

FABRICADEMY PROJECT PROPOSAL PRESENTATION

PITCH DECK

Interactive Garden

2025-2026

A living interface between plants, humans, and biodata

CARLOTTA PREMAZZI

ABOUT ME

PITCH DECK

CARLOTTA PREMAZZI cpdesignstudio.com

Multimedia Designer/Artist & Visual Live Performer
Tech-Empathy Artist
Hybrid-Interactive-Neurofeedback Art



FABRICADEMY PROJECT PROPOSAL PRESENTATION

TITLE

PROJECT OVERVIEW (ABSTRACT)

REFERENCES & INSPIRATIONS

ACADEMIC TRENDS

FIRST-PERSON RESEARCH

WHAT (PROJECT DEFINITION)

WHO (STAKEHOLDERS & USERS)

WHY (MOTIVATION & RELEVANCE)

HOW (METHOD & APPROACH)

PSS

PROTOTYPES & EXPERIMENTS

SYSTEM DIAGRAM

WHEN TIMELINE

EXPECTED OUTCOMES

CLOSING / FUTURE

Interactive Garden

is an immersive installation where **real plants** express their health through **soft robotic flowers** that bloom in response to **biodata**. **Human biofeedback**, such as heartbeat, can subtly influence the environment, creating a **multisensory dialogue** between visitor and plant. The system forms a **responsive ecosystem** shaped by soft materials, sensing, and interaction.

CARLOTTA PREMAZZI

General

Multisensory Interaction, Human-Plant Communication, Biofeedback Systems, Soft Robotics, Responsive Ecosystem, Biophilic Design

Mood

Immersive, Meditative, Visionary, Symbiotic, Wonder

REFERENCE & INSPIRATION

PITCH DECK



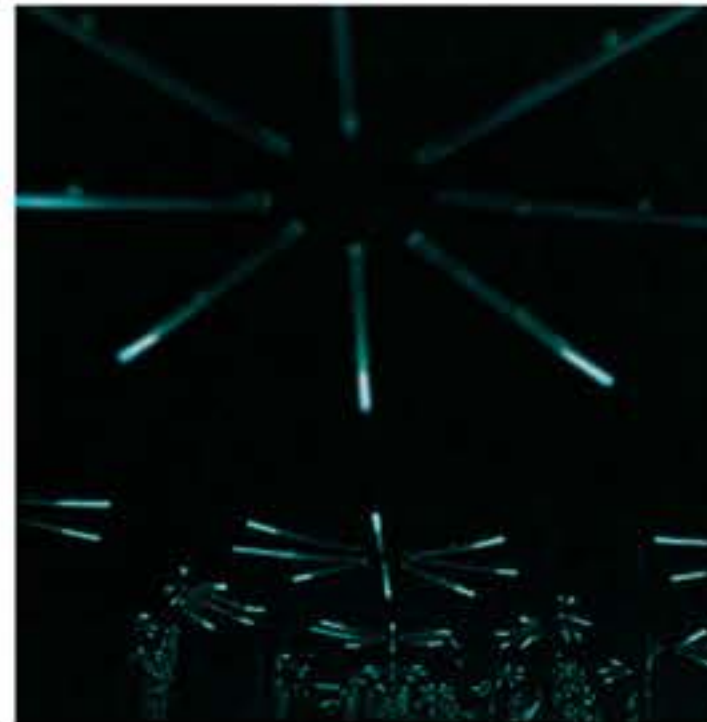
Studio Drift
Shylight



PNAT Project Nature
The Hidden Plant
Community



Philips
Bio-light



One Luminous Dot
Teresa Van Dongen



Studiosroosegaarde
Glowing-Garden



ecologicstudio
H.O.R.T.U.S. XL
Astaxanthin.g

Plant Intelligence & Plant Signaling

- Brenner ED, Stahlberg R, Mancuso S, Vivanco J, Baluska F, Van Volkenburgh E. Plant neurobiology: an integrated view of plant signaling. Trends Plant Sci. 2006 Aug;11(8):413-9. doi:10.1016/j.tplants.2006.06.009. Epub 2006 Jul 13. PMID: 16843034.
- Plant Signaling & Behavior, Volume 20, Issue 1 (2025) Taylor & Francis Online: Peer-reviewed Journals

Multispecies Interaction & More-than-Human Design

- Giaccardi, Elisa & Redström, Johan. (2020). Technology and More-Than-Human Design. Design Issues. 36. 33-44. 10.1162/desi_a_00612.
- Haraway, Donna J. (2016), Staying with the Trouble: Making Kin in the Chthulucene, Durham: Duke University Press.

Soft Robotics & Biomimetic Systems

- Soft Robotics Journal (MIT Press)
- Biology and bioinspiration of soft robotics: Actuation, sensing, and system integration, Ren, Luquan et al, iScience, Volume 24, Issue 9, 103075

Biofeedback & Physiological Computing

- Kandel E., Schwartz J. H. , Jessell T. M. , Siegelbaum S. A. , Hudspeth A. J. , Principles of Neural Science , Fourth Edition, McGraw-Hill, 2013
- Buzsáki G., Rhythms of the brain , Oxford University Press, 2006
- Nijholt A., Contreras-Vidal J.L., Jeunet C., Våljamäe A., Brain-Computer Interfaces for Non-clinical (Home, Sports, Art, Entertainment, Education, Well-Being) Applications , Frontiers in Computer Science, 2022
- Nijholt, A., Brain Art Brain-Computer Interfaces for Artistic Expression, Springer, Cham, 2019

Immersive & Multisensory Interaction Design

- Löwgren, J., & Stolterman, E. – Thoughtful Interaction Design, 2007, The MIT Press
- Anna Ståhl, Madeline Balaam, Rob Comber, Pedro Sanches, and Kristina Höök. 2022. Making New Worlds – Transformative Becomings with Soma Design. In Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems (CHI '22). Association for Computing Machinery, New York, NY, USA, Article 176, 1-17. <https://doi.org/10.1145/3491102.3502018>

FABRICADEMY PROJECT PROPOSAL PRESENTATION

WGSN

FUTURE COSTUMER 27

EMOTIONS



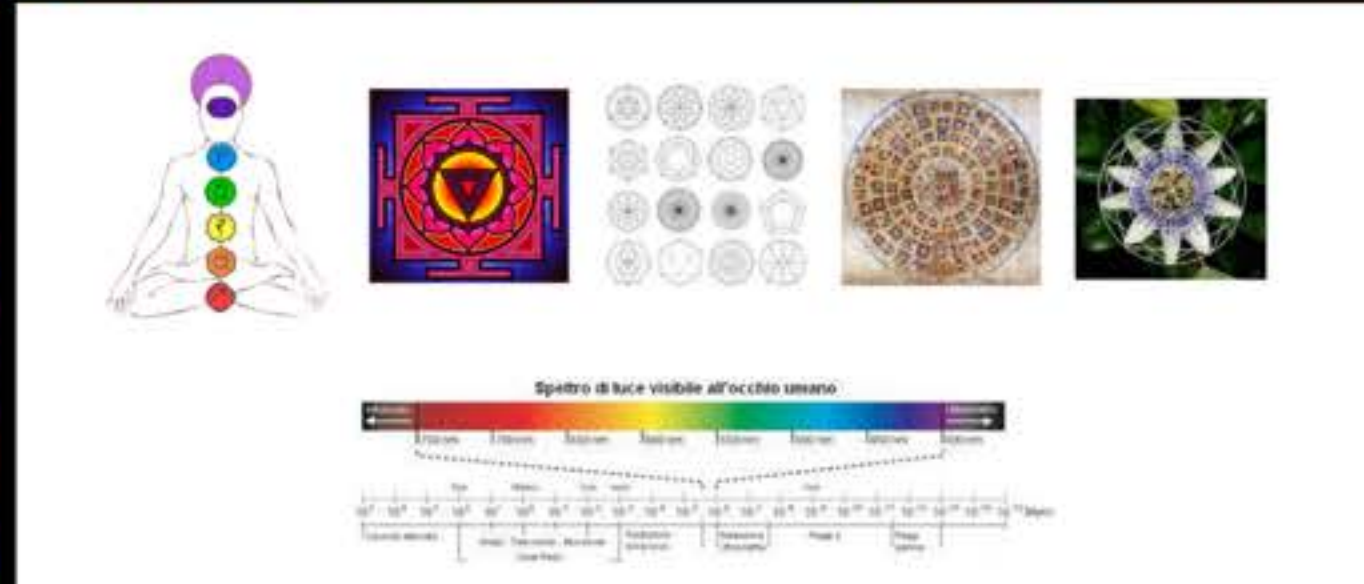
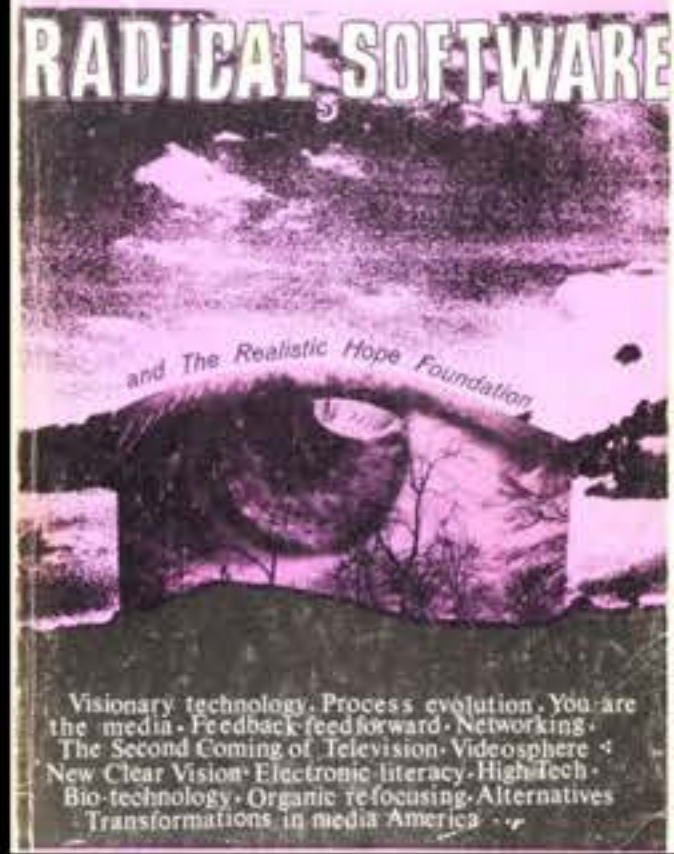
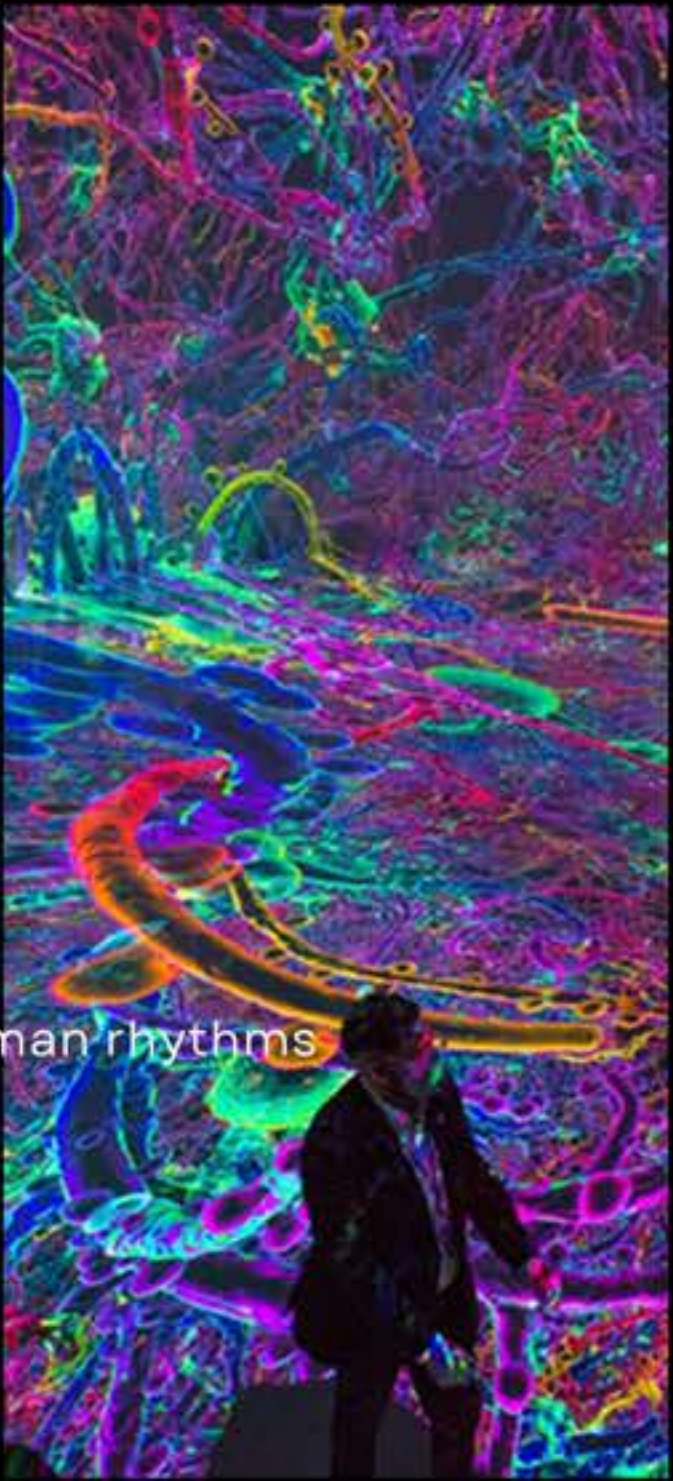
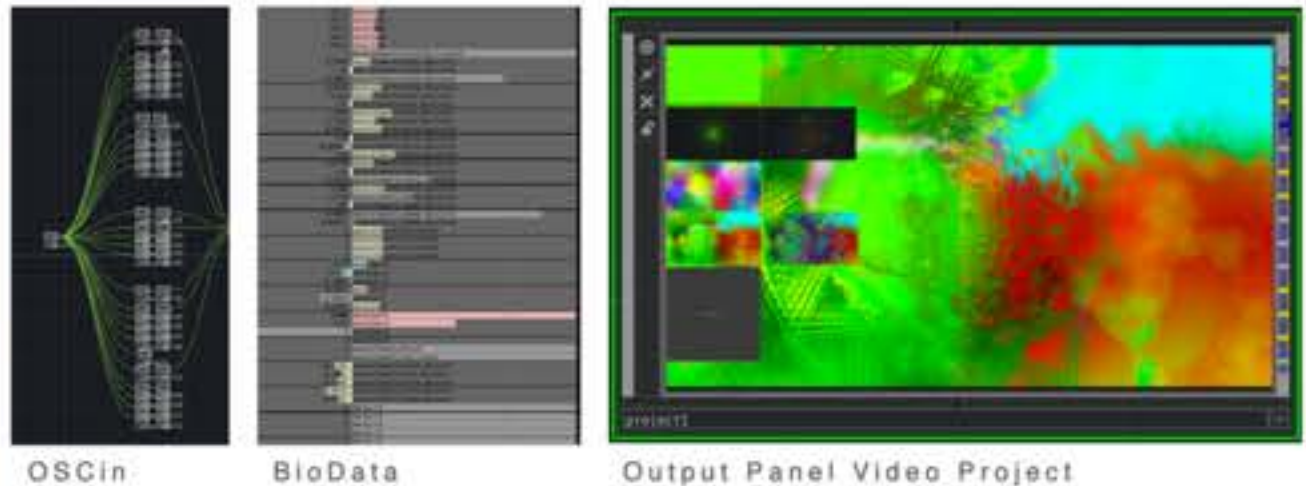
FIRST- PERSON RESEARCH

- Embodied ideation
- Autobiographical design
- Experiments perceiving plant-human rhythms
- Material & Sensory Explorations



FIRST- PERSON RESEARCH

- Embodied ideation
- Autobiographical design
- Experiments perceiving plant-human rhythms
- Material & Sensory Explorations





Interactive Garden: An Immersive & Responsive Ecosystem

Core Mechanism (Autonomous Function)



Real Plants & Biodata
(Soil Moisture Sensors)
- Sensors read plant biodata.

Thrive
Signal



Processing & Control
(Invisible Biological Processes)
- System analyzes data.

Trigger



Pneumatic Silicone Flowers Bloom
(Tangible Gesture)
- A dynamic, playful visual display.

Human Interaction Layer
(Symbiotic Dialogue)

Modulates
System

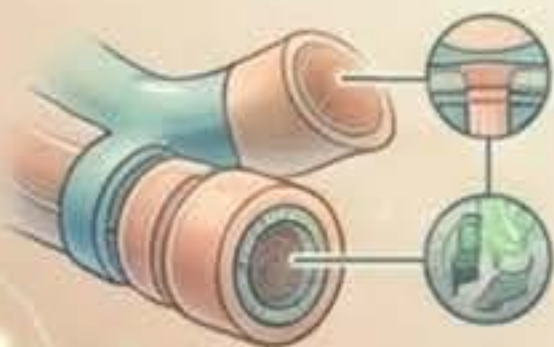


Human Presence & Biofeedback
(Heartbeat/EEG)
- Subtle modulation of the environment.



Fosters Symbiotic Dialogue
& Enriches Environment

Design & Future Vision



Soft, Modular & Flexible Components
Soft robotics,
environmental sensing.



**Invites Contemplation
& Presence**
Awareness of slow rhythms
of living organisms.

**Future Iterations:
Bioluminescent/Fluorescent
Materials**
Enhance atmospheric and
poetic experience.



Immersive Ecosystem

An immersive ecosystem where:

- plant biodata → soft-robotic blooming, sound modulation
- human heartbeat → soft-robotic blooming modulation, sound modulation

WHO

FABRICADEMY PROJECT PROPOSAL PRESENTATION

Stakeholder+Users

DESIGNER / ARTIST
(CARLOTTA
PREMAZZI)

PLANTS AND LIVING
SYSTEMS

VISITORS /
PARTICIPANTS

FABRICADEMY &
BIOLAB

2025-2026

CARLOTTA PREMAZZI

biOLAB
Lisboa

FABRICADEMY
textile and technology academy

Stackeholder+Users

CURATORS
MUSEUMS

- FUNDAÇÃO EDP / MAAT – MUSEUM OF ART, ARCHITECTURE AND TECHNOLOGY (LISBON)
- FUNDAÇÃO CALOUSTE GULBENKIAN & INSTITUTO GULBENKIAN DE CIÊNCIA (LISBON)
- FUNDAÇÃO MILLENIUM BCP (LISBON)
- ESTUFA FRIA DE LISBOA – CÂMARA MUNICIPAL DE LISBOA
- GNRATION (BRAGA)
- V2_ LAB FOR THE UNSTABLE MEDIA (ROTTERDAM, NETHERLANDS)
- BALTAN LABORATORIES (EINDHOVEN, NETHERLANDS)
- NEMO SCIENCE MUSEUM / MEDIALAB (AMSTERDAM, NETHERLANDS)
- MUSE – MUSEO DELLE SCIENZE (TRENTO)
- FONDAZIONE PRADA (MILANO / VENEZIA)
- PIRELLI HANGARBICOCCA (MILANO)
- TRIENNALE MILANO – MUSEO DEL DESIGN

CARLOTTA PREMAZZI

Stackeholder+Users

CULTURAL
INSTITUTIONS

- FUNDAÇÃO EDP / MAAT – MUSEUM OF ART, ARCHITECTURE AND TECHNOLOGY (LISBON)
- FUNDAÇÃO CALOUSTE GULBENKIAN & INSTITUTO GULBENKIAN DE CIÊNCIA (LISBON)
- FUNDAÇÃO MILLENIUM BCP (LISBON)
- ESTUFA FRIA DE LISBOA – CÂMARA MUNICIPAL DE LISBOA
- GNRATION (BRAGA)
- V2_ LAB FOR THE UNSTABLE MEDIA (ROTTERDAM, NETHERLANDS)
- BALTAN LABORATORIES (EINDHOVEN, NETHERLANDS)
- FONDAZIONE PISTOLETTO CITTADELLARTE, UNIDEE CONNECTIVE RESIDENCIES 2025-26
- FONDAZIONE PRADA (MILANO / VENEZIA)
- PIRELLI HANGARBICOCCA (MILANO)

2025-2026

CARLOTTA PREMAZZI

WHO

FABRICADEMY PROJECT PROPOSAL PRESENTATION

Stackeholder+Users

ART FESTIVALS

- ARS ELECTRONICA (LINZ, AUSTRIA)
- SÓNAR+D (BARCELONA, SPAIN)
- OFFF (BARCELONA, SPAIN)

 **ARS ELECTRONICA**
Art, Technology & Society

2025-2026

CARLOTTA PREMAZZI

 **biOLAB**
Lisboa

 **FABRICADEMY**
textile and technology academy

WHO

FABRICADEMY PROJECT PROPOSAL PRESENTATION

Stakeholder+Users

ENVIRONMENTAL &
BIO-DESIGN
COMMUNITIES:

- PNAT PROJECT NATURE BY STEFANO MANCUSO



2025-2026

CARLOTTA PREMAZZI



WHO

FABRICADEMY PROJECT PROPOSAL PRESENTATION

Stakeholder+Users

USERS /
BENEFICIARIES

- **USERS / BENEFICIARIES**
- **PEOPLE SEEKING IMMERSIVE, MULTISENSORY EXPERIENCES.**
- **INDIVIDUALS INTERESTED IN NATURE, WELLNESS, AND CONTEMPLATIVE ENVIRONMENTS.**
- **STUDENTS, RESEARCHERS, AND DESIGNERS EXPLORING BIODATA, SOFT ROBOTICS, AND PLANT-BASED INTERACTION.**
- **BROADER AUDIENCES CURIOUS ABOUT NEW FORMS OF COMMUNICATION BETWEEN HUMANS AND THE NATURAL WORLD.**

2025-2026

CARLOTTA PREMAZZI

biOLAB
Lisboa

FABRICADEMY
textile and technology academy

WHY

FABRICADEMY PROJECT PROPOSAL PRESENTATION

CONTEXT, SUSTAINABILITY, INNOVATION

The project addresses our growing disconnection from nature by revealing the real-time signals of plants and making their rhythms perceptible. It promotes sustainability by fostering awareness, empathy, and ecological responsibility through low-impact, biomimetic technologies. Its innovation lies in combining plant biodata, soft robotics, and human biofeedback to create a new model of communication that is multisensory, slow, and non-verbal.

- **RECONNECT HUMANS WITH LIVING SYSTEMS**
- **REVEAL INVISIBLE PLANT RHYTHMS**
- **EXPLORE SLOW, ECOLOGICAL INTERACTION**

CARLOTTA PREMAZZI

2025-2026

Tools+Technologies

- Sensing: soil moisture sensors, basic environmental sensors, heartbeat sensor optional EEG.
- Microcontrollers: ESP32 or Arduino for data collection, OSC for communication.
- Soft Robotics: silicone molds, pneumatic chambers, air pumps, valves, laser-cut or 3D-printed structures.
- Sound & Interaction: TouchDesigner, Ableton/PureData.
- Fabrication: silicone casting, 3D printing, laser cutting, modular assembly for flowers and structures

Approach

- Collect plant biodata (soil moisture, environmental conditions).
- Translate biodata into movement using pneumatic soft robotics (flowers opening/closing).
- Integrate human biofeedback (heartbeat → micro-modulations in sound, movement, atmosphere).
- Combine signals to create a shared responsive ecosystem between plants, humans, and the installation.
- Develop a multisensory environment with soft movement, subtle sound, slow rhythms, and atmospheric design.
- Iterate through prototypes: materials, pneumatics, sensing pipelines, and sound responses.

CARLOTTA PREMAZZI

PSS VALUE

FABRICADEMY PROJECT PROPOSAL PRESENTATION

FUNCTIONAL VALUE

- TRANSLATES REAL PLANT BIODATA INTO VISIBLE, TACTILE, AND AUDIBLE SIGNALS.
- ALLOWS USERS TO UNDERSTAND PLANT WELL-BEING IN AN INTUITIVE WAY.
- DEMONSTRATES SOFT ROBOTICS AS A SENSITIVE, LOW-ENERGY COMMUNICATION TOOL.

EMOTIONAL & EXPERIENTIAL VALUE

- CREATES A CALMING, CONTEMPLATIVE ENVIRONMENT THAT SLOWS DOWN PERCEPTION.
- BUILDS A SENSE OF CONNECTION, EMPATHY, AND CURIOSITY TOWARD PLANT LIFE.
- OFFERS A NOVEL EXPERIENCE WHERE BIOLOGICAL RHYTHMS ARE SHARED AND SENSED.

ECOLOGICAL VALUE

- RAISES AWARENESS OF PLANT INTELLIGENCE, INTERSPECIES COMMUNICATION, AND ECOLOGICAL INTERDEPENDENCE.
- ENCOURAGES SUSTAINABLE THINKING BY MAKING NATURAL RHYTHMS VISIBLE AND VALUED.

CARLOTTA PREMAZZI

PSS SERVICE INTERFACE

FABRICADEMY PROJECT PROPOSAL PRESENTATION

PHYSICAL INTERFACES

**THE PNEUMATIC FLOWERS THAT BLOOM AND CLOSE IN RESPONSE TO BIODATA.
THE PLANT ITSELF, AS A LIVING INTERFACE GENERATING SIGNALS.
HEARTBEAT SENSOR, PROXIMITY, BREATHING PRESENCE.**

SPATIAL INTERFACES

**THE IMMERSIVE GARDEN ENVIRONMENT: SOUNDSCAPE, SOFT LIGHTING, SPATIAL
ARRANGEMENT.
THE AREA WHERE USERS STAND OR APPROACH THE PLANT TO “ENTER” THE SYSTEM.**

DIGITAL INTERFACES

**THE BIODATA PIPELINE (ESP32/ARDUINO → TOUCHDESIGNER → PNEUMATICS/SOUND).
REAL-TIME MAPPING OF PLANT SIGNALS AND HUMAN BIOFEEDBACK.**

CARLOTTA PREMAZZI

PSS CUSTOMER USER JOURNEY

FABRICADEMY PROJECT PROPOSAL PRESENTATION



2025-2026

CARLOTTA PREMAZZI

FABRICADEMY PROJECT PROPOSAL PRESENTATION

FRONT-END (WHAT THE USER SEES/FEELS):

REAL PLANT AND BLOOMING SOFT-ROBOTIC FLOWERS
MULTISENSORY ATMOSPHERE (MOVEMENT, SOUND, PRESENCE)
VISUAL/TACTILE EXPRESSION OF PLANT HEALTH
OPTIONAL HEARTBEAT INTERACTION
A CALM, IMMERSIVE GARDEN-LIKE ENVIRONMENT

BACK-END (WHAT ENABLES THE SYSTEM):

SOIL MOISTURE SENSORS, ENVIRONMENTAL SENSING
ESP32/ARDUINO MICROCONTROLLERS
PNEUMATIC SYSTEM: PUMPS, VALVES, SILICONE CHAMBERS
SOUND ENGINE (TOUCHDESIGNER / ABLETON / EMBEDDED AUDIO)
DATA PIPELINE MERGING PLANT BIODATA AND HUMAN BIOFEEDBACK
MODULAR, MAINTAINABLE STRUCTURE FOR SOFT ROBOTICS

CARLOTTA PREMAZZI

2025-2026

PSS PLAN A, B, C

FABRICADEMY PROJECT PROPOSAL PRESENTATION

A – FULL SYSTEM (PLANT BIODATA + PNEUMATICS + HEARTBEAT + SOUND)

- Real plant + soil moisture biodata
- Pneumatic soft-robotic flowers
- Heartbeat sensor + sound modulation
- Combined human-plant dialog (movement + sound)
- Multisensory installation ready for exhibition

PLAN B – REDUCED INTERACTION (BIODATA + PNEUMATICS + SIMPLE HEARTBEAT LAYER)

- Plant biodata controls pneumatics
- Human heartbeat included only in sound or light modulation
- Simpler hardware pipeline, same conceptual outcome

PLAN C – MINIMAL SYSTEM (BIODATA → PNEUMATICS ONLY)

- Plant biodata → pneumatic movement
- No biofeedback; humans interact passively
- Focus on materiality, softness, and ecosystem expression

2025-2026

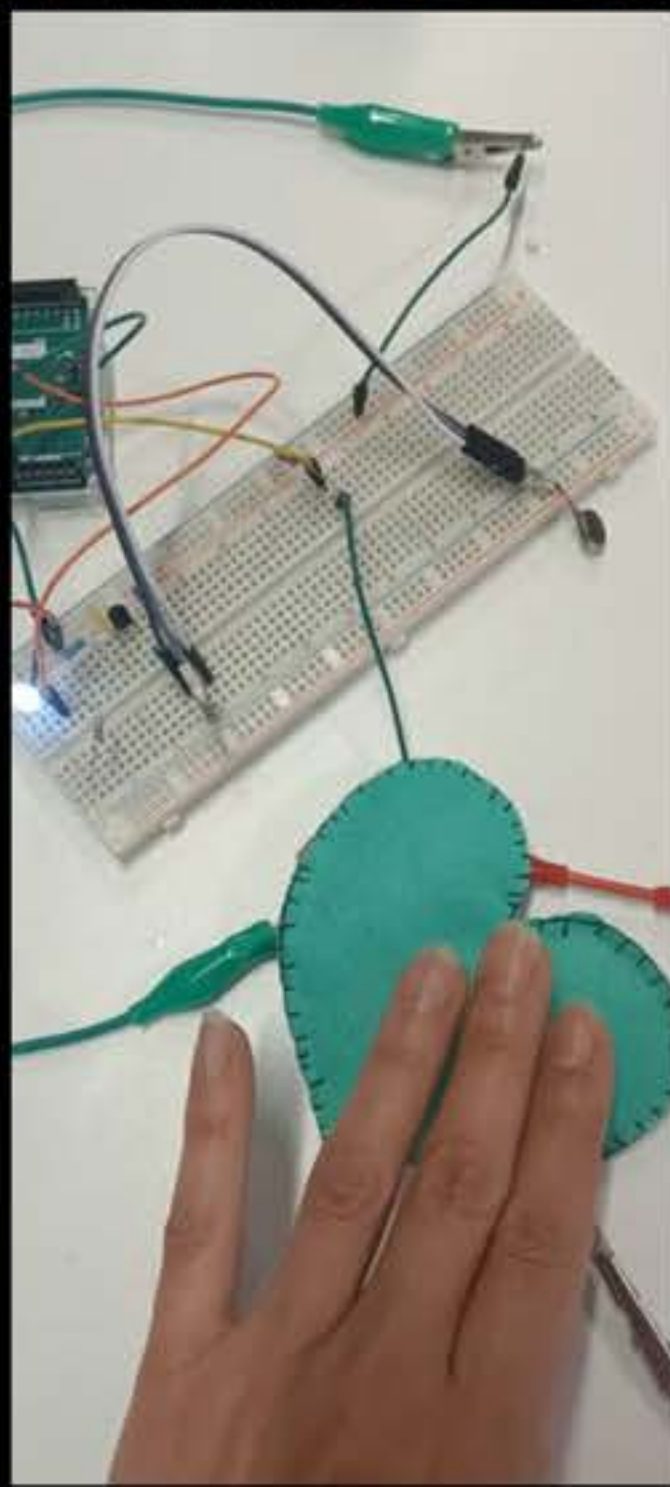
CARLOTTA PREMAZZI

FABRICADEMY PROJECT PROPOSAL PRESENTATION

PROTOTYPES & EXPERIMENTS



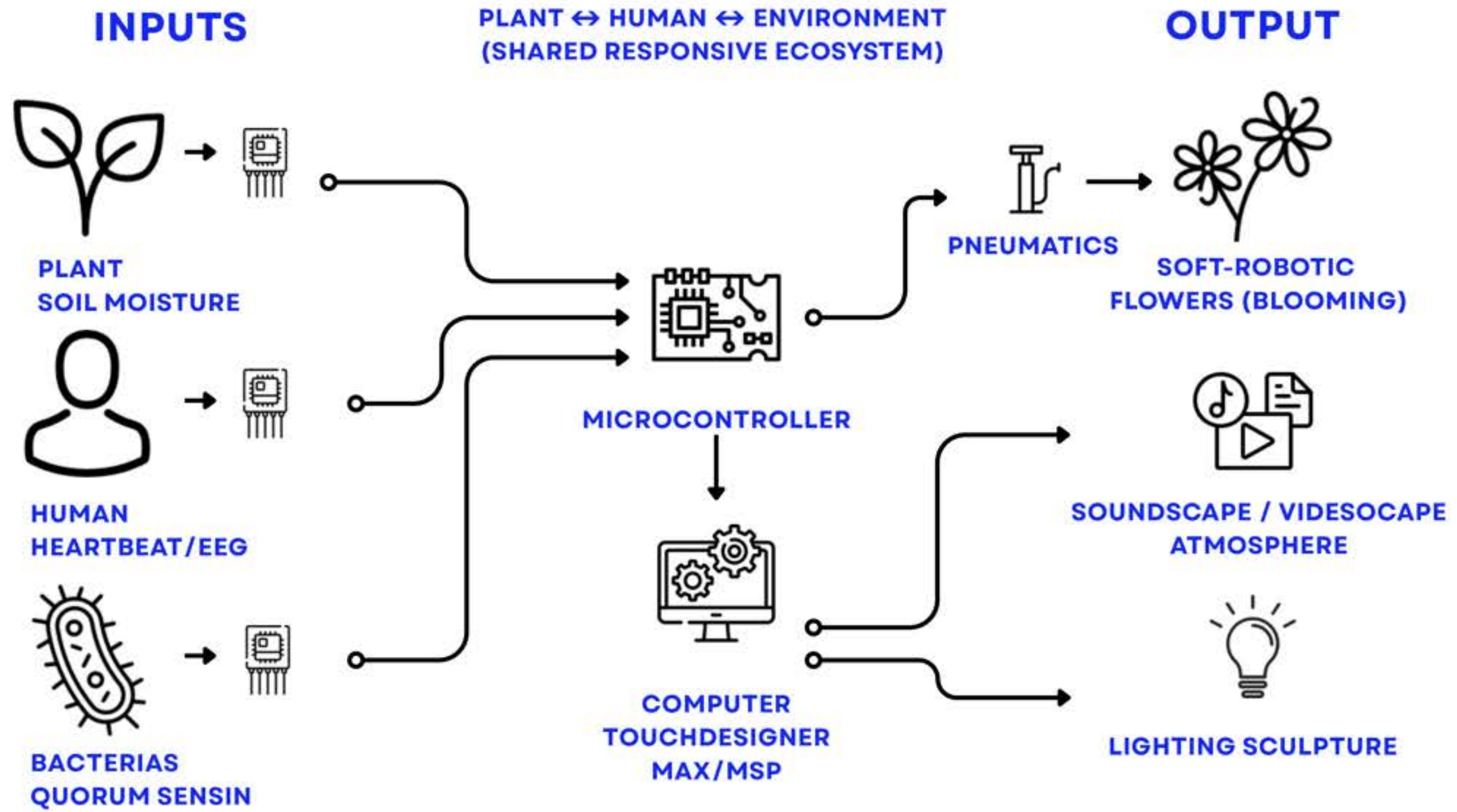
CARLOTTA PREMATA 2025/2026



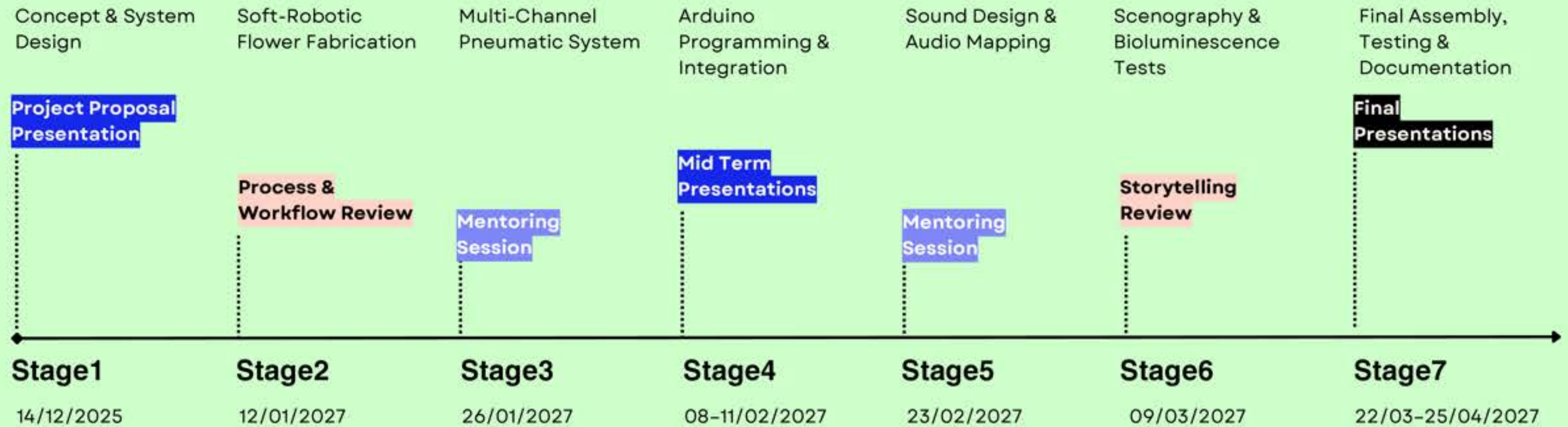
DIAGRAM

FABRICADEMY PROJECT PROPOSAL PRESENTATION

SYSTEM DIAGRAM – PLANT-HUMAN FEEDBACK LOOP



Timeline



EXPECTED OUTCOMES

FABRICADEMY PROJECT PROPOSAL PRESENTATION

**FULLY WORKING
INTERACTIVE
INSTALLATION**

**FULL
DOCUMENTATION
(WEBSITE, DIAGRAMS,
PHOTOS, VIDEO)**

**EXHIBITION-READY
VERSION TO SELL
PRESENT**

2025-2026

CARLOTTA PREMAZZI

biOLAB
Lisboa

FABRICADEMY
textile and technology academy

THANK YOU

CPDESIGNSTUDIO.COM

