RADICAL ECOSYSTEM

A BIO-HYBRID SYSTEM WHERE PLANT SIGNALS SHAPE TECHNOLOGICAL BEHAVIOUR.

FABRICADEMY 2026 FINAL PROJECT
CARLOTTA PREMAZZI, HYBRIDASTUDIO

BIOLAB Lisboa

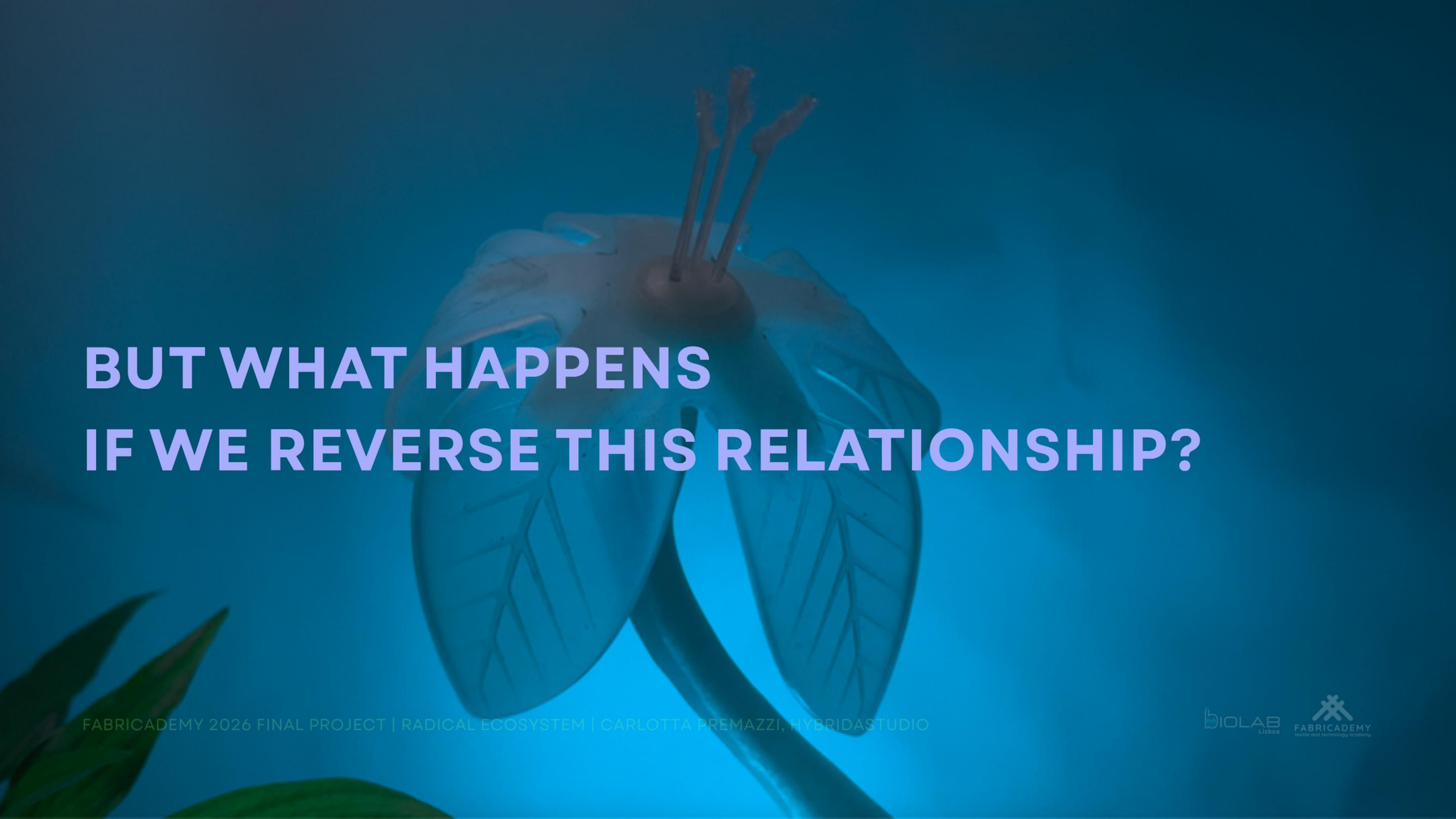
FABRICADEMY
textile and technology academy

HUMANS, PLANTS AND ECOSYSTEMS SHARE THE SAME ELEMENTS
WATER, ENERGY AND ELECTRICAL SIGNALS.

PLANTS CONSTANTLY SENSE THEIR ENVIRONMENT.
THEY RESPOND TO LIGHT, HUMIDITY AND TOUCH.

THEIR ACTIVITY SHAPES ECOSYSTEMS.
MOST OF THESE PROCESSES REMAIN INVISIBLE TO US.

**TODAY TECHNOLOGY IS WIDELY USED TO MONITOR AND CONTROL NATURE –
IN AGRICULTURE, CLIMATE SYSTEMS AND BIOENGINEERING.**



BUT WHAT HAPPENS
IF WE REVERSE THIS RELATIONSHIP?

WHAT IF NATURE CONTROLS TECHNOLOGY?

PLANTS ARE NOT PASSIVE ORGANISMS.
THEY ARE COMPLEX LIVING SYSTEMS THAT CONSTANTLY SENSE AND RESPOND TO THEIR ENVIRONMENT.

IN THIS PROJECT, PLANT SIGNALS INFLUENCE THE BEHAVIOUR OF A TECHNOLOGICAL SYSTEM.


PERHAPS THE CHALLENGE FOR THE FUTURE IS NOT ONLY TO DESIGN SMARTER TECHNOLOGIES,

BUT ALSO TO LEARN HOW TO BETTER LISTEN TO THE LIVING SYSTEMS THAT SURROUND US.

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RADICAL ECOSYSTEM

A bio-hybrid system where nature shapes technology

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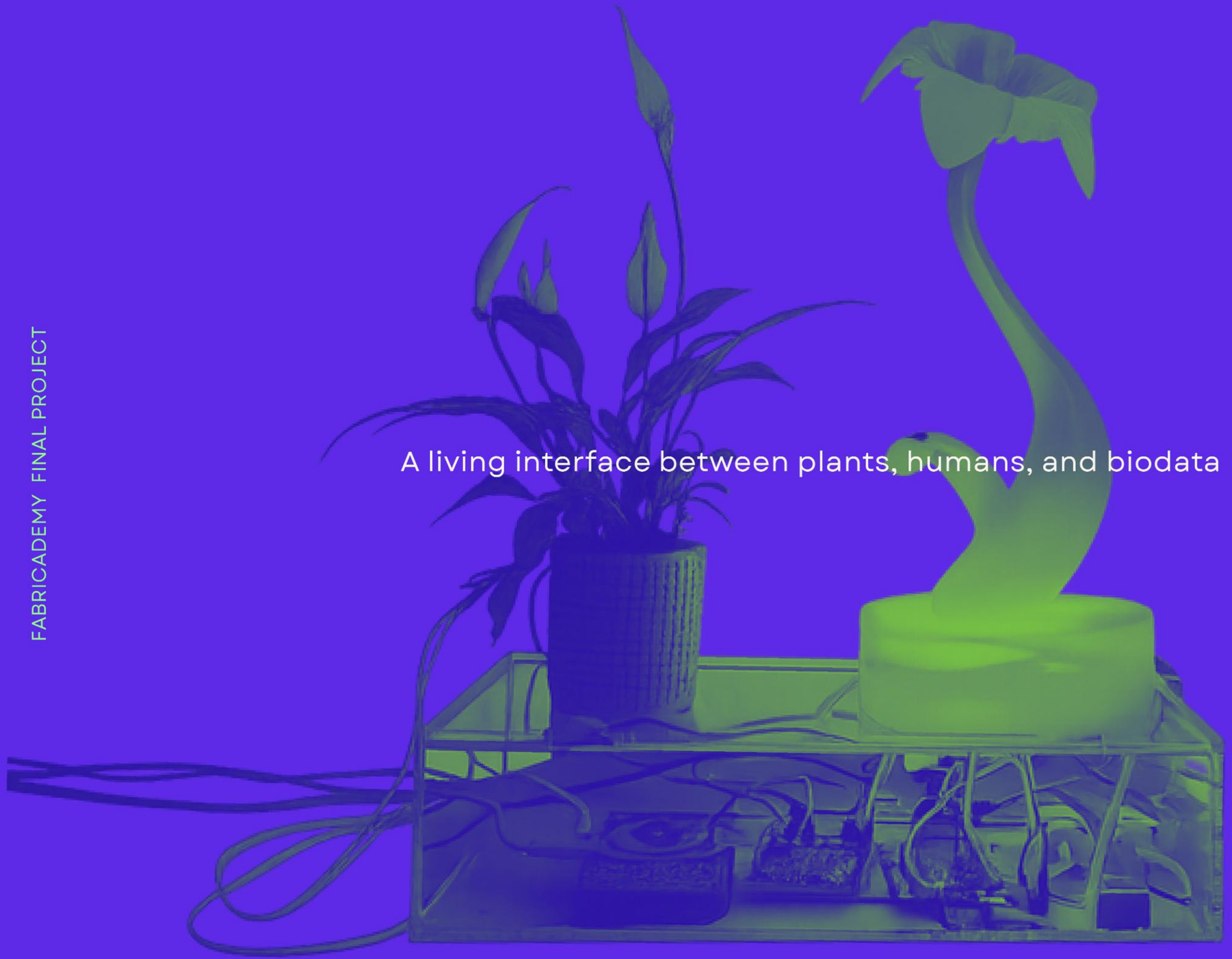
A living interface between plants, humans, and biodata



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BIO-HYBRID SYSTEM FEEDBACK LOOP

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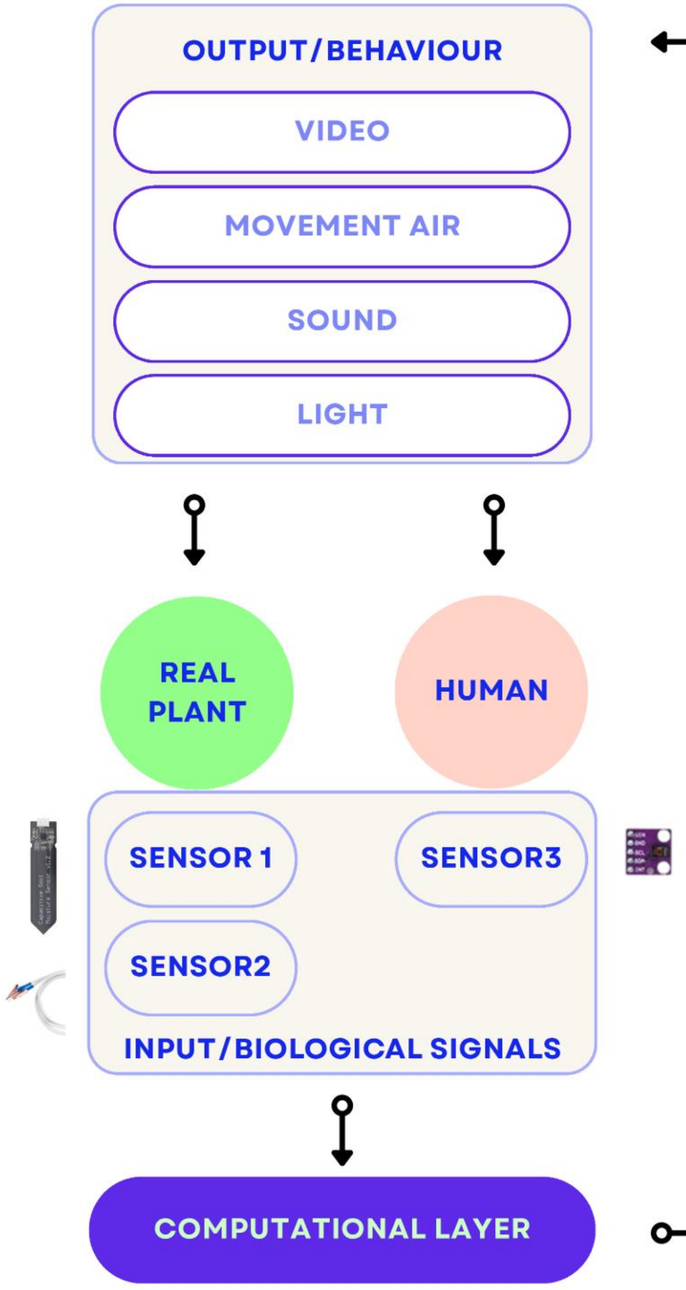

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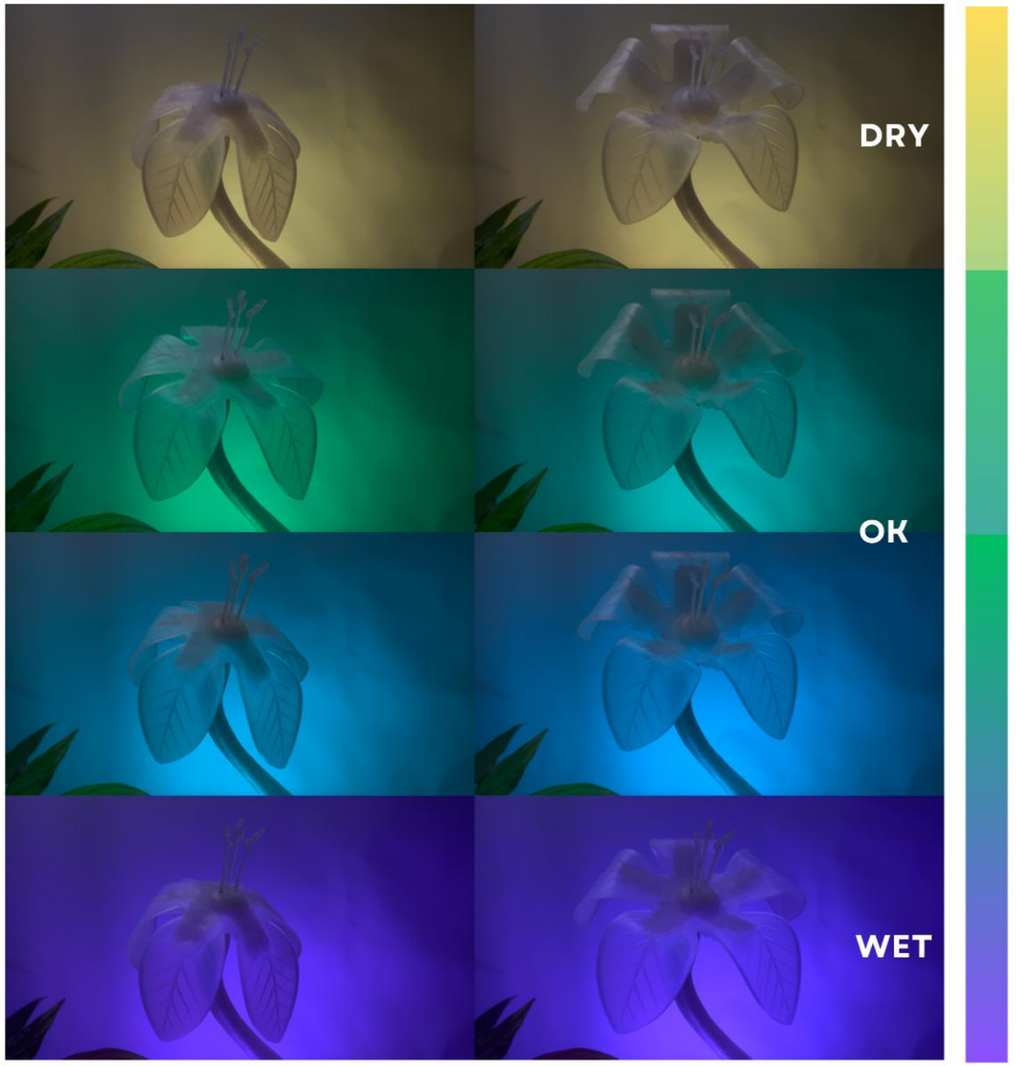
BEHAVIOURAL LOGIC

FUNCTIONS				OUTPUT
RHYTHM	SPARSE	ORGANIC	DEEP	VIDEO
MODULATION	FAST	BREATH	SLOW	MOVEMENT AIR
RITHM	SPARSE	ORGANIC	DEEP	SOUND
RED	YELLOW	GREEN CYAN	VIOLET	LIGHT



HUMIDITY BASED STATES

LED COLOR AND PUMP FUNCTION

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ANATOMY OF THE ARTIFICIAL FLOWER

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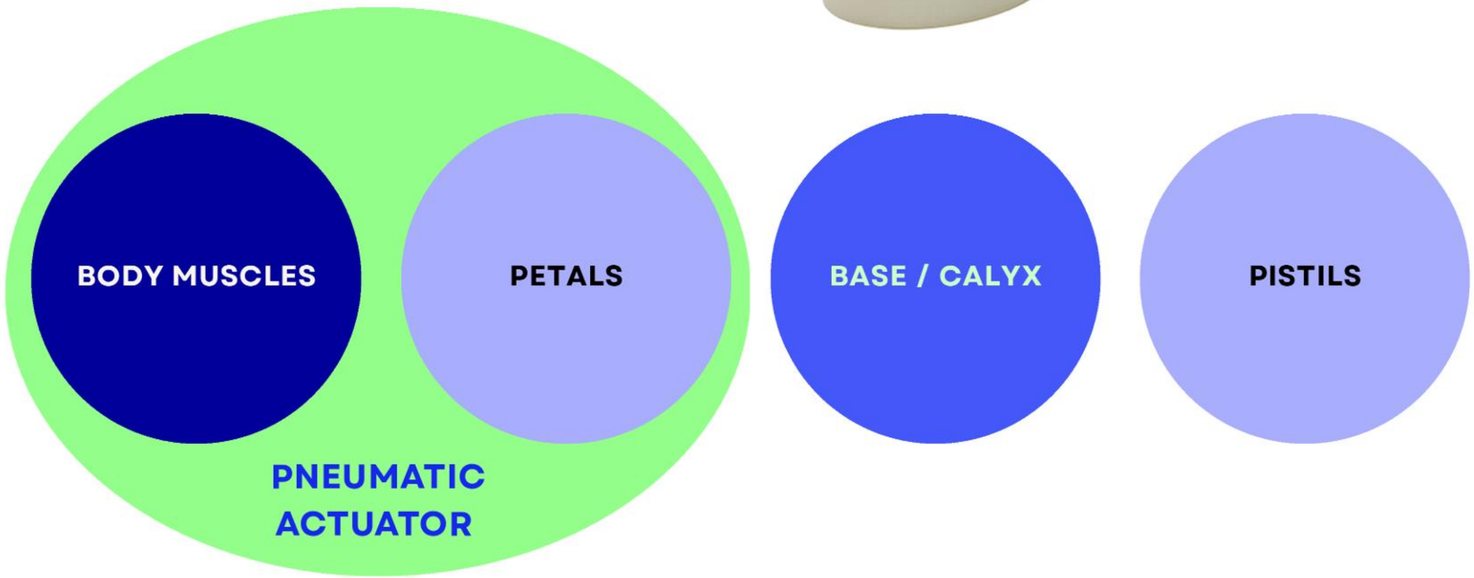

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SYSTEM ARCHITECTURE DIAGRAM– PLANT–HUMAN FEEDBACK LOOP

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INPUTS

PLANT BIOELECTRICAL

PLANT HUMIDITY

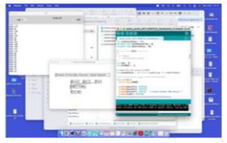
the plant influencing the system state

HUMAN HEARTBEAT

the human introducing temporary perturbations

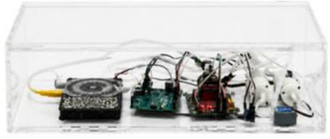
PLANT ↔ HUMAN ↔ ENVIRONMENT (SHARED RESPONSIVE ECOSYSTEM)

POCKET SCION



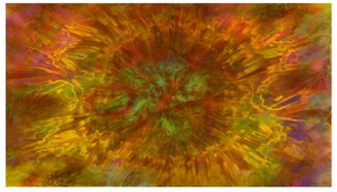
COMPUTER PUREDATA/WEBAUDIO TOUCHDESIGNER

MICROCONTROLLER ARDUINO UNO



PNEUMATICS

OUTPUT



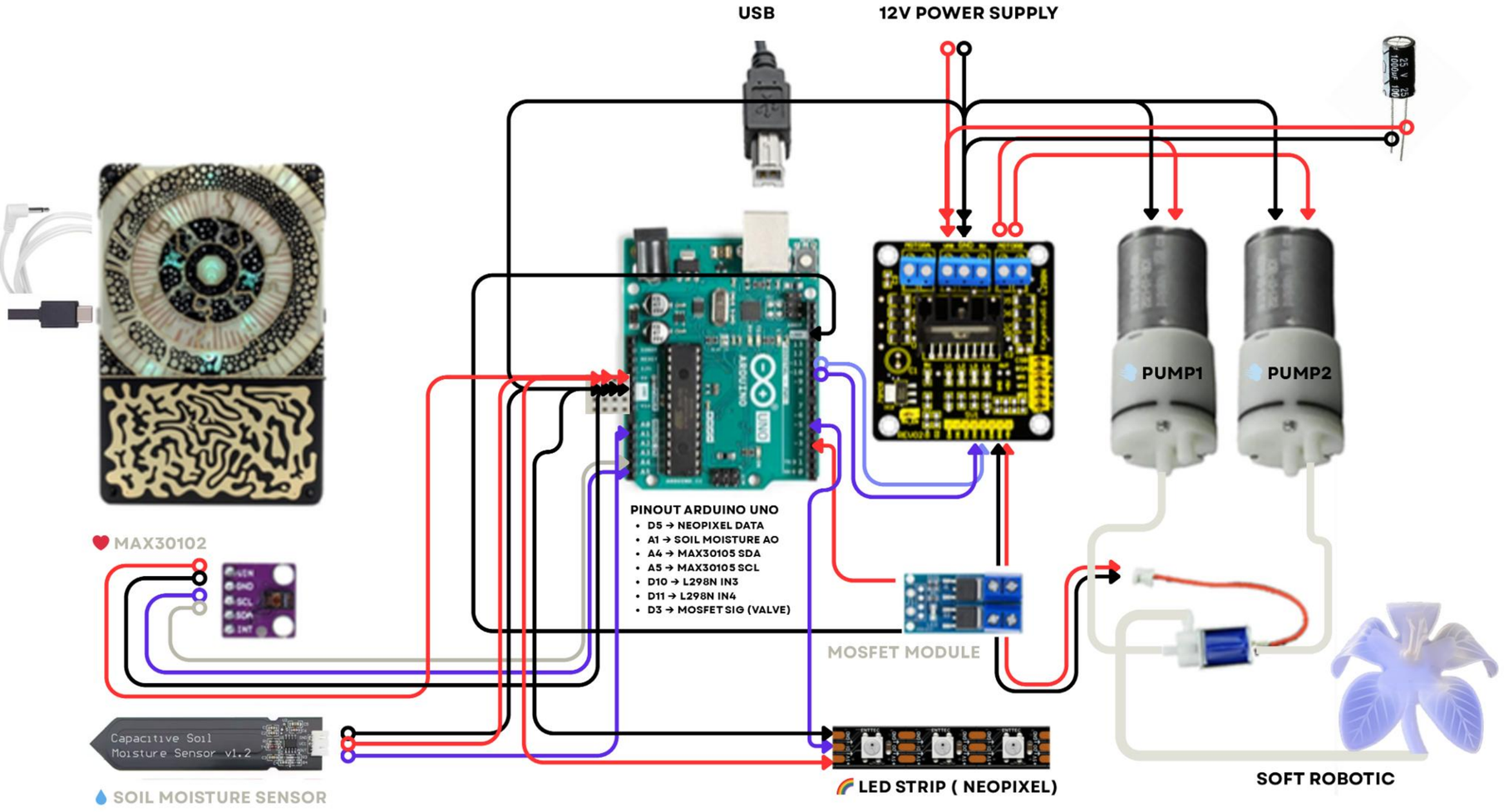
SOUNDSCAPE / VIDEOSCAPE ATMOSPHERE

SOFT-ROBOTIC FLOWERS (BLOOMING)

LIGHTING SCULPTURE

the artificial body translating signals into movement, light and sound

SCHEMATICS


USB
12V POWER SUPPLY
PUMP1
PUMP2
PINOUT ARDUINO UNO
• D5 → NEOPIXEL DATA
• A1 → SOIL MOISTURE AO
• A4 → MAX30105 SDA
• A5 → MAX30105 SCL
• D10 → L298N IN3
• D11 → L298N IN4
• D3 → MOSFET SIG (VALVE)
MAX30102
MOSFET MODULE
Capacitive Soil Moisture Sensor v1.2
SOIL MOISTURE SENSOR
LED STRIP (NEOPIXEL)
SOFT ROBOTIC

DEVELOPMENT PROCESS

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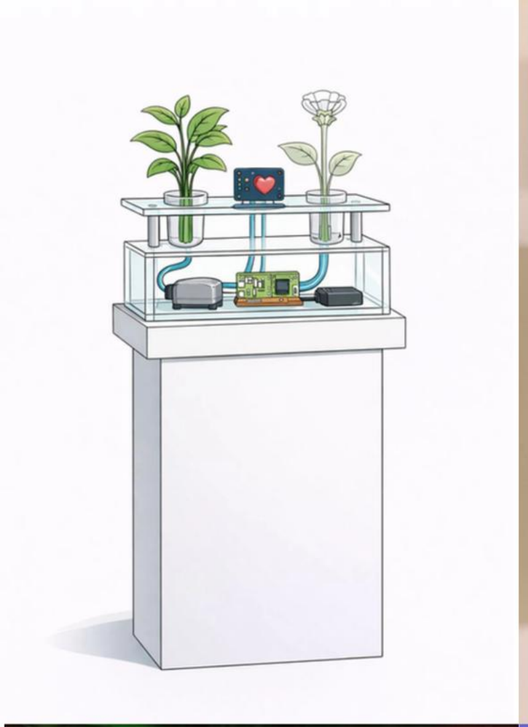
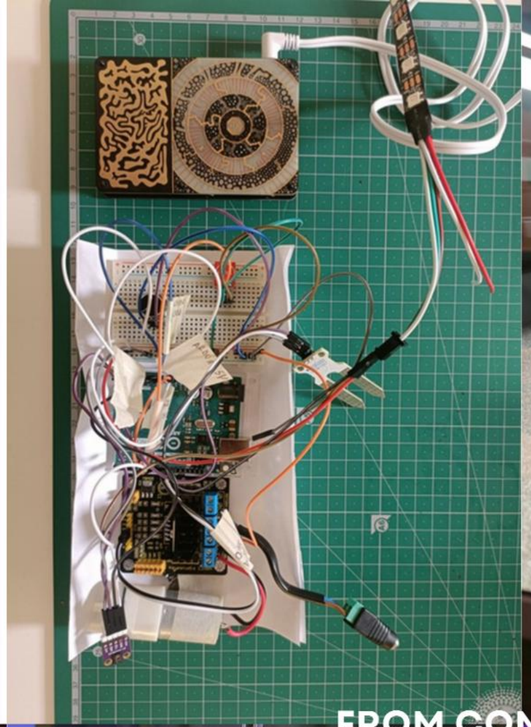
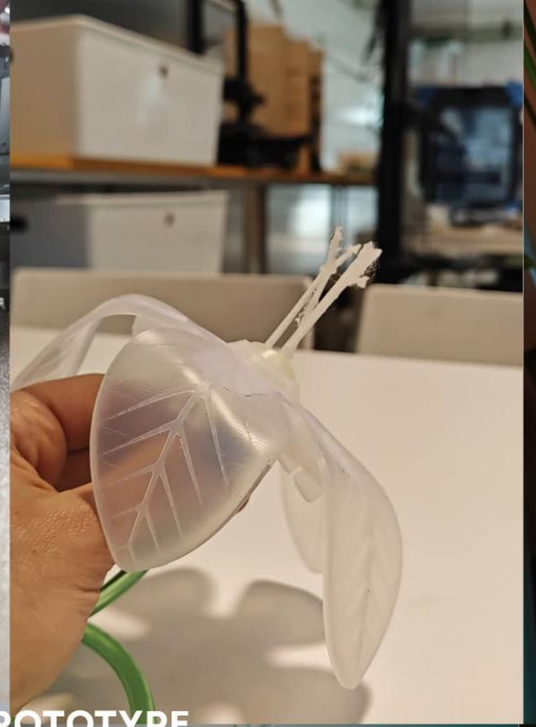
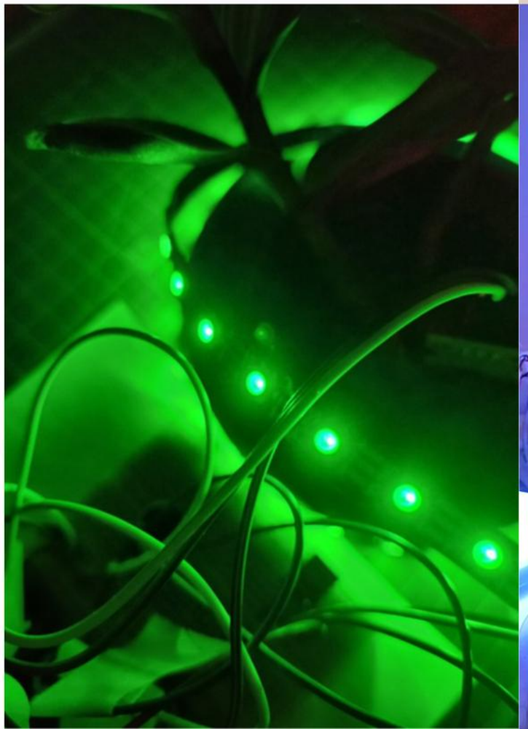
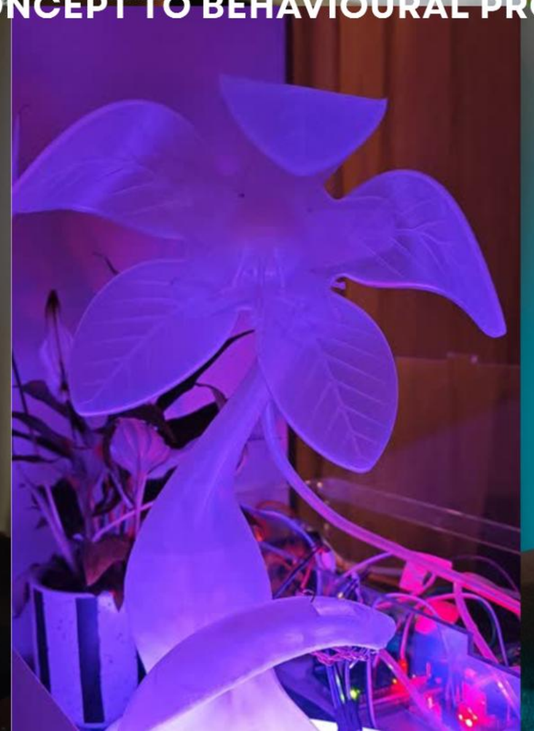






FROM CONCEPT TO BEHAVIOURAL PROTOTYPE





HYSTORIC OF FABRICATION

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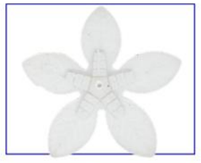
	BODY MUSCLES MOLD				PETALS MOLD			ACTUATOR
V1 S.R. ASSIGNM.								**V1** STAR 
V2 CHAMBER MODIFICATION								**V2** FLOWER 
V3 STRUCTURAL ADJUSTMENTS								**V3** TEXTURED 
V4 IMPROVED PART B								
V5 FINAL VERSION								
V6								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CURRENT STAGE

AUTONOMOUS LOW TECH SYESTEM

POCKET SCION AUDIO

3D PRINT AND LASER CUT MODULAR PIECES

1 SMALL SOFT ROBOTICS

NEXT STEP

IMMERSIVE ENVIROMENT
SPACIAL SOUND
IMMERSIVE VIDEO PROJECTION

WEB AUDIO SOFTWARE BY ANECOICA STUDIO

3D PRINT UNIQUE MODULAR PIECE

SOFT ROBOTICS GARDEN
BIG SOFT ROBOTICS
DIFFERENT SOFT ROBOTICS

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