Eugenia Sananes
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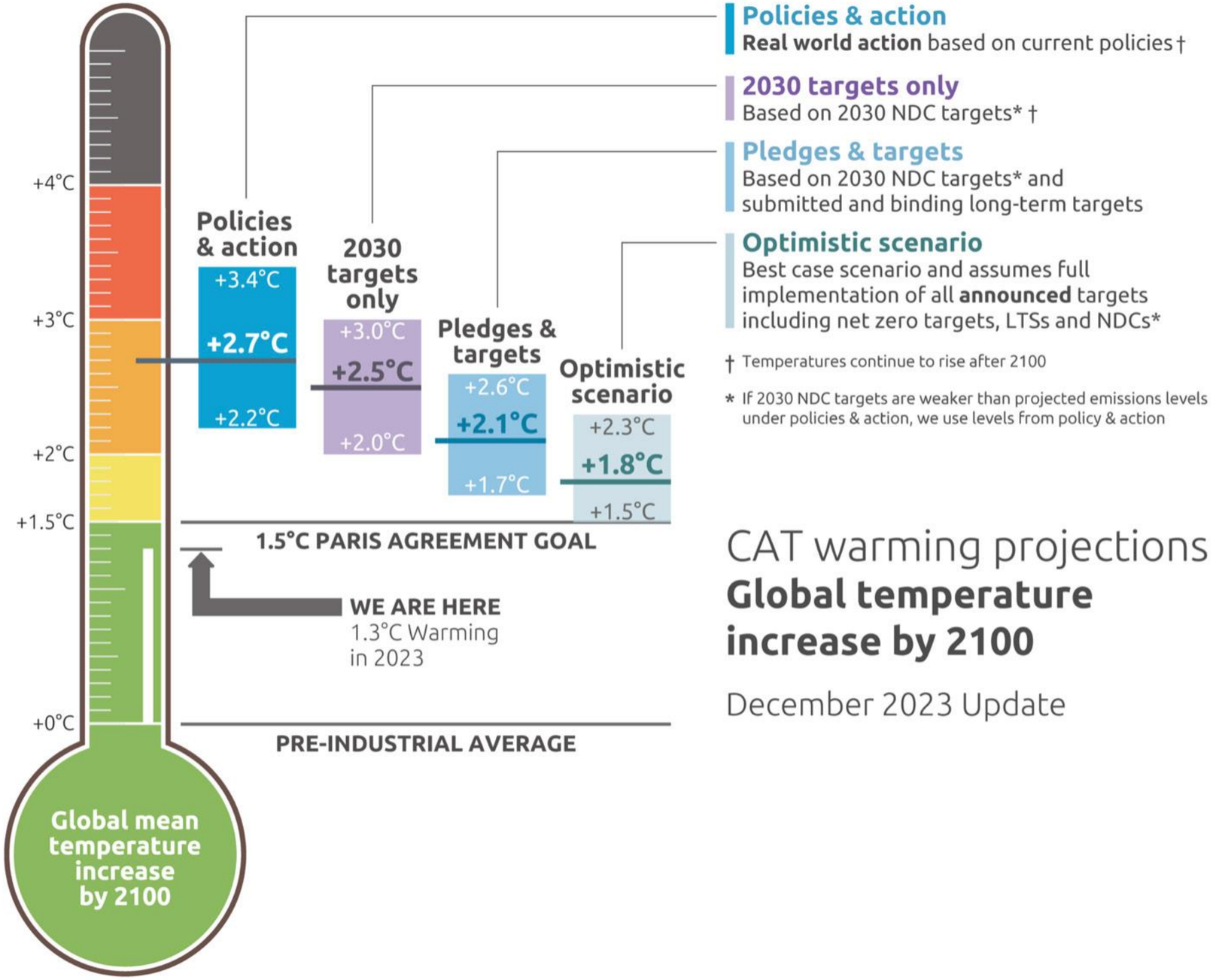
FAB LAB BCN

Iaac Institute for advanced architecture of Catalonia

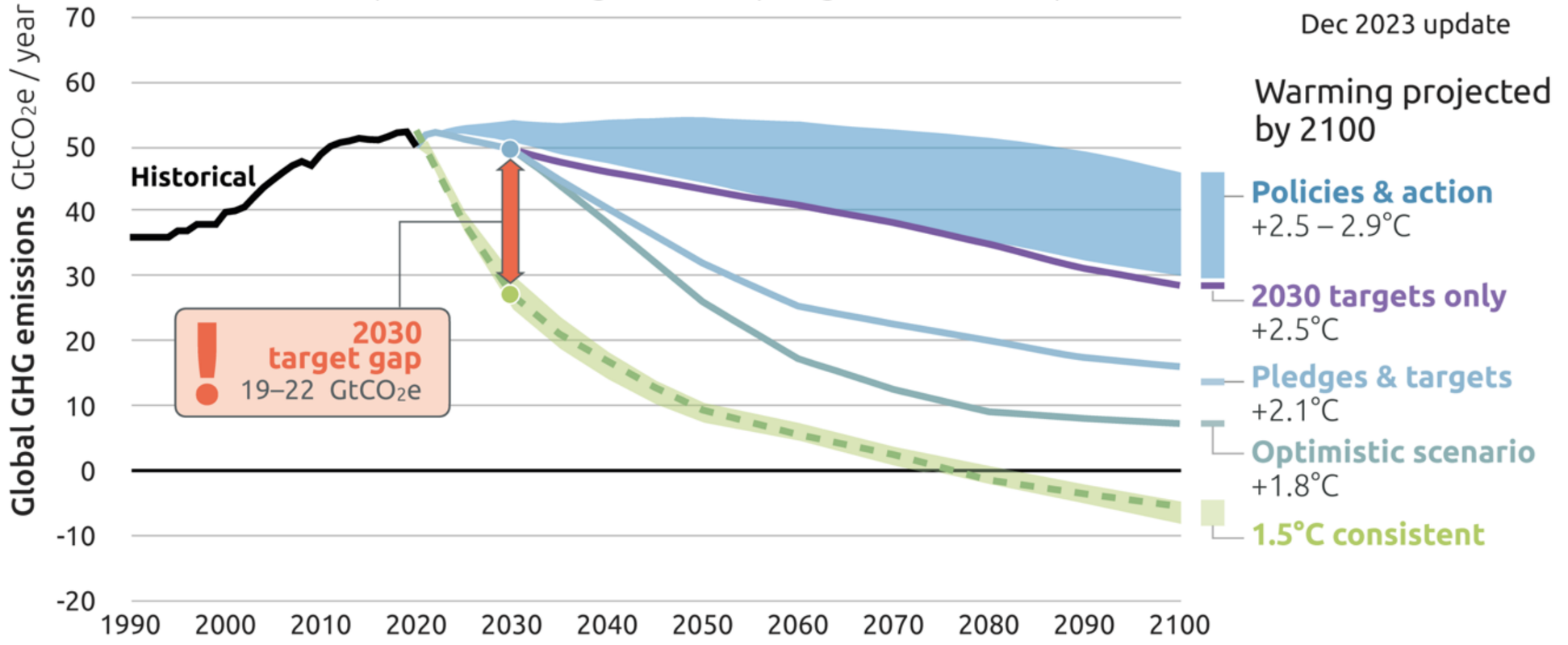


CAT warming projections **Global temperature increase by 2100**

December 2023 Update

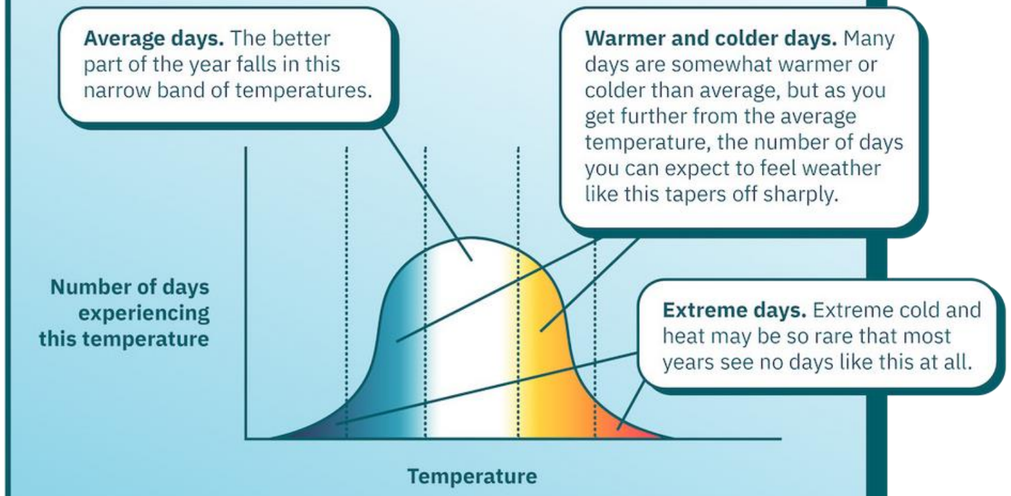
2100 WARMING PROJECTIONS

Emissions and expected warming based on pledges and current policies

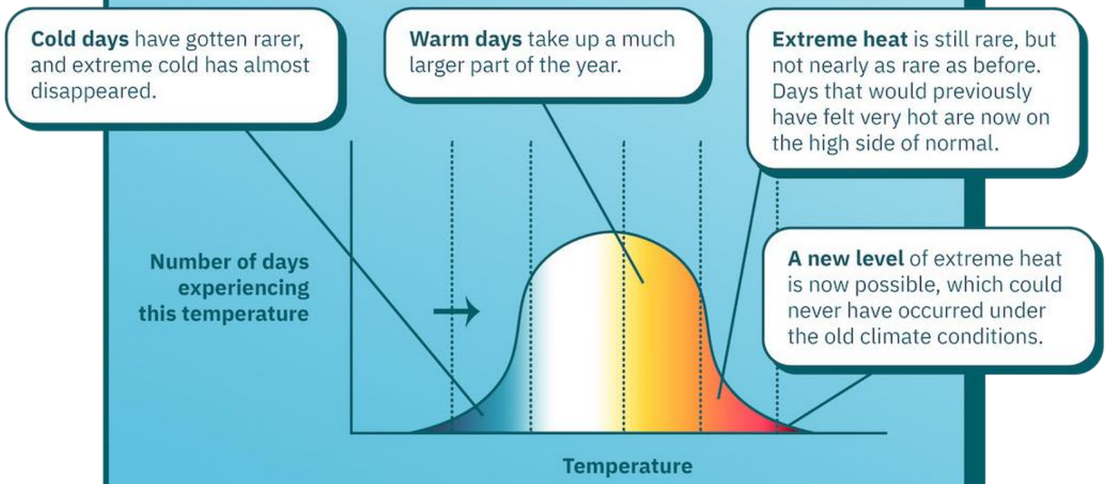


A little more warming can mean a lot more extreme heat

The relationship between global warming and extreme heat is easy to see if you look at the "bell curve" of temperatures that are possible in a given region. A bell curve is a way of showing information, like local temperature, that mostly stays in a narrow range, and gets rarer and rarer as you move further to the extremes.



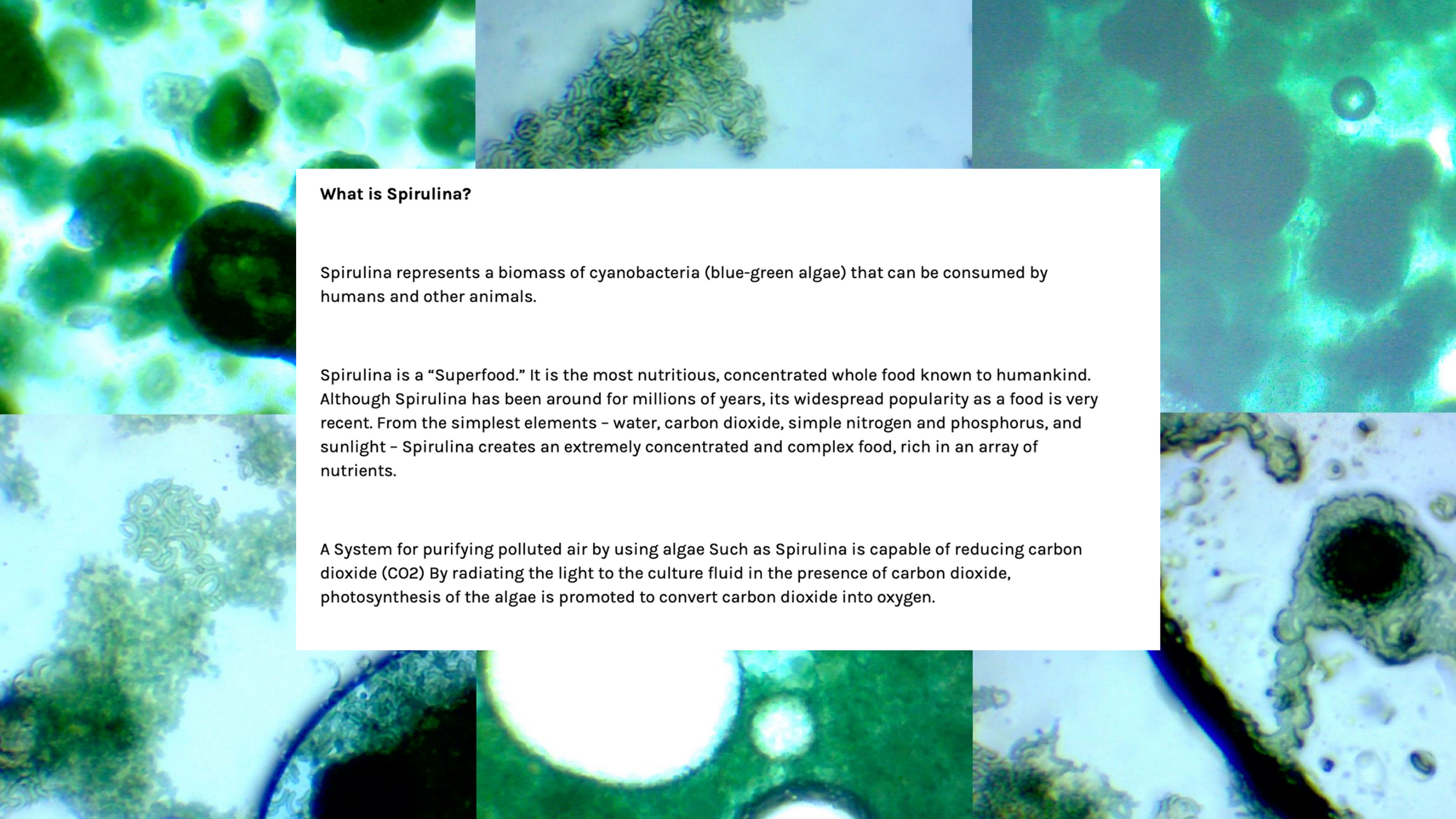
What happens if the average temperature gets a little warmer? If you shift the whole bell curve to the right, the effect toward the middle of the graph is not too dramatic, but the extremes change a lot.



In the year 2085, cities had become a maze of concrete and steel, towering structures casting long shadows over what was once lush and verdant landscapes. The relent- less march of urbanization had left no room for nature, and the once abundant forests were now mere legends. With the rapid industrialization, pollution levels soared, and clean air and water became rare commodities.

Using the amazing proprieties of the spirulina, we created Aspira : a 3D printed inte- ligent device where circulate algae feeding on your own body fluid to grow and filter the air and water.

Aspira is a modular device that can be put on every garment or accessory. This device is 100% independant, it will use dirty, polluted water or your body fluid like sweat to feed this algae and make it grow. You can wear several algae device at once if the pol- lution level is high. By wearing Aspira on your daily life you will contribute to reduce pollution.

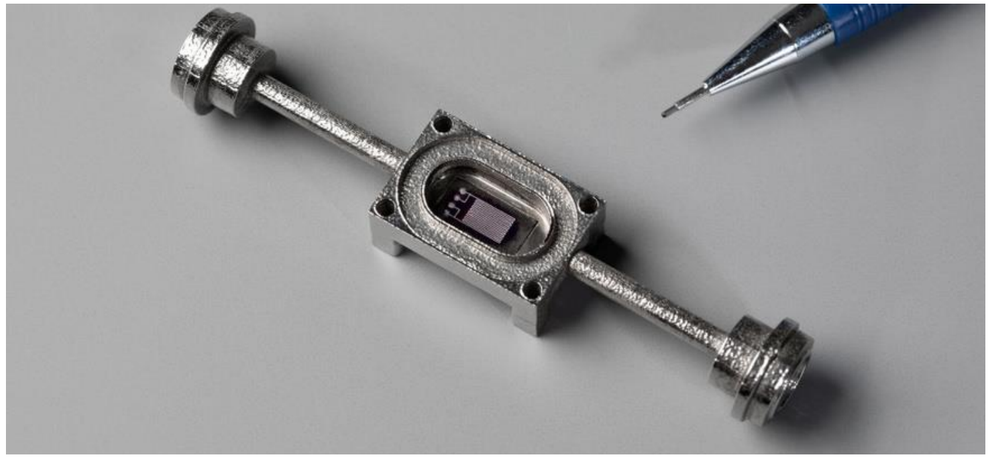


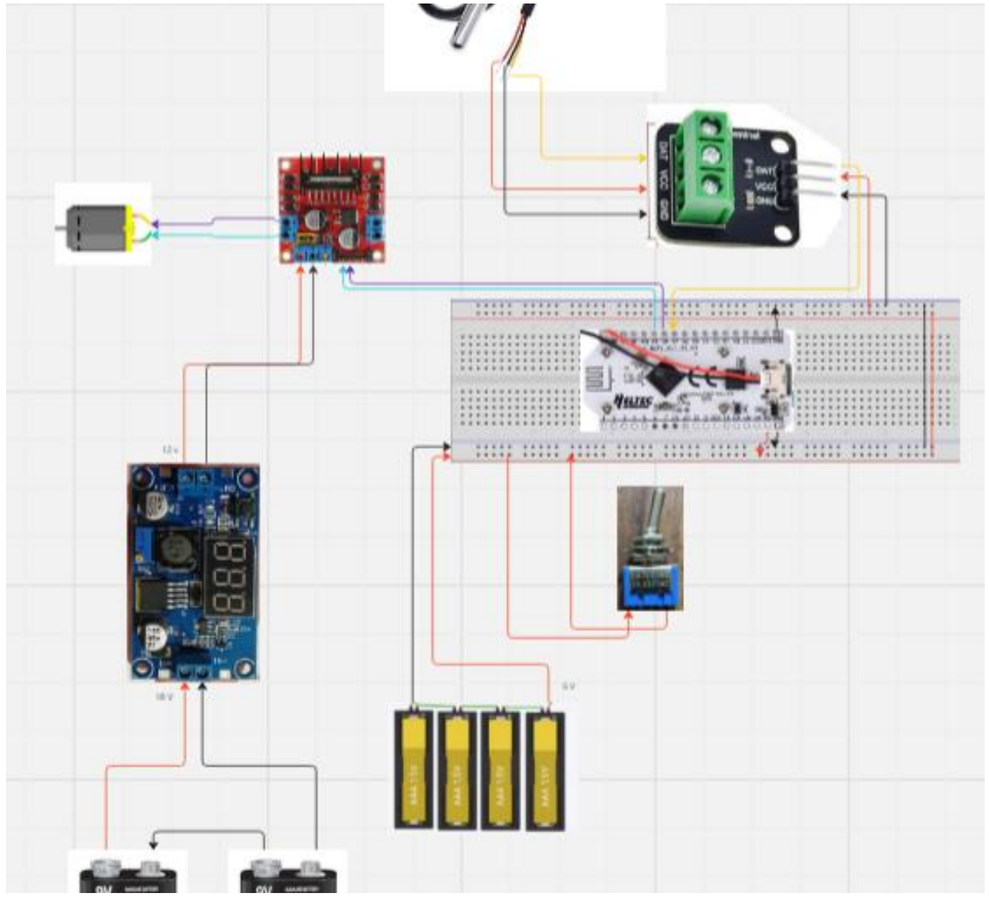
What is Spirulina?

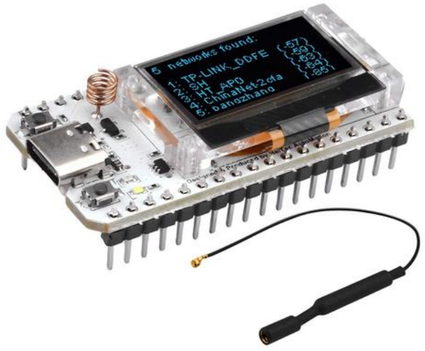
Spirulina represents a biomass of cyanobacteria (blue-green algae) that can be consumed by humans and other animals.

Spirulina is a “Superfood.” It is the most nutritious, concentrated whole food known to humankind. Although Spirulina has been around for millions of years, its widespread popularity as a food is very recent. From the simplest elements – water, carbon dioxide, simple nitrogen and phosphorus, and sunlight – Spirulina creates an extremely concentrated and complex food, rich in an array of nutrients.

A System for purifying polluted air by using algae Such as Spirulina is capable of reducing carbon dioxide (CO2) By radiating the light to the culture fluid in the presence of carbon dioxide, photosynthesis of the algae is promoted to convert carbon dioxide into oxygen.







SPIRULINA ALGAE

SMARTPHONE
INTELIGENT

PERISTALTIC
MOTOR

CODING &
CONNECTIVITY

SENSOR
TEMPERATURE
& PH

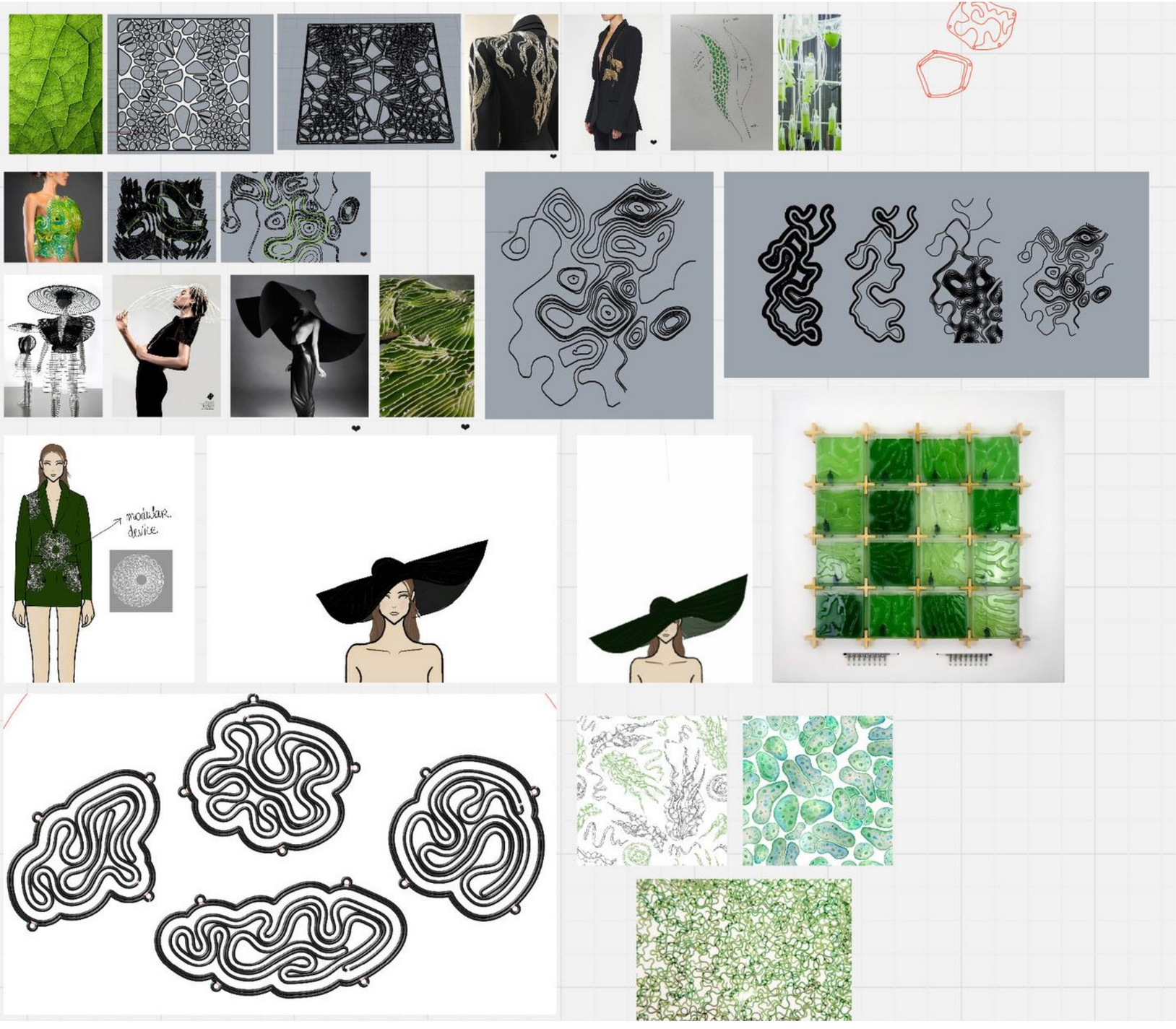


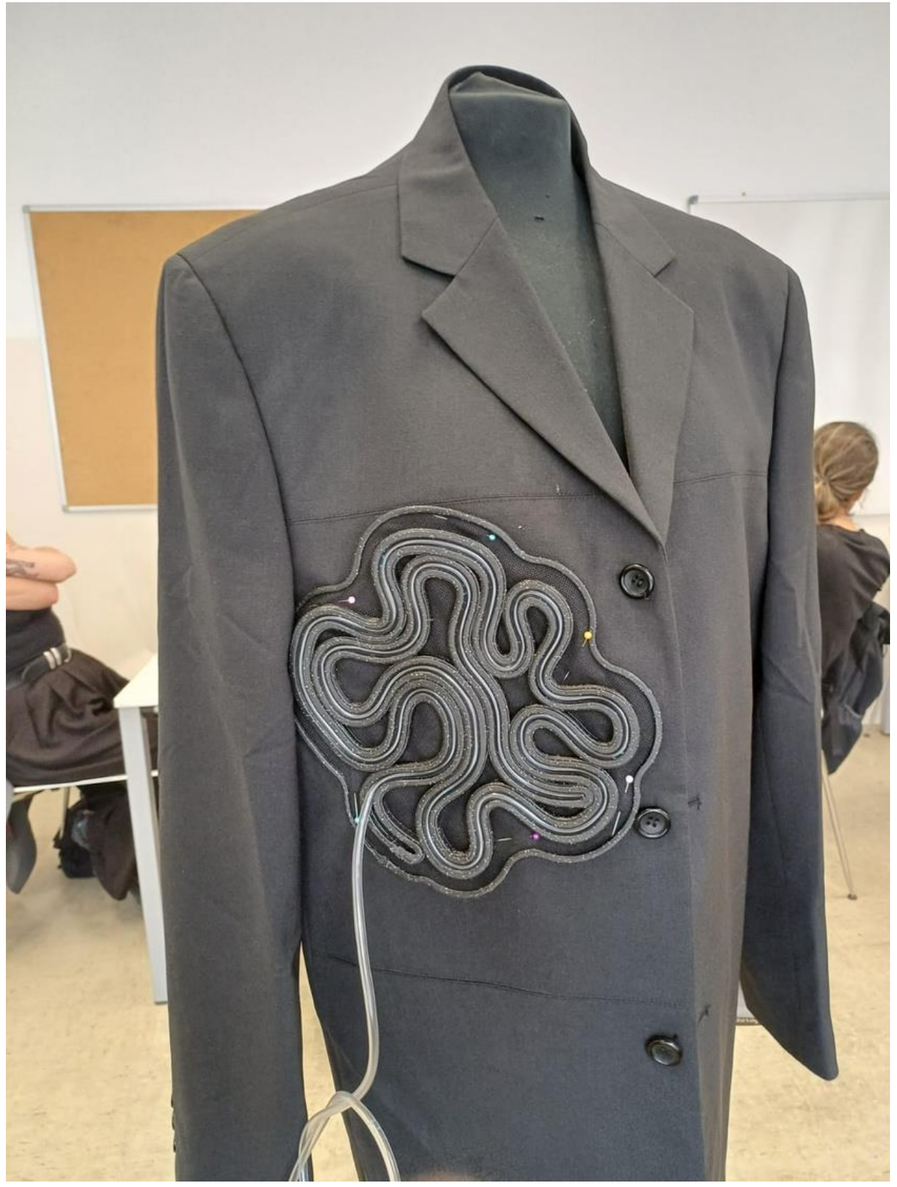


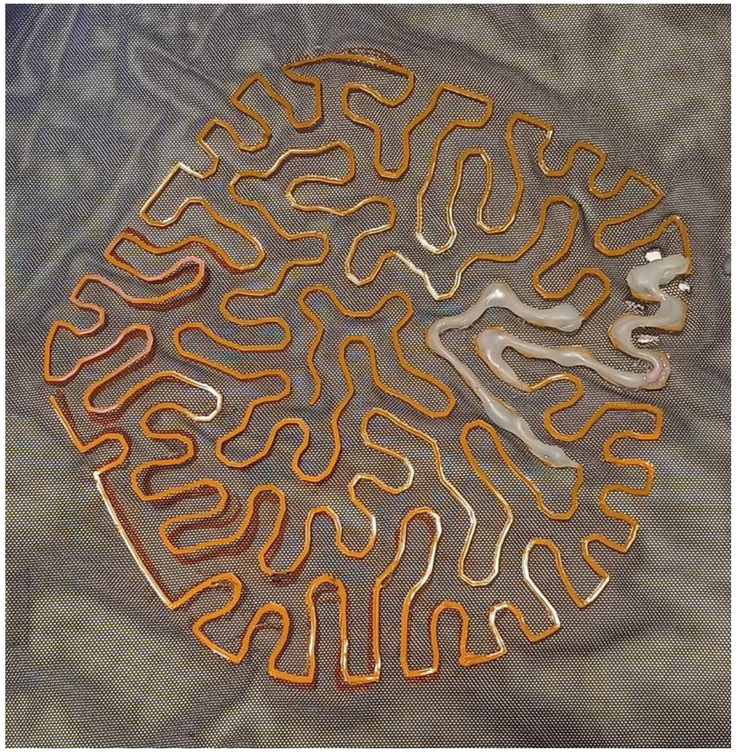

CÉLINE

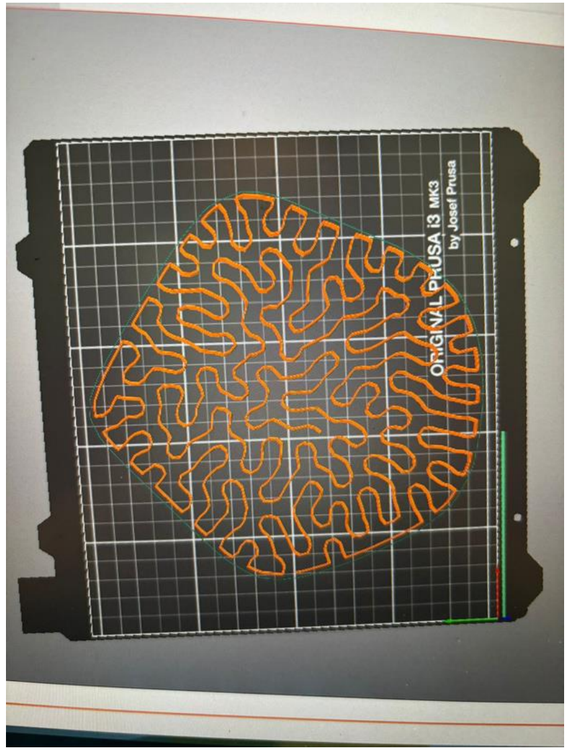


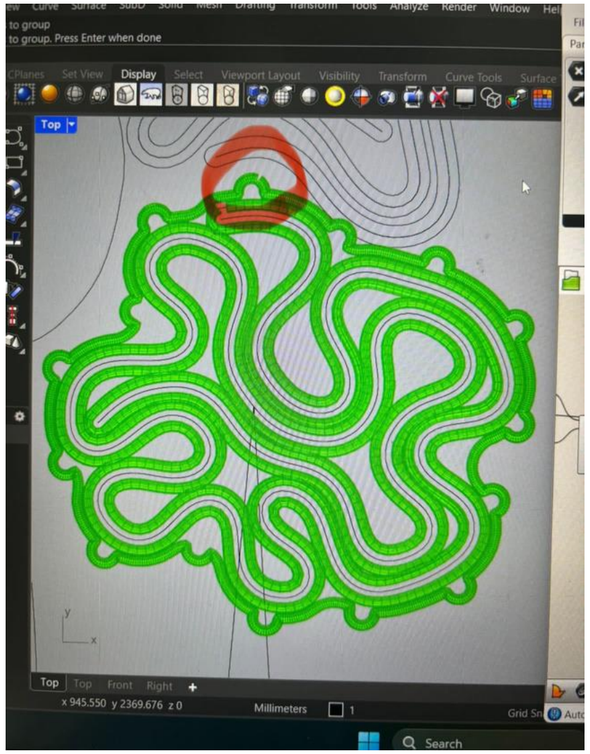
JILSANDER


modular device






ORIGINAL PRUSA i3 MK3
by Josef Prusa


to group
to group. Press Enter when done
Display
Top
Top
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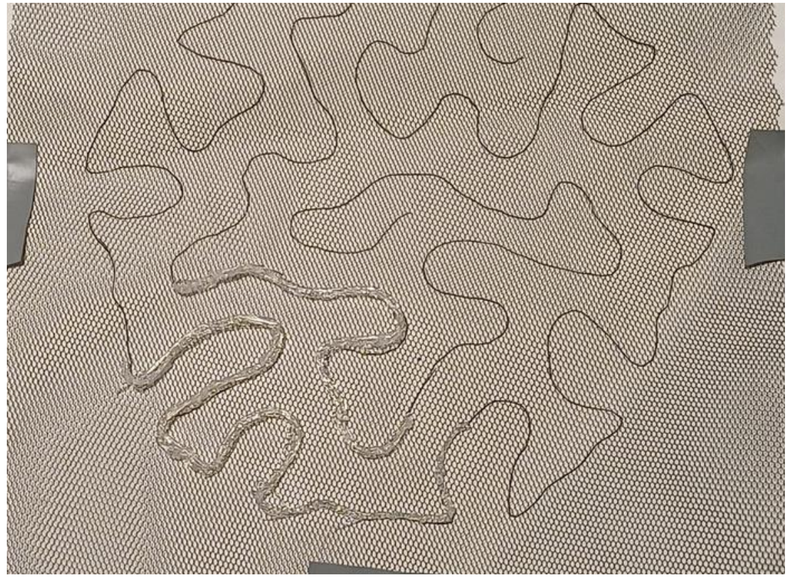
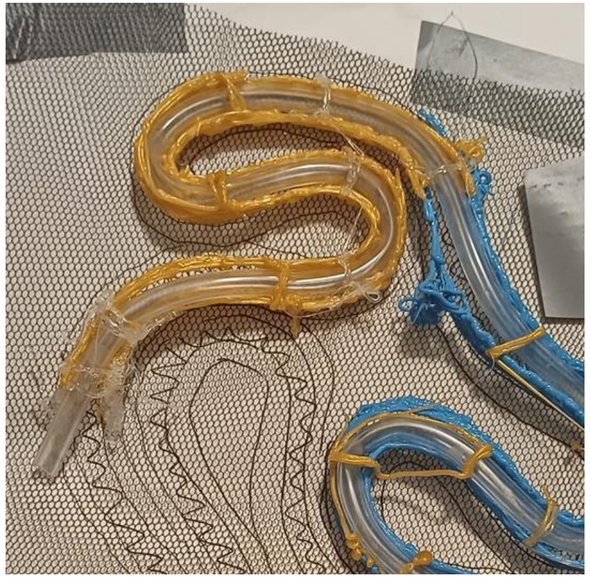
x 945.550 y 2369.676 z 0
Millimeters
Search





TEST_V2 | Arduino IDE 2.3.2

File Edit Sketch Tools Help

WiFi LoRa 32(V3)

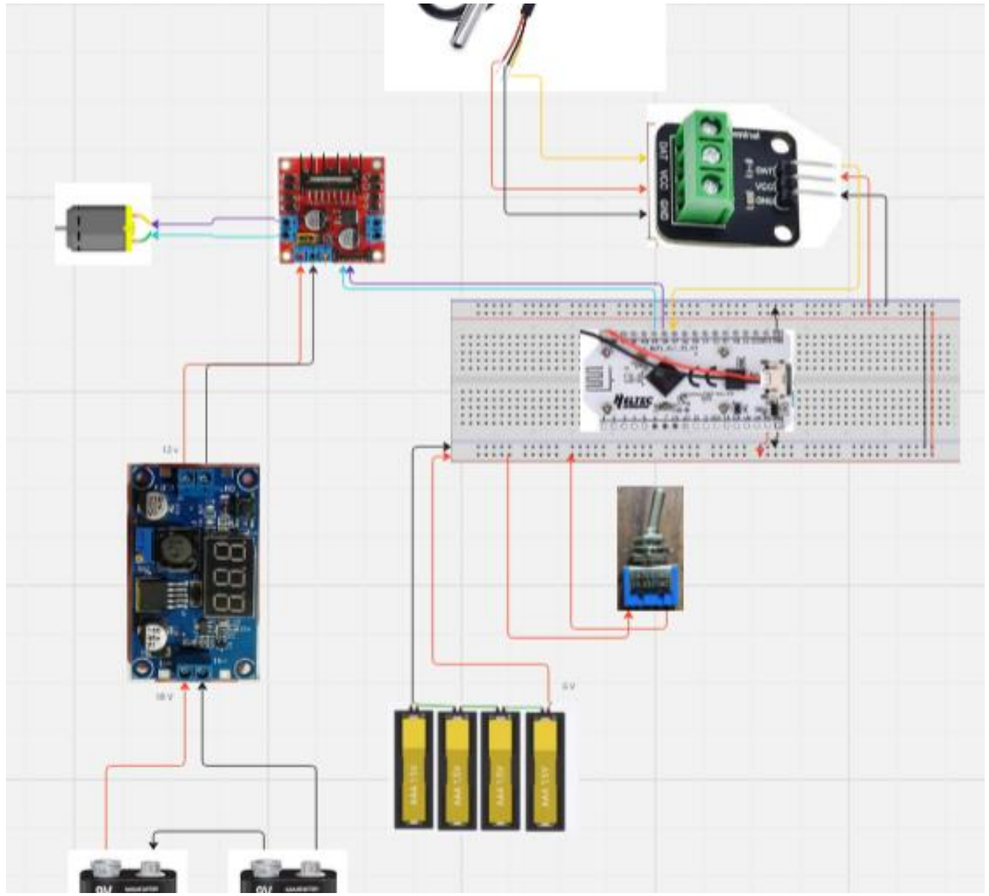
TEST_V2.ino

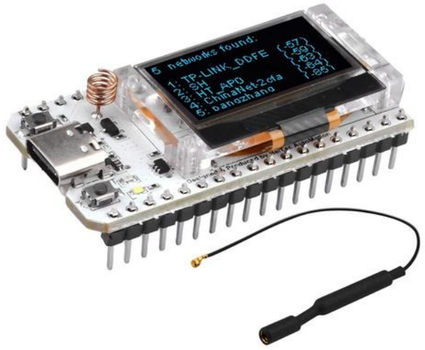
```
// Initialize all pins
void pinInit() {
  pinMode(M1L, OUTPUT);
  pinMode(M1R, OUTPUT);
  pinMode(S1, INPUT);
}

void readSensor(OLEDDisplay* display, OLEDDisplayUiState* state, int16_t x, int16_t y) {
  float sensor = analogRead(S1);
  String temperatura = "Temperatura: " + String(sensor);

  display->setTextAlignment(TEXT_ALIGN_CENTER);
  display->setFont(ArialMT_Plain_10);
  display->drawString(centerX, 0, temperatura);
}

void motorRotation() {
  digitalWrite(M1L, LOW);
  digitalWrite(M1R, HIGH);
  delay(10000);
```





SPIRULINA ALGAE

SMARTPHONE INTELIGENT

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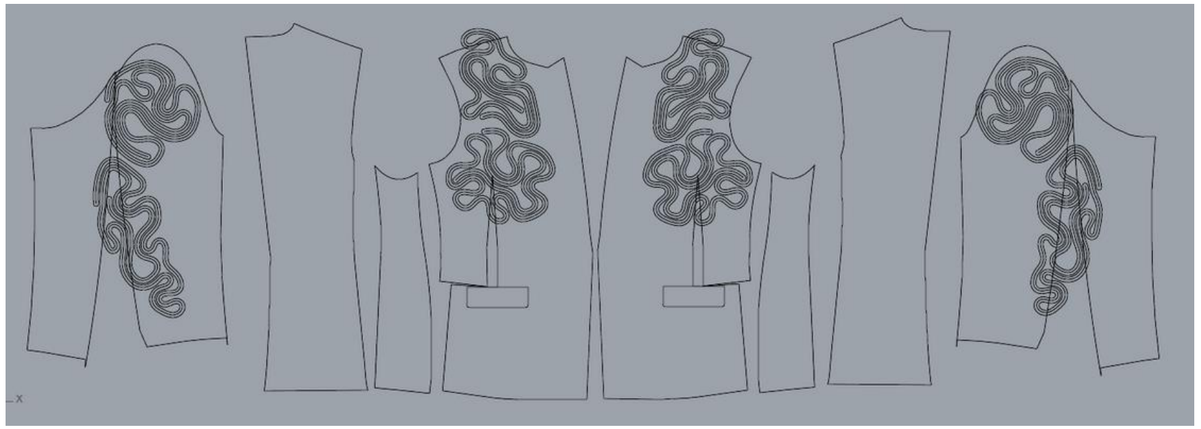
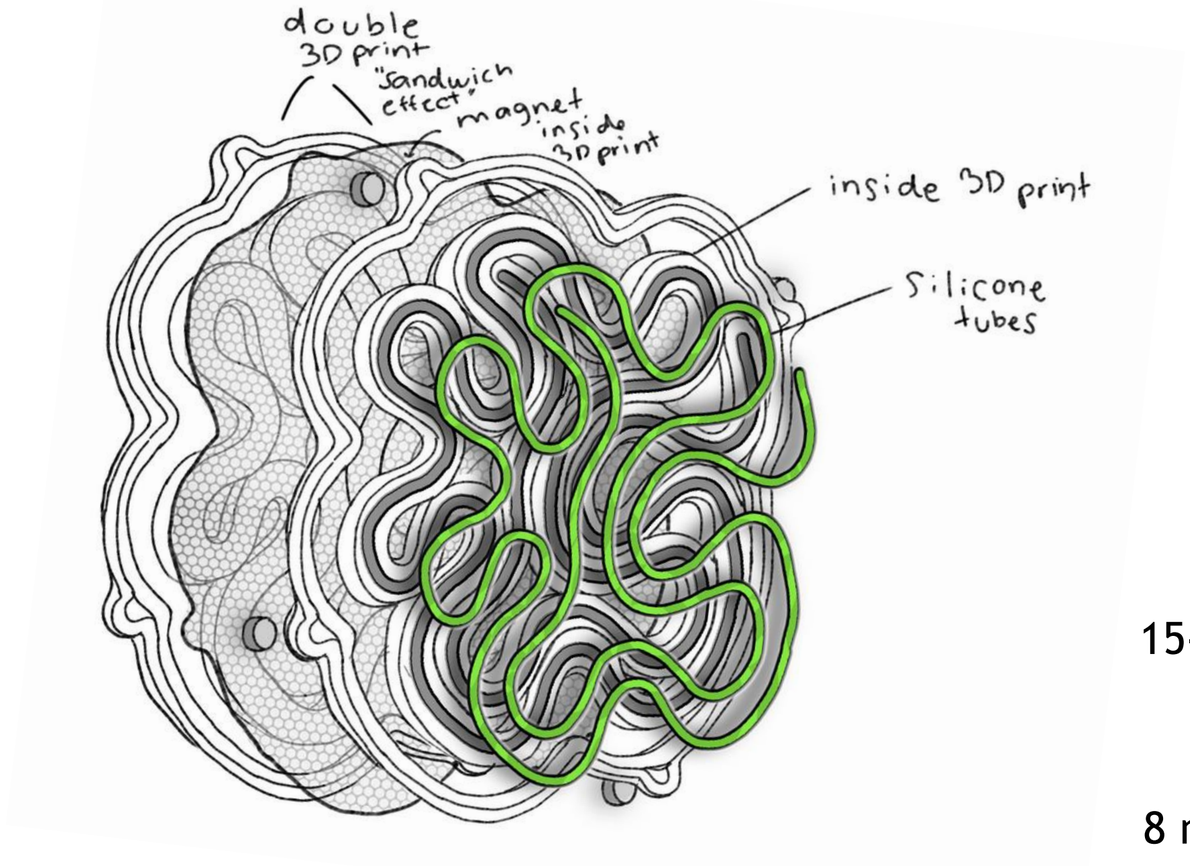
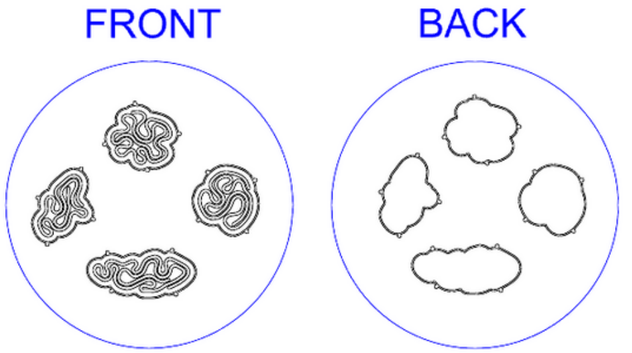
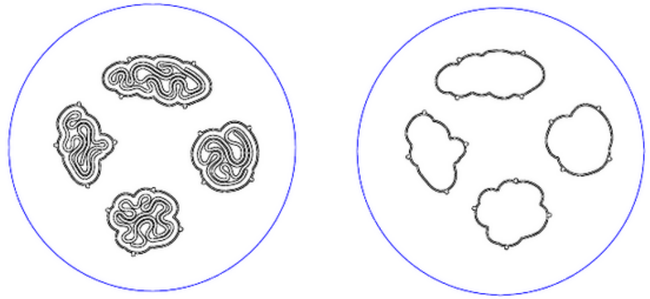






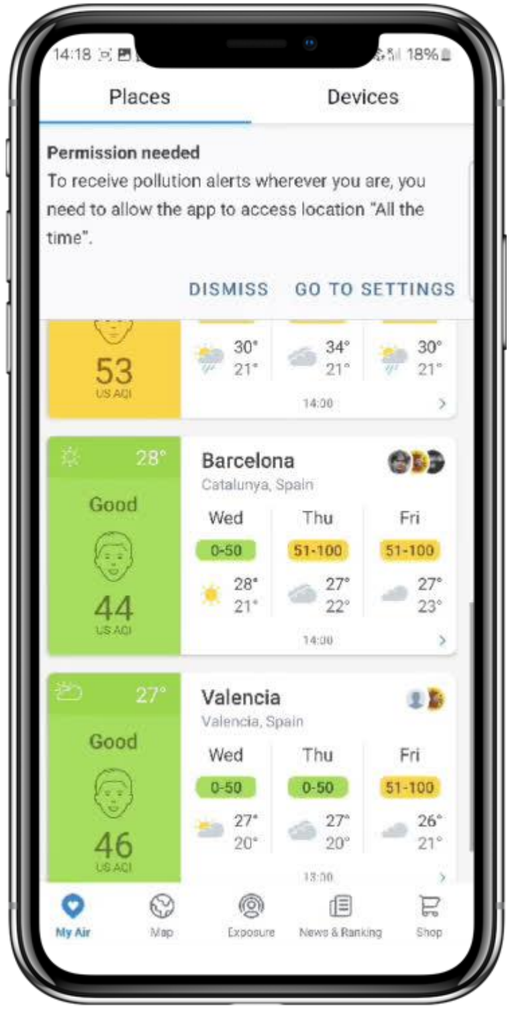
MIRRORED



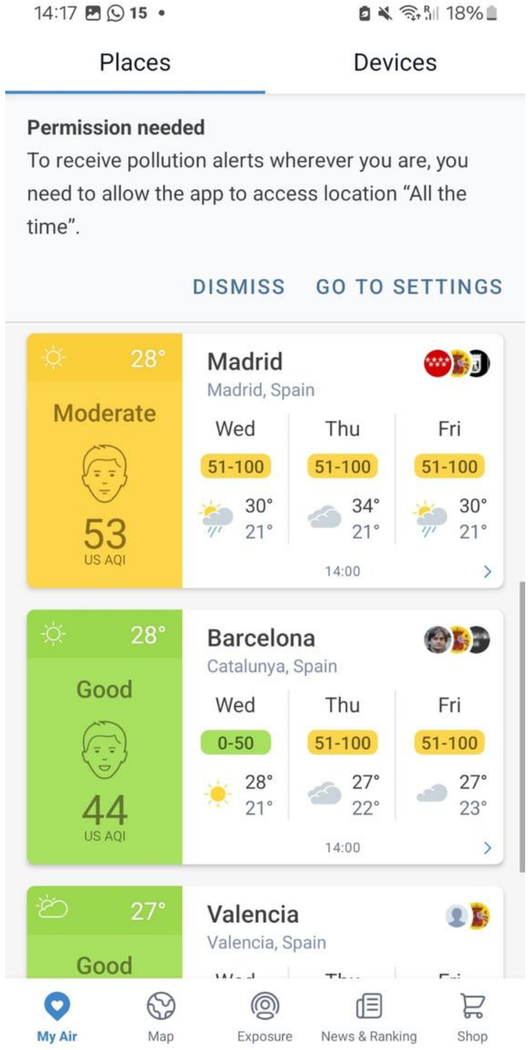
5 - 15 min heating

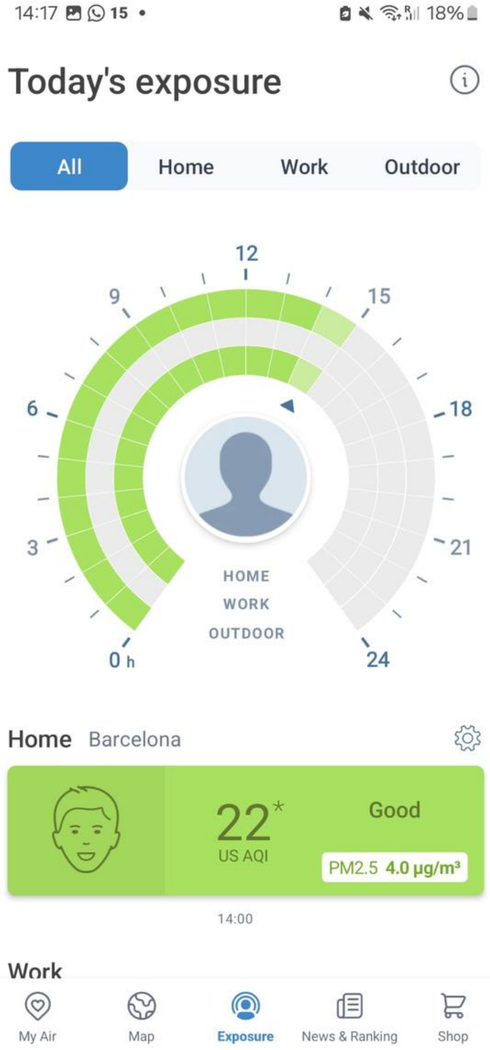
15-20min priniting per module

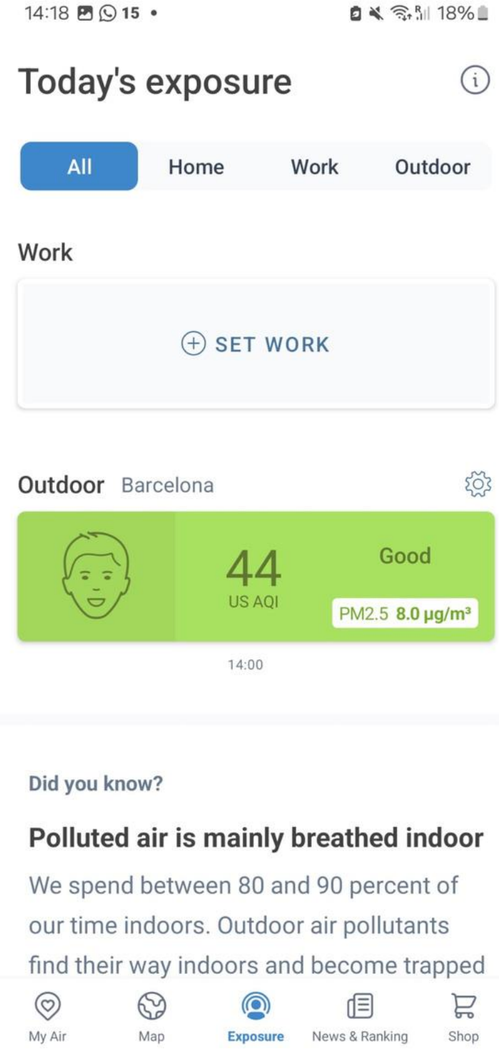
8 modules, 2.7-3hours

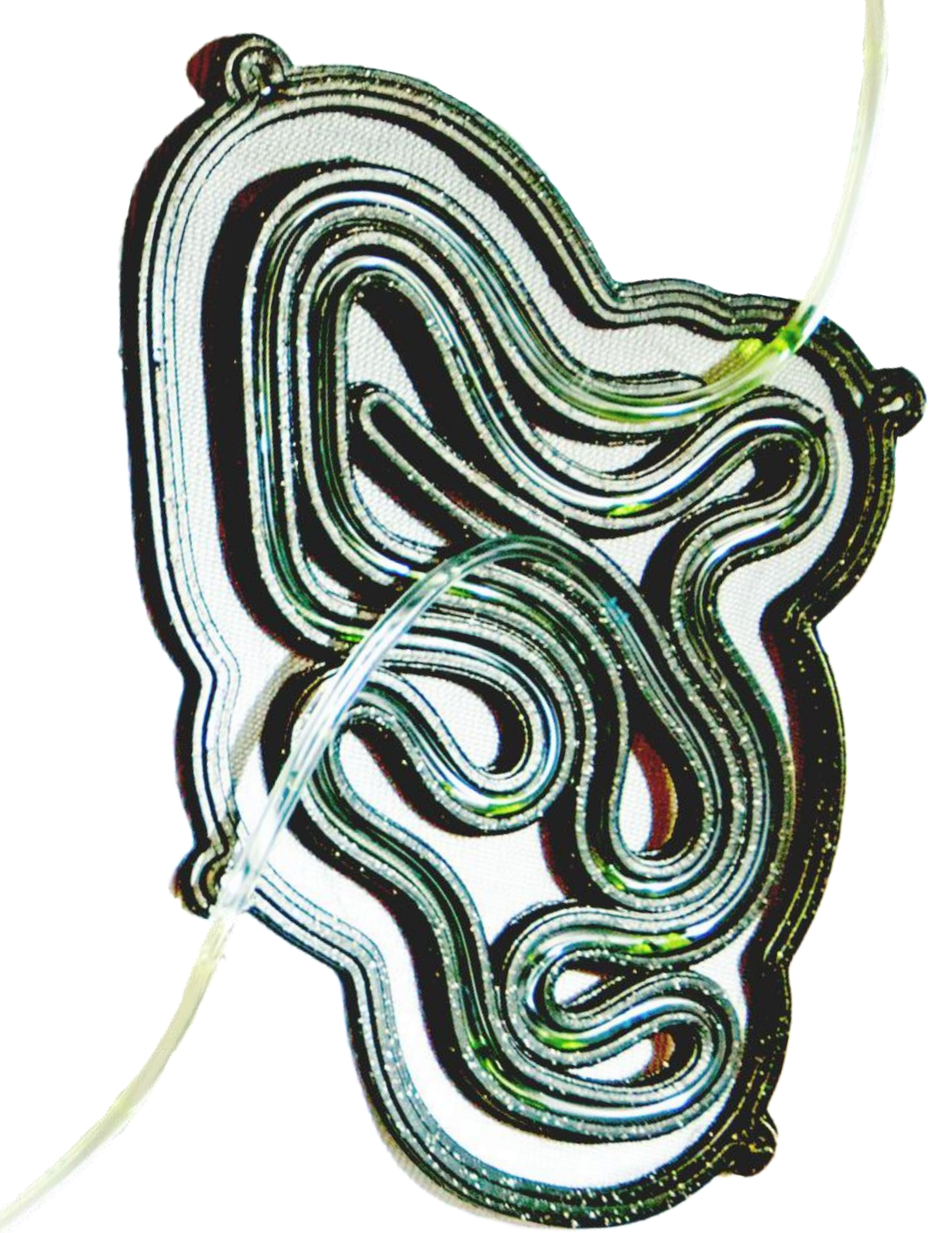

14:18
18%
Places
Devices
Permission needed
To receive pollution alerts wherever you are, you need to allow the app to access location "All the time".
DISMISS
GO TO SETTINGS
53
US AQI
30°
21°
34°
21°
30°
21°
14:00
28°
Barcelona
Catalunya, Spain
Good
Wed
Thu
Fri
0-50
51-100
51-100
44
US AQI
28°
21°
27°
22°
27°
23°
14:00
27°
Valencia
Valencia, Spain
Good
Wed
Thu
Fri
0-50
0-50
51-100
46
US AQI
27°
20°
27°
20°
26°
21°
13:00
My Air
Map
Exposure
News & Ranking
Shop


Quality of air:
Moderate - 60 US AQI


14:17
18%
Places
Devices
Permission needed
To receive pollution alerts wherever you are, you need to allow the app to access location "All the time".
DISMISS
GO TO SETTINGS
28°
Moderate
53
US AQI
Madrid
Madrid, Spain
Wed
Thu
Fri
51-100
51-100
51-100
30°
21°
34°
21°
30°
21°
14:00
28°
Good
44
US AQI
Barcelona
Catalunya, Spain
Wed
Thu
Fri
0-50
51-100
51-100
28°
21°
27°
22°
27°
23°
14:00
27°
Good
Valencia
Valencia, Spain
My Air
Map
Exposure
News & Ranking
Shop


14:17
18%
Today's exposure
All
Home
Work
Outdoor
12
15
18
21
24
0 h
3
6
9
HOME
WORK
OUTDOOR
Home
Barcelona
22*
US AQI
Good
PM2.5 4.0 µg/m³
14:00
Work
My Air
Map
Exposure
News & Ranking
Shop


14:18
18%
Today's exposure
All
Home
Work
Outdoor
Work
SET WORK
Outdoor
Barcelona
44
US AQI
Good
PM2.5 8.0 µg/m³
14:00
Did you know?
Polluted air is mainly breathed indoor
We spend between 80 and 90 percent of our time indoors. Outdoor air pollutants find their way indoors and become trapped
My Air
Map
Exposure
News & Ranking
Shop



Environmental Impact

- They contribute to nearly 50% of photosynthesis and mitigating global warming.
- Each gram of algae absorbs two grams of CO2.
- A tree absorbs an average of 15-20 kg of CO2 per year.

The CO2 absorbed annually by 40 grams of algae, totaling 29.2 kg, is equivalent to:

- not driving a car for approximately 12.6 hours.
- It also equals the CO2 emissions from electricity use in an average household for about 18.25 days.
- This amount of CO2 absorption by algae is comparable to the emissions from a person flying approximately 35,610 miles.
- Additionally, it equates to the emissions from the production of about 1.08 kg of beef.
- Lastly, it is similar to the CO2 emissions from heating a typical home for about 7.3 days.

The Andalusian company ALgaEnergy launched the CO2ALGAEFIX project: algae capable of absorbing the same amount of CO2 as 26,000 trees.
ALgaEnergy set up a microalgae cultivation plant on a 10,000 m^2 surface area, with a capacity for one million liters of green liquid, capable of producing 40 tons of biomass annually.

Instituto Max Planck de Bremen. (2020). En MARUM - Centro de Ciencias Marinas y Medioambientales de la Universidad de Bremen.

García-Rodríguez, C. A., & Hernández-Touset, C. J. P. (2012). Diseño conceptual de sistema para el cultivo intensivo de macro algas marinas [Conceptual Design System for the Intensive Cultivation of Seaweeds]. Departamento de Ingeniería Química, Universidad Central de Las Villas, Cuba.

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