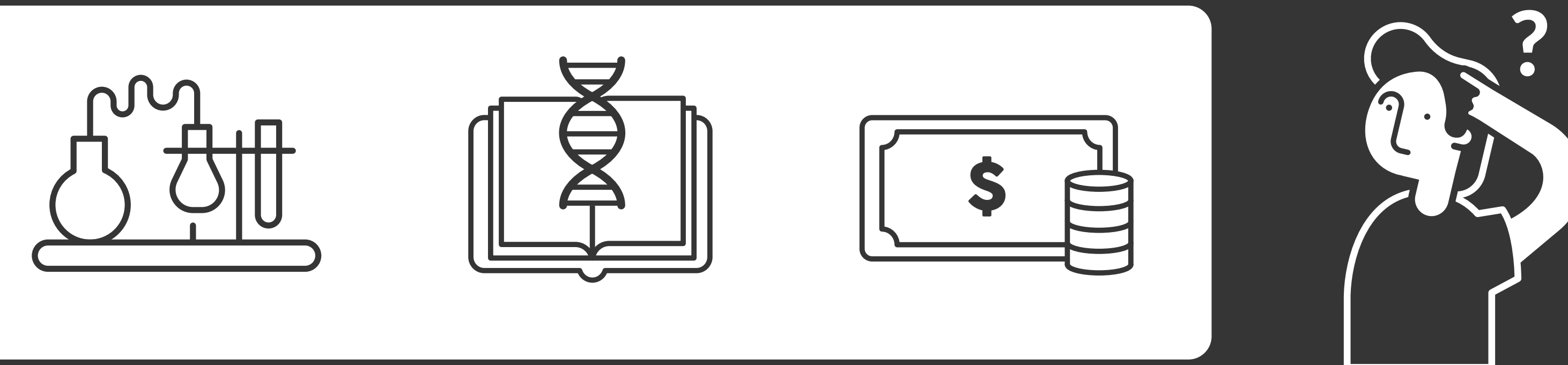


Barriers to access synbio

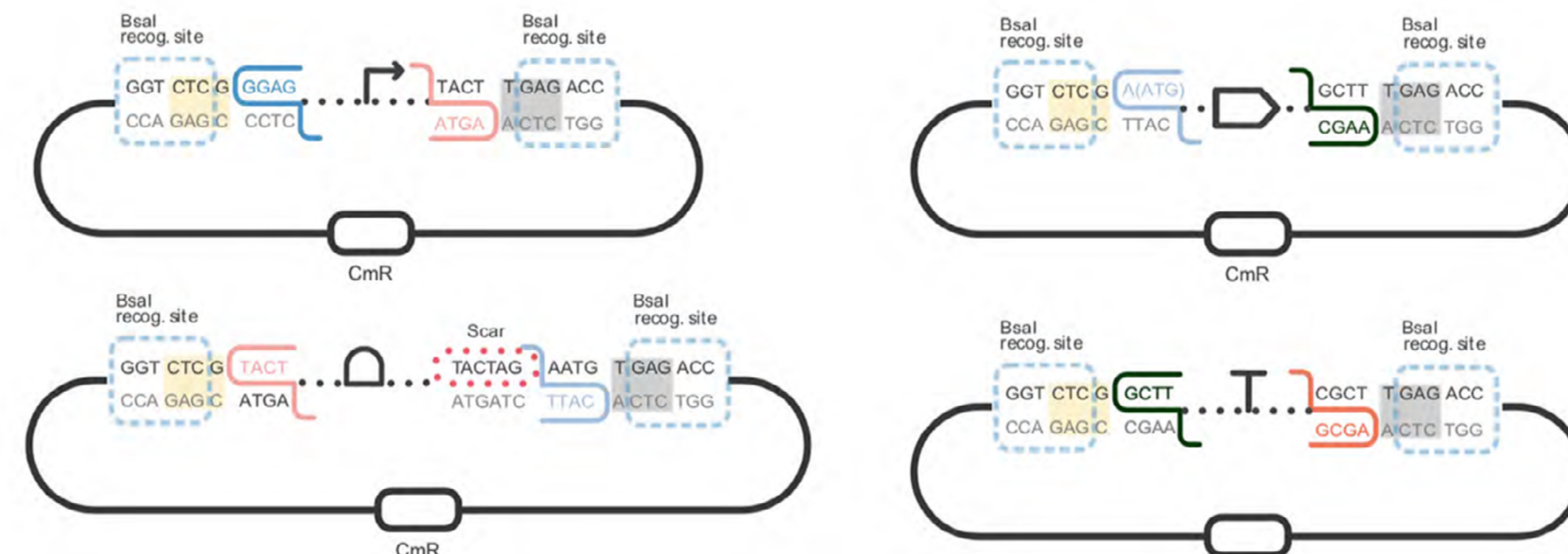
The access is hampered by the required **equipment, knowledge** and **economic costs**.



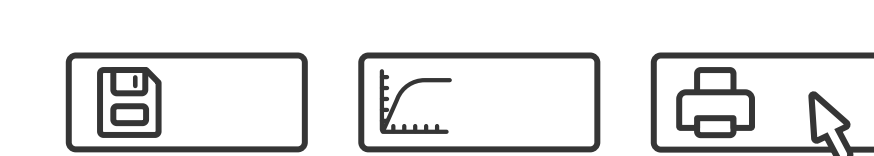
Software



An intuitive and user-adapted interface allows the user to design and print genetic circuits by selecting the basic DNA pieces.

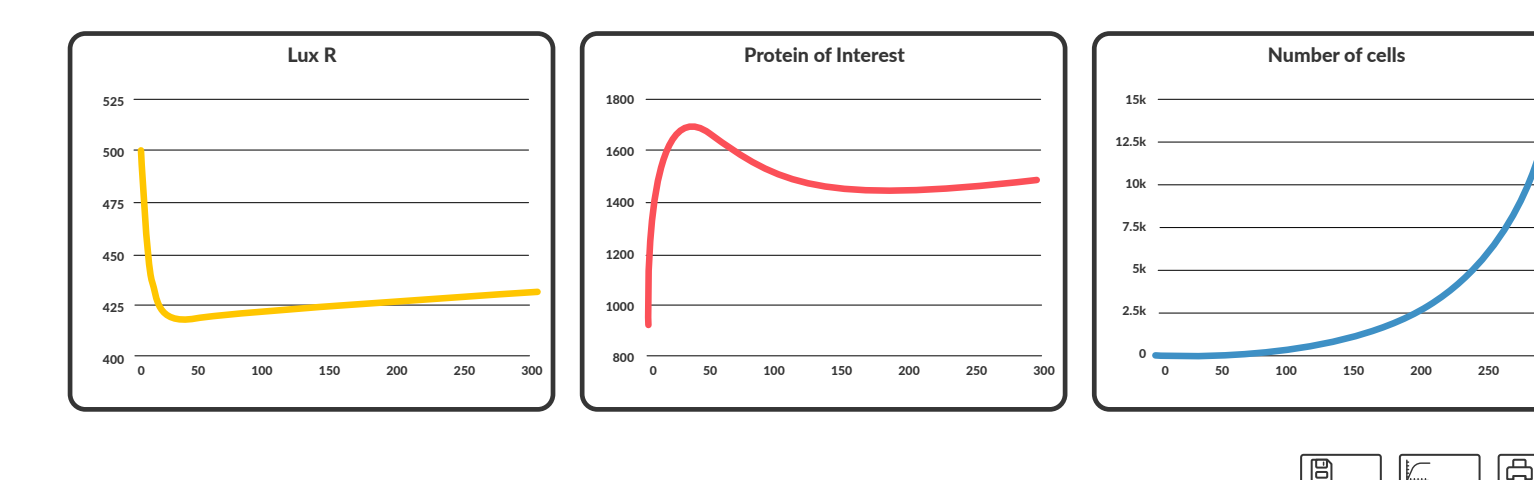


These pieces are part of our Golden Gate standardized Part Collection, and they are fully characterized to provide the user all the information about the designed genetic circuit.



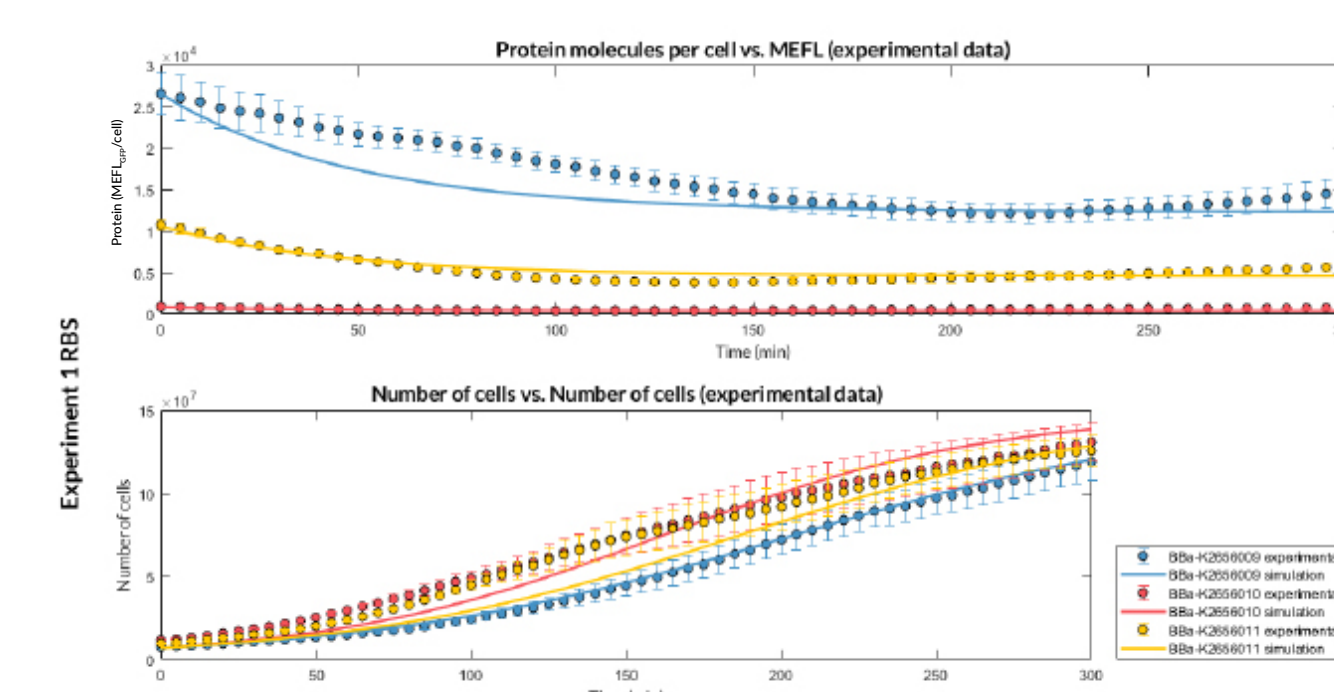
Before printing a genetic circuit, it can be simulated with our Simulation Tool, or it can be directly printed.

Simulation tool



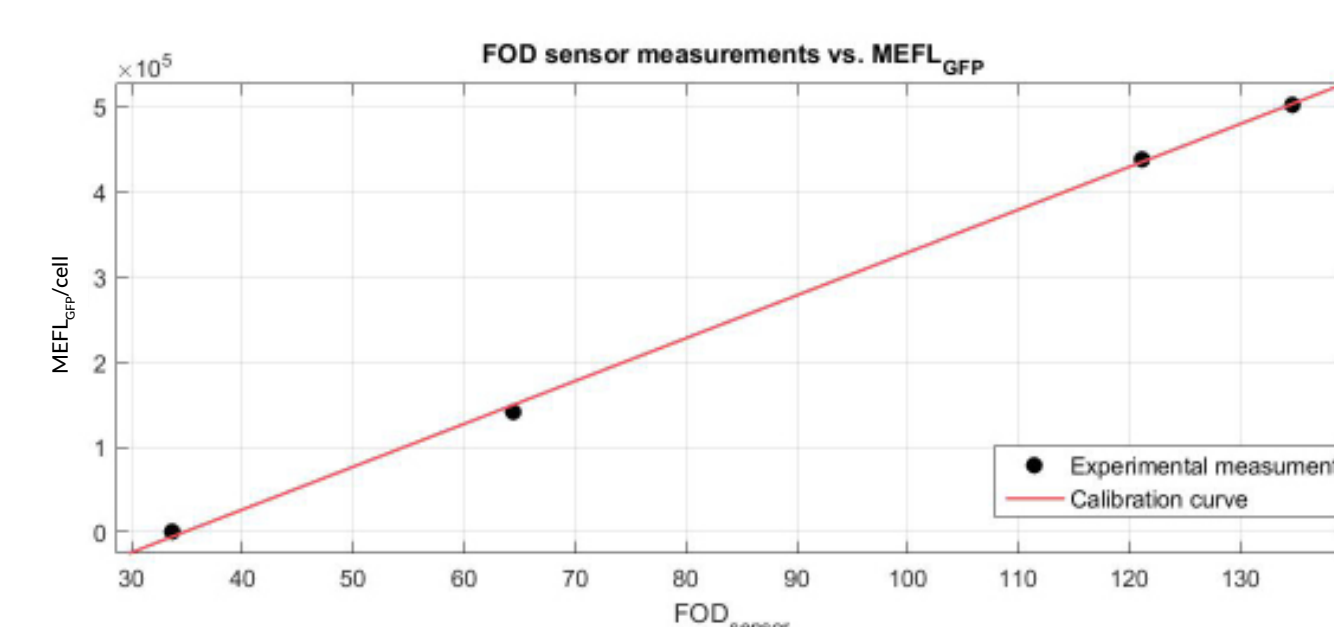
Experimental and simulation results

Parts characterization



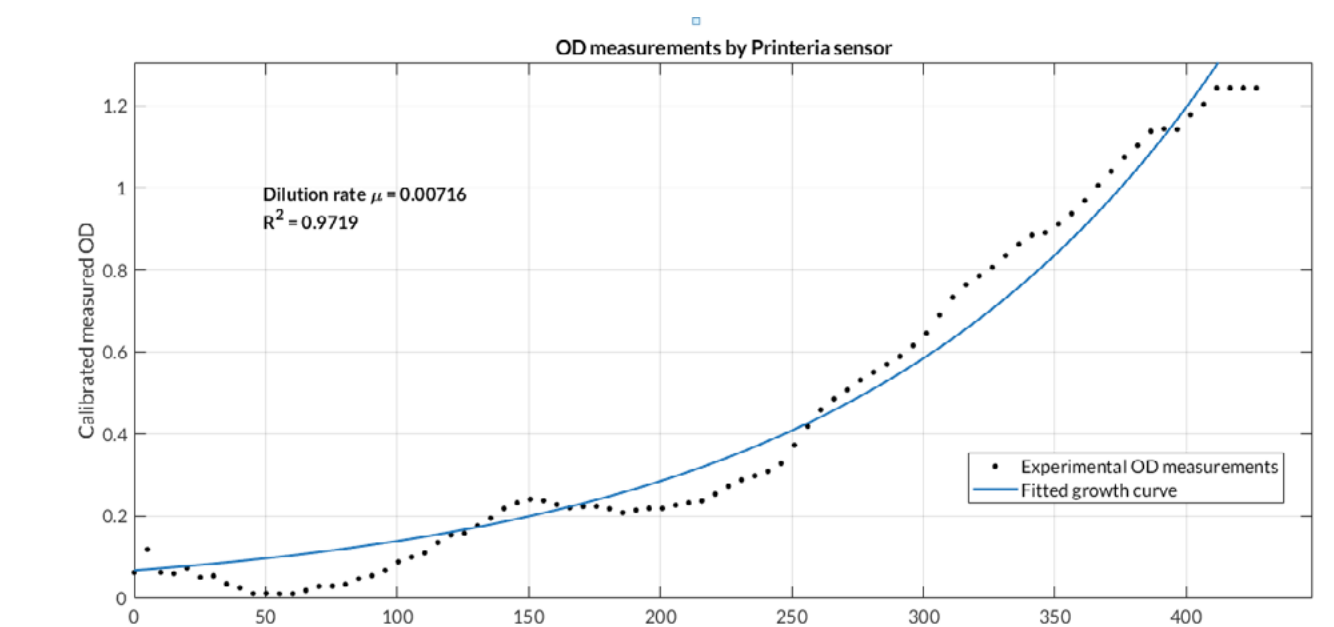
With our ODE model and the experimental data we have estimated model parameters and characterized all the parts in our Printerria part collection.

Calibration system



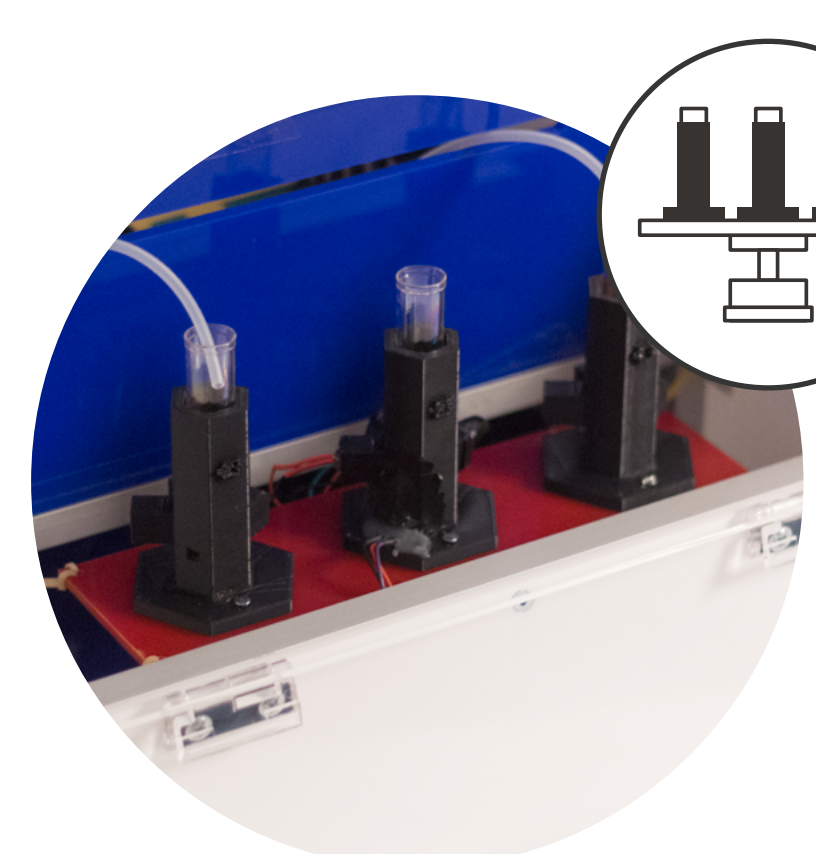
The calibration curve shows experimental data measured by Printerria's sensors vs. the fluorescein molecules number per cell (MEFL_{GFP}/cell) from our Interlab Study.

Printerria Experiments



Calibrated Optical Density curve made by Printerria's OD sensor.

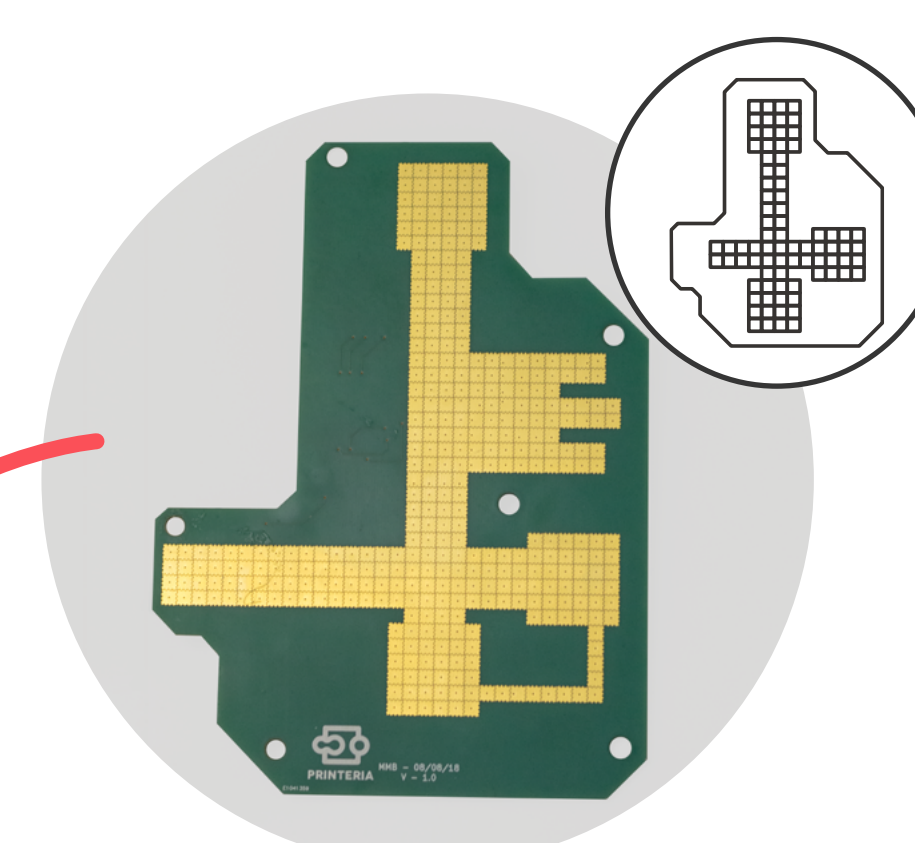
3 Output system



Here, the optimal conditions for growth and measuring Optical Density (OD) and Fluorescence (F) are set.

- Components**
- Shaker
 - 650nm Laser
 - 480nm led
 - Light sensor

2 Reaction zone



Applying different voltages to the pads in the PCB surface, local hydrophobicity changes. This makes the droplets move between the hot and cold zones.

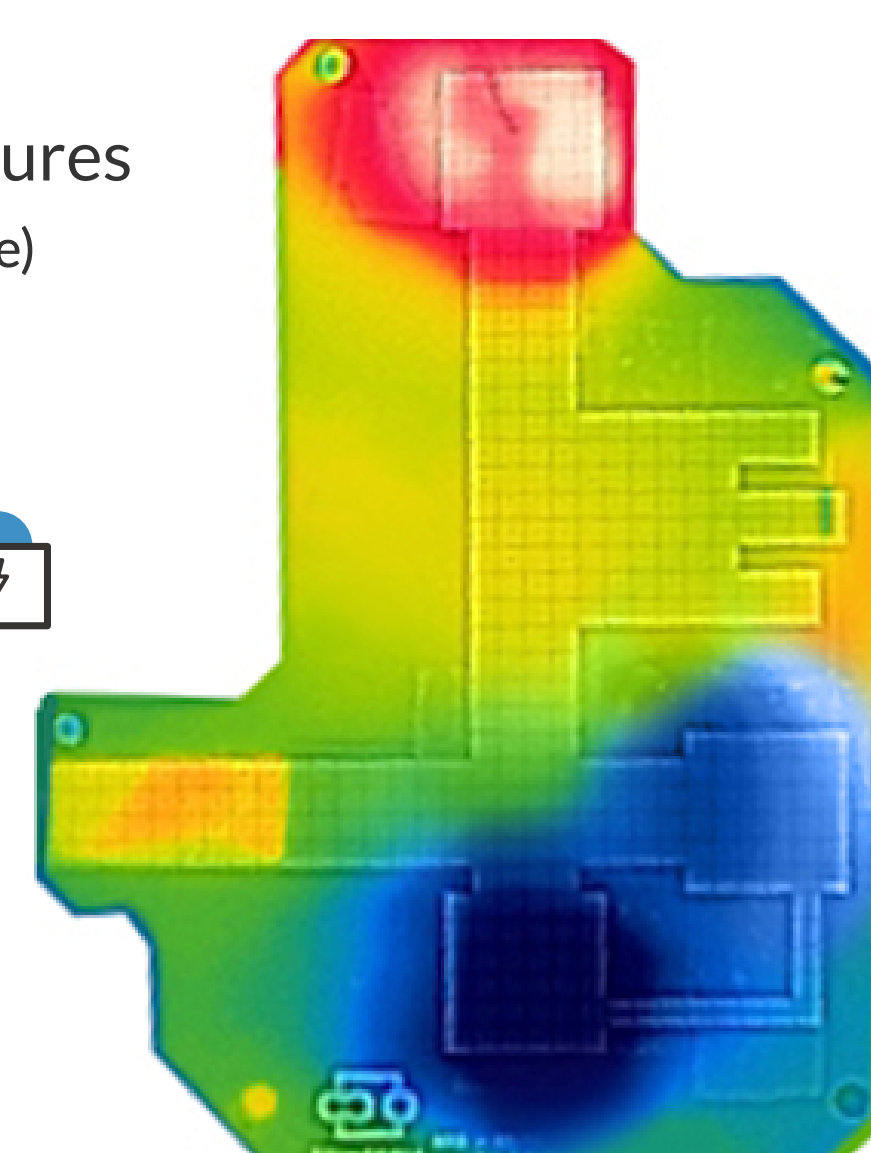
Components

- For drop movement**
- Printed Circuit Board (PCB)
 - Surface: PTFE foil and hydrophobic gel
- For changing temperatures**
- Power resistor (37°C zone)
 - Peltier effect (16°C zone)

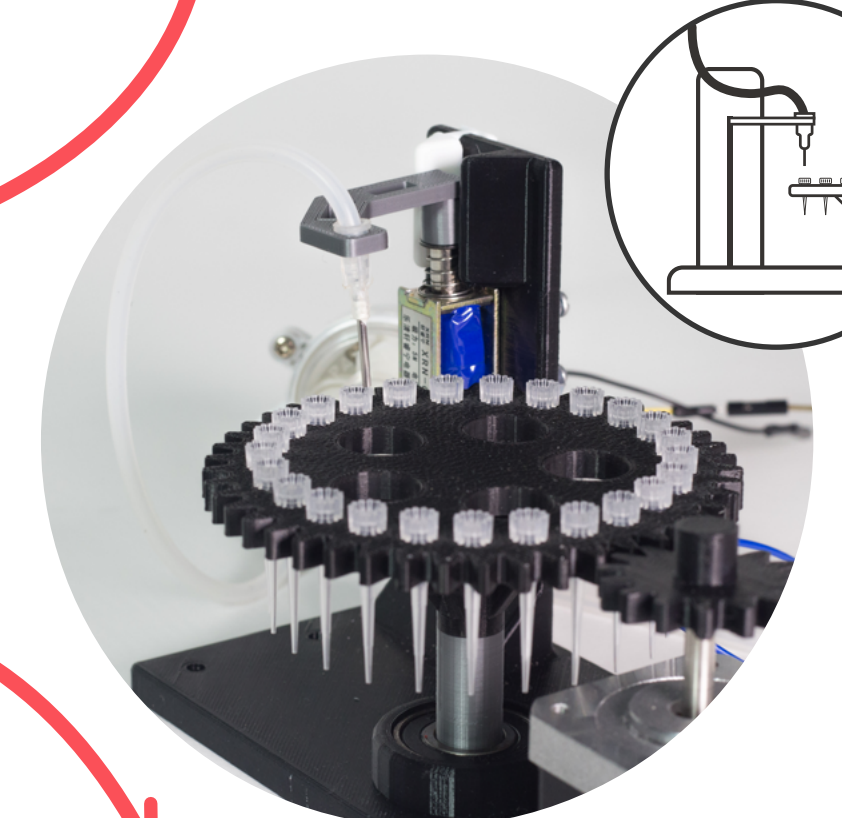
Droplets movement



Thermal image of the PCB showing the temperatures of the different zones



1 Entry zone

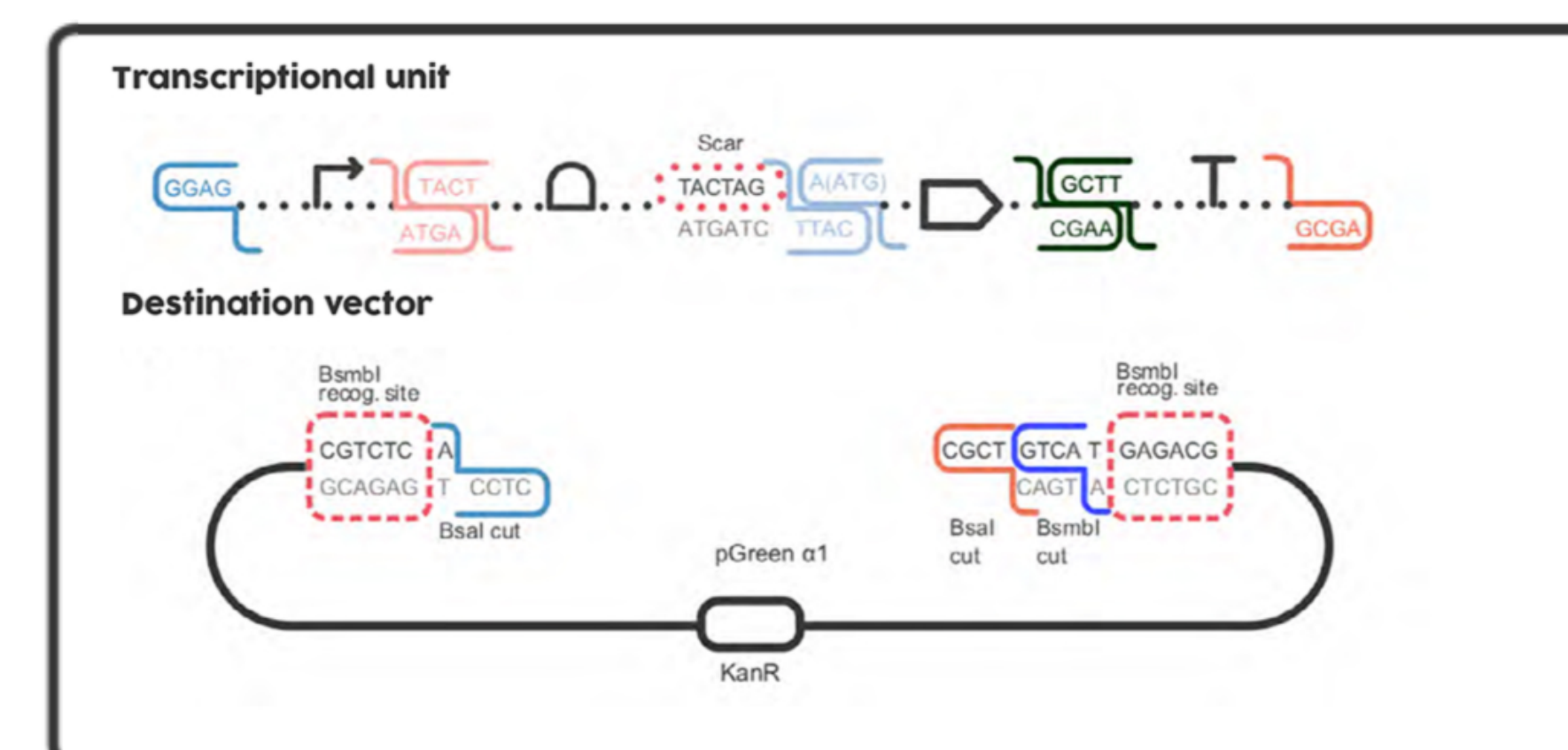


The BioInk is positioned in a carousel-based system, so a needle produces the fall of the assembly reagents.

Components

- Carousel system
- Peristaltic pump

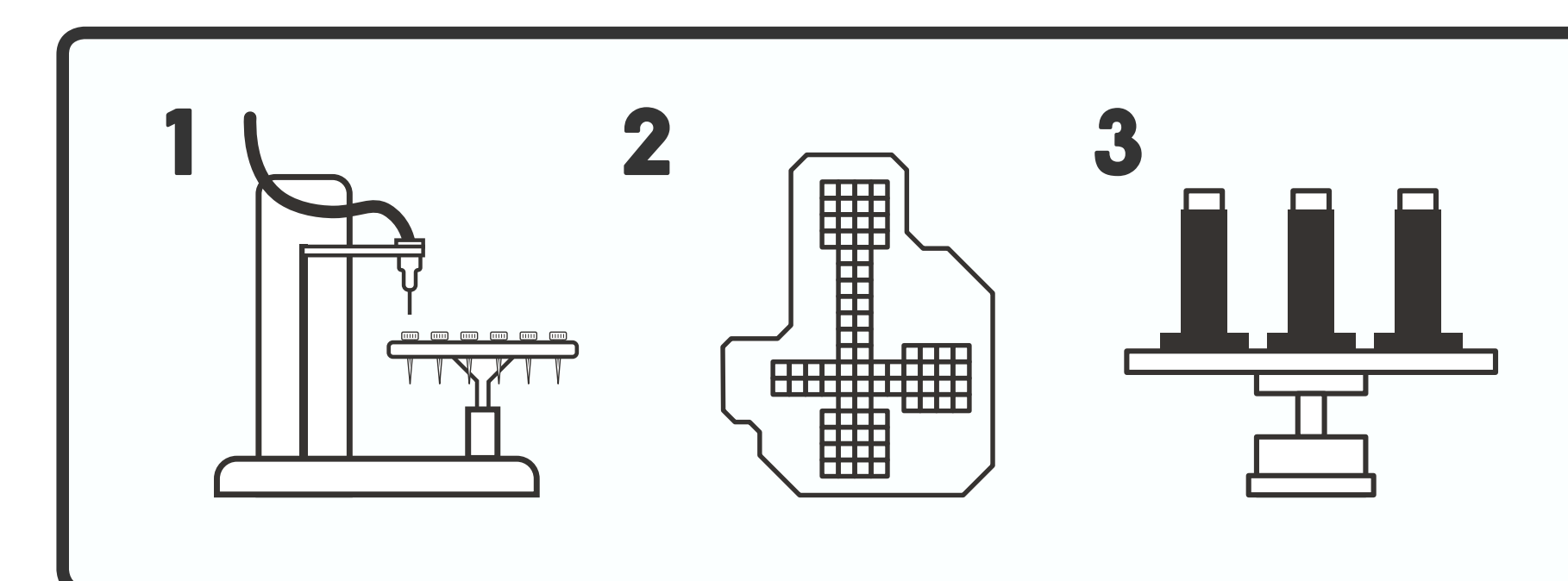
Level 1 Golden Gate



Printerria uses the Level 1 Golden Gate assembly method, so the multipartite directional assembly of a composite part (transcriptional unit) is carried out by a high robust one-step reaction in a drop.

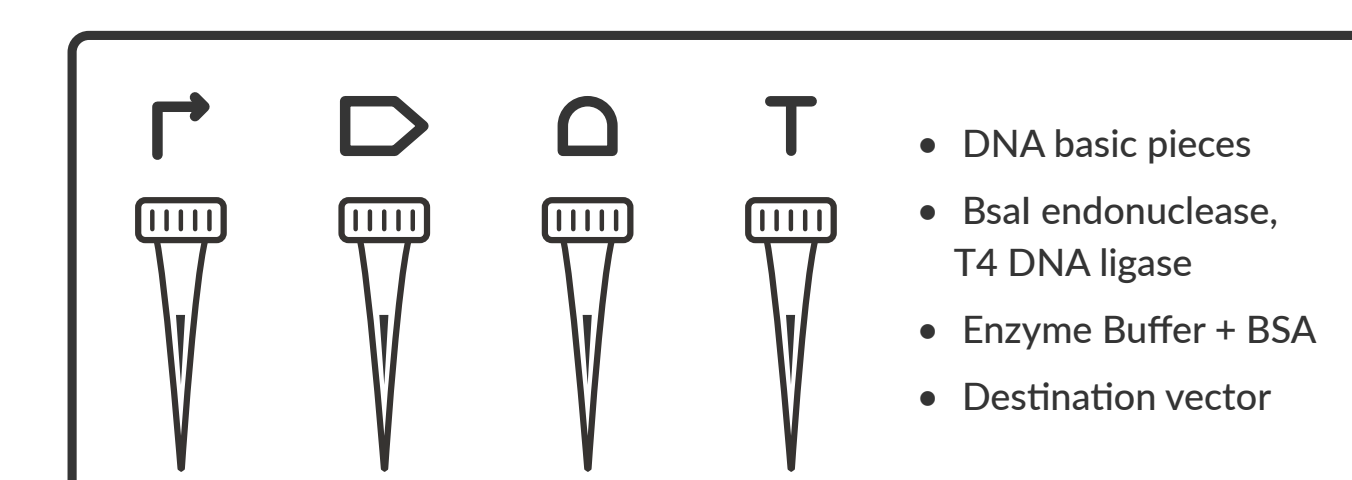
The destination vector is introduced in its linearized form to avoid the screening of non-recombinant transformed plasmids.

Hardware



Printerria combines **multiple technologies** to **automatically produce** genetic circuits.

BioInk (Bioparts)



Human Practices



Social Engagement

We understand **BioArt** as the point where **art and science** meet, with art being the cornerstone of dissemination.



Educational approach to SynBio.



Integrated Human

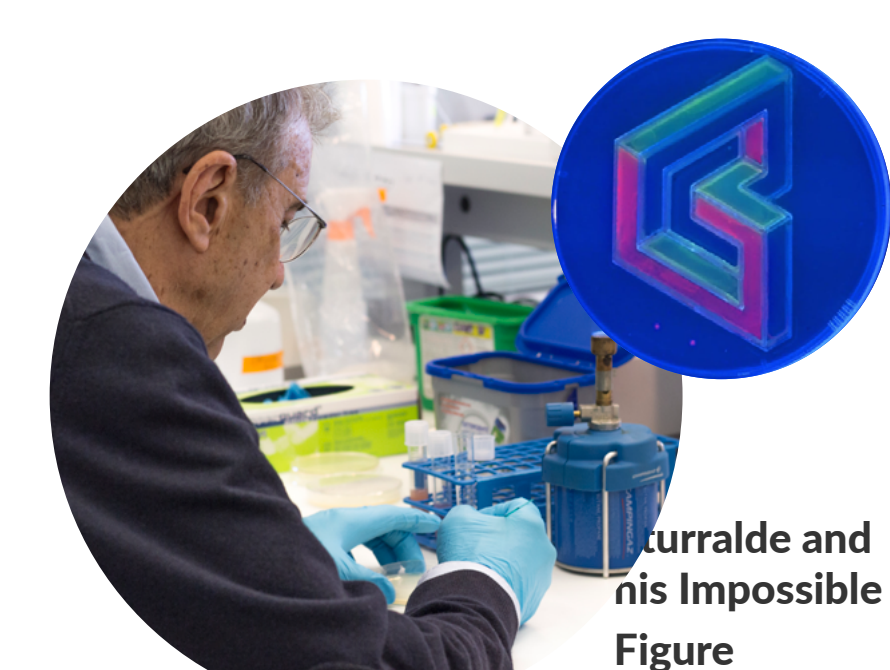
Feedback from students (with the Kano Model) and renowned scientists and artists was taken into account in order to **improve** our device's functionalities.



Maria Peñil and Mehmet



Carol from Printerria's Team with Francis Mojica



Guilherme and his Impossible Figure