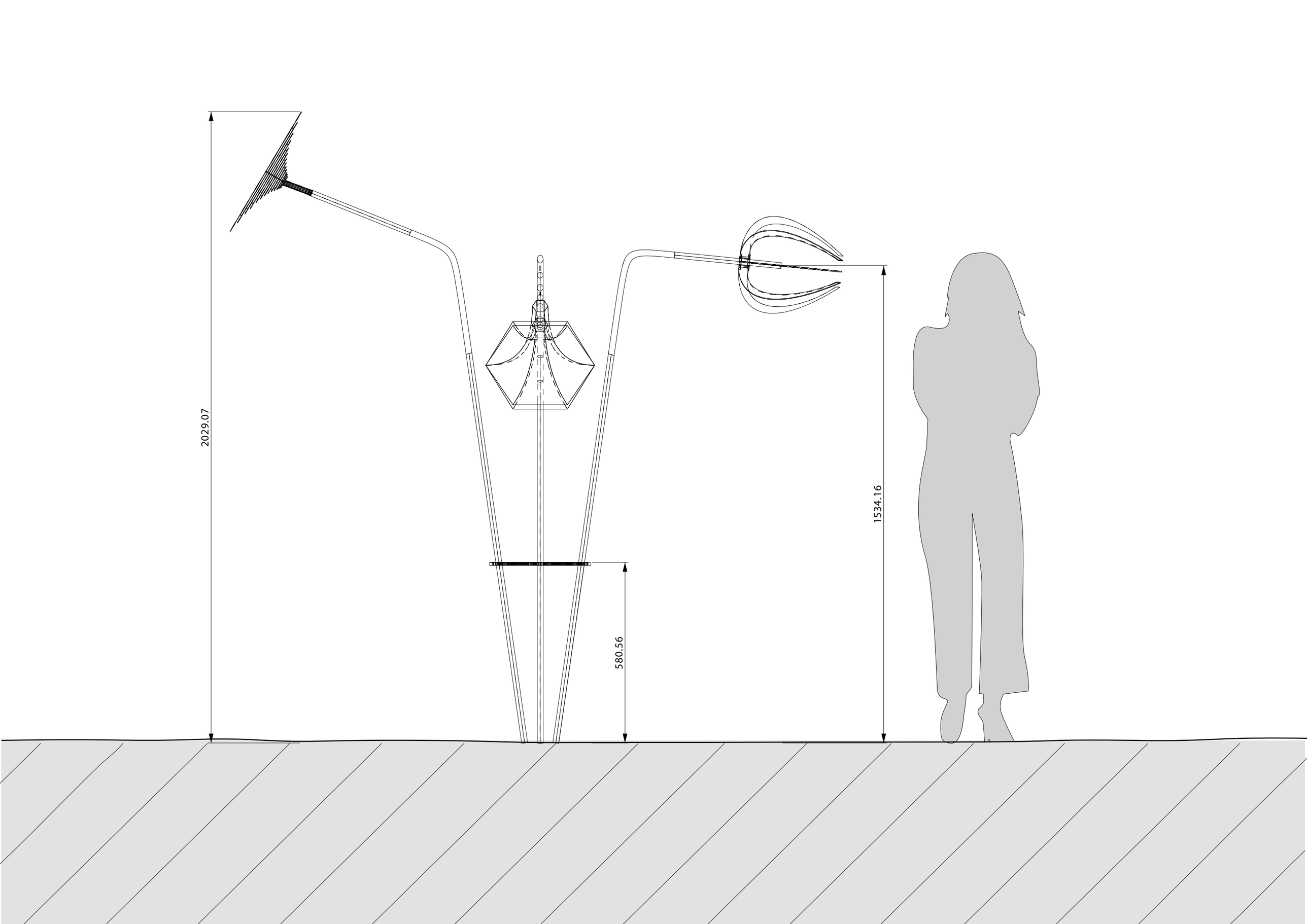


View from North



View from East

ORTHOGRAPHIC DRAWINGS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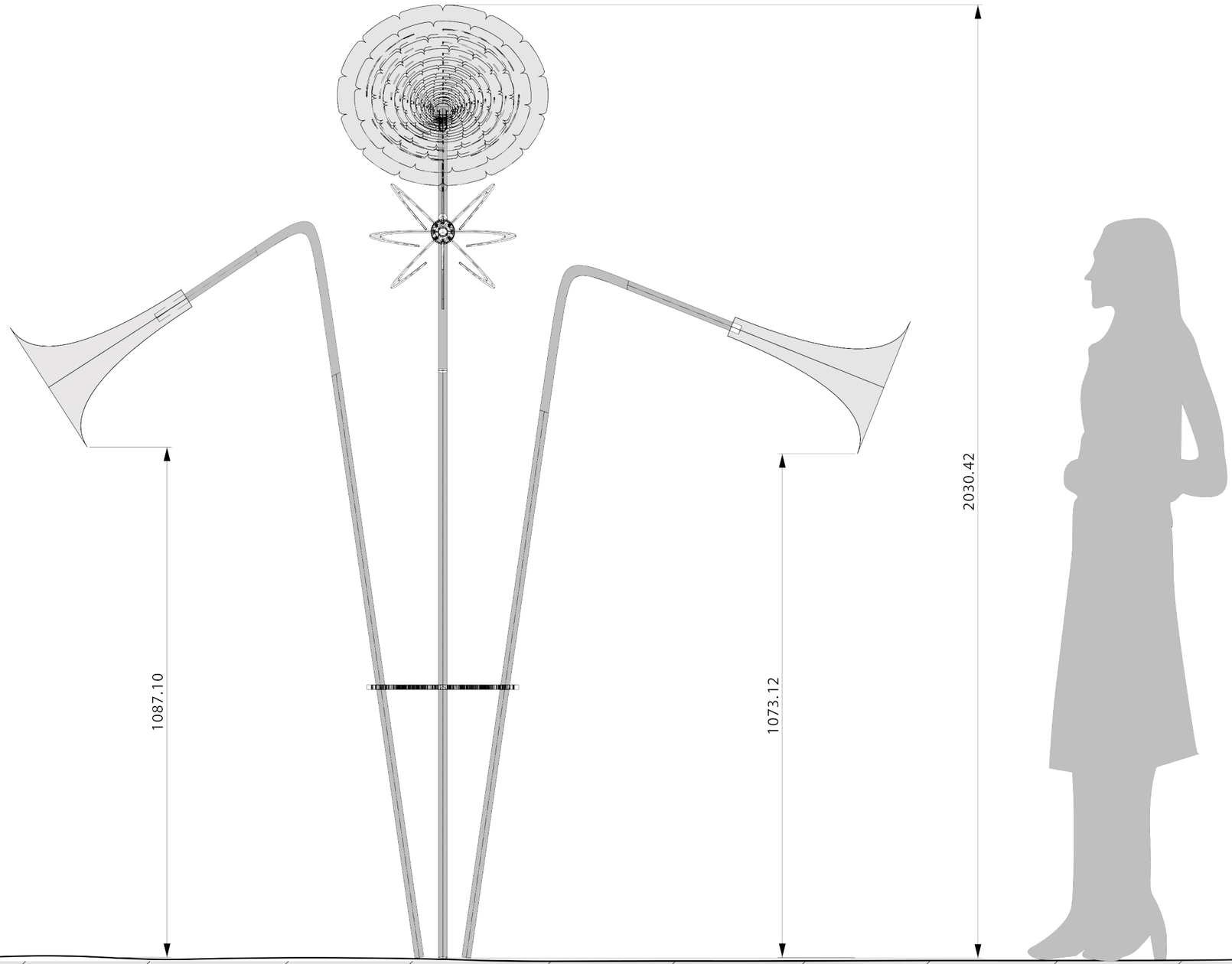
1534.16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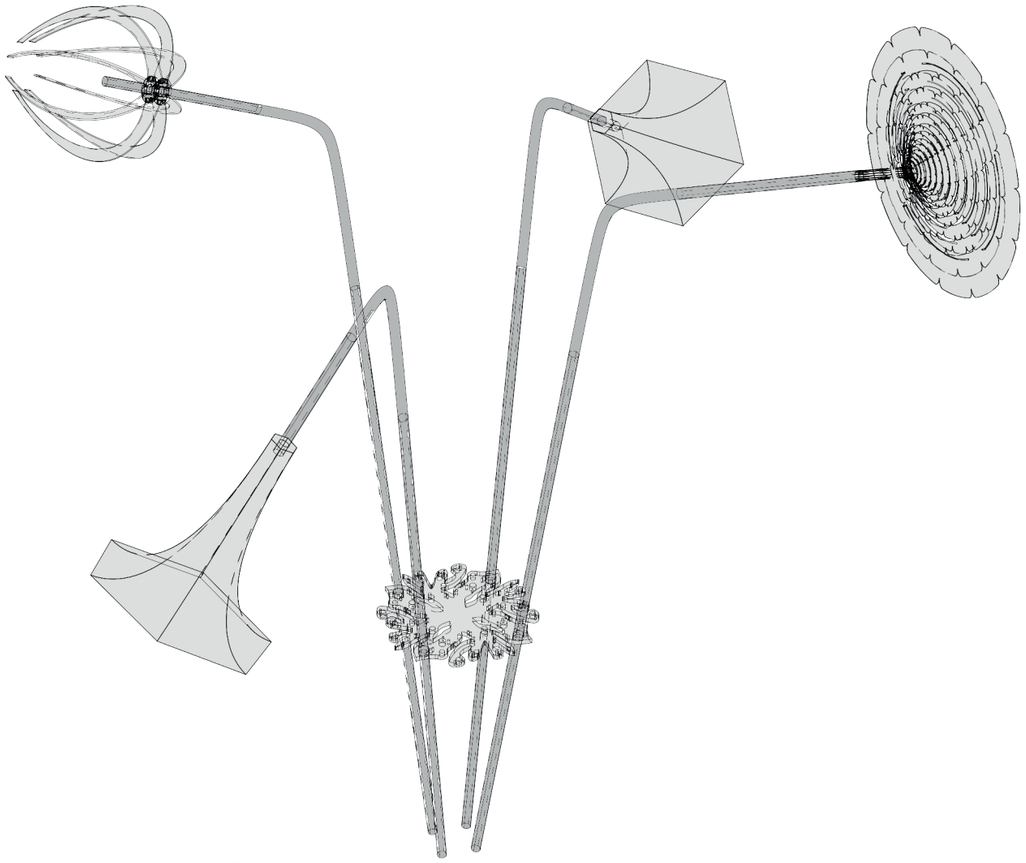
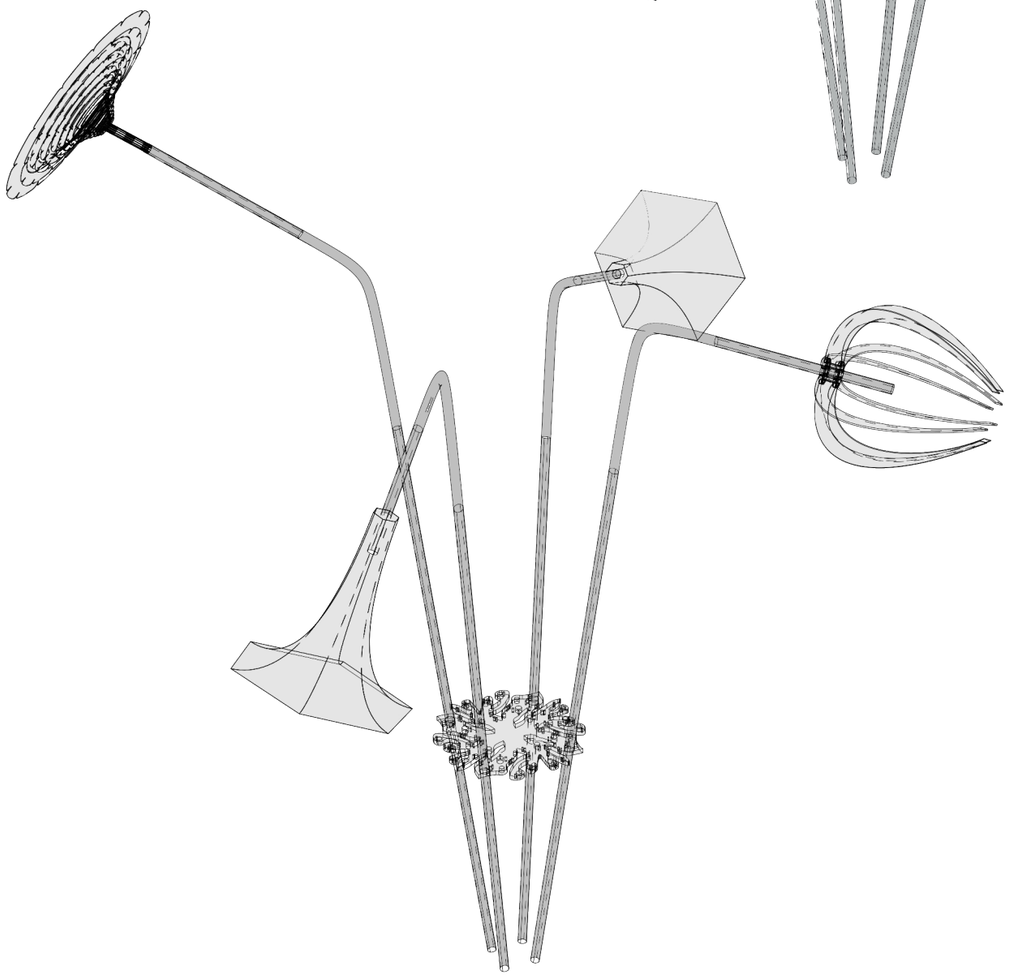
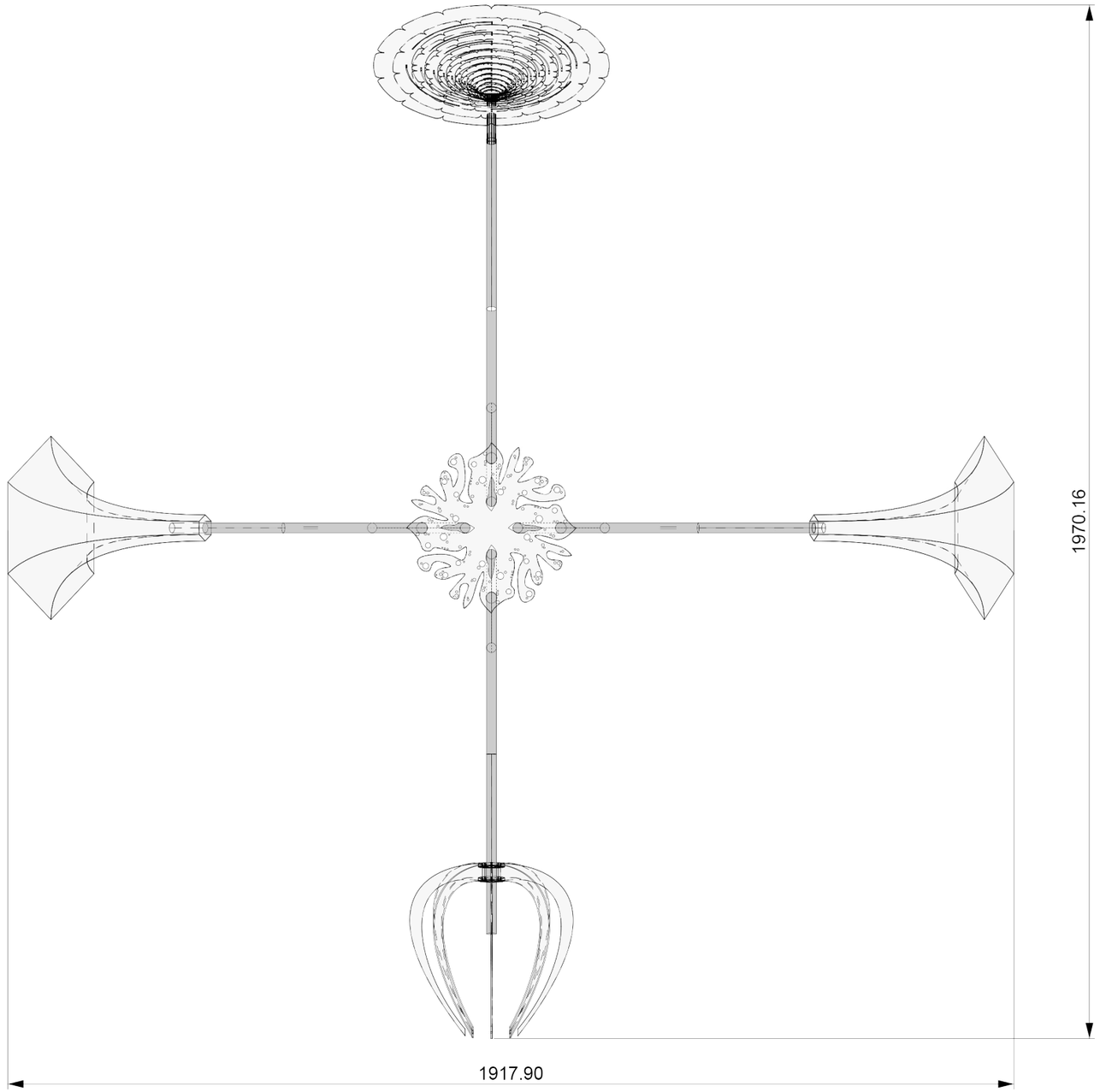
1087.10
1073.12



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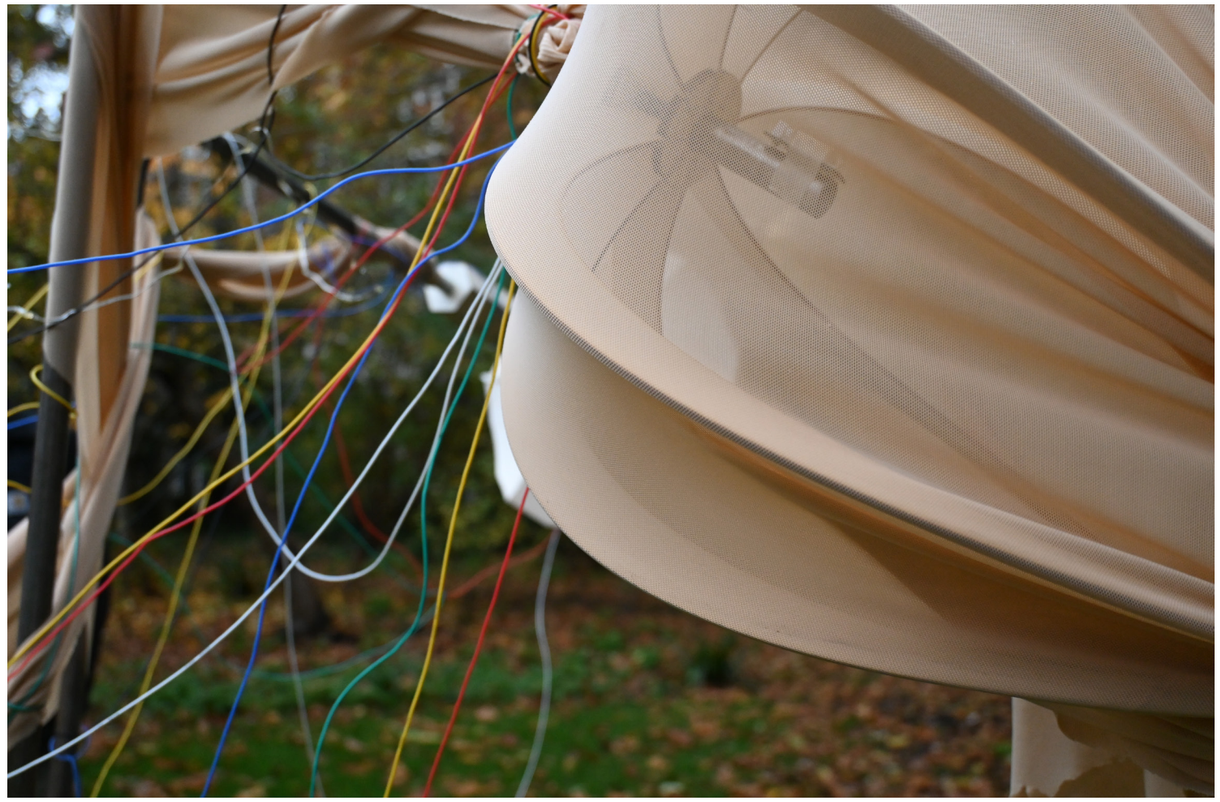
FINAL PROJECT INSTALLATION