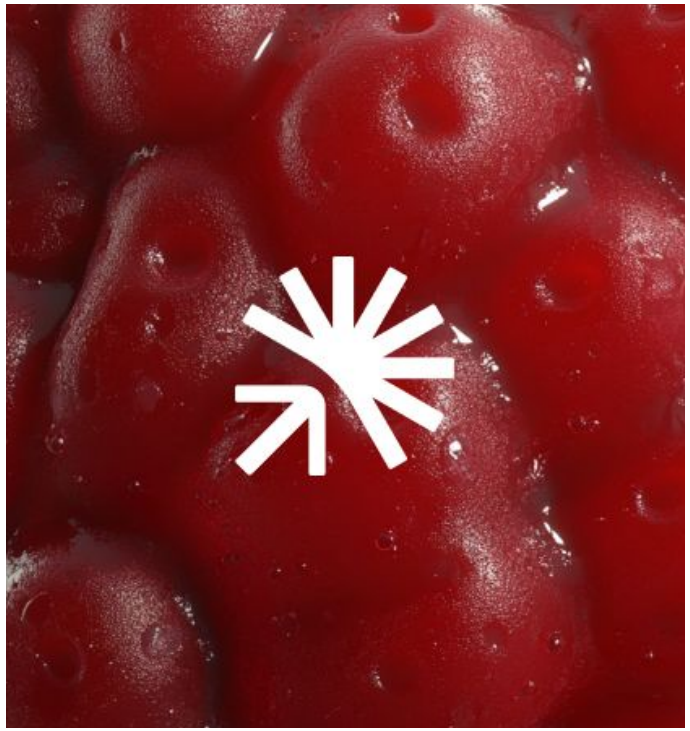
CIRCULAR FOOD SYSTEM LAB



POLITECNICO MILANO 1863 | DEPARTMENT OF MECHANICAL E

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ABOUT US

A multidisciplinary Research and Living Lab

for the Twin Transition of urban Food Systems, at the Politecnico di Milano, active from early 2025.



Scientific Coordinator

STEFANO MAFFEI
Full Professor



Lab Manager

MASSIMO BIANCHINI
Associate Professor



LORENZO SILVESTRI
Research Fellow



ANDREA SOMENZI
Research Fellow



LUCA GROSSO
Research Fellow



MATTEO MOJOLI
Research Fellow



VALENTINO STELLA
Research Fellow



FRANCESCA ZECCARA
Research Fellow



BARBARA PARINI
Collaborator

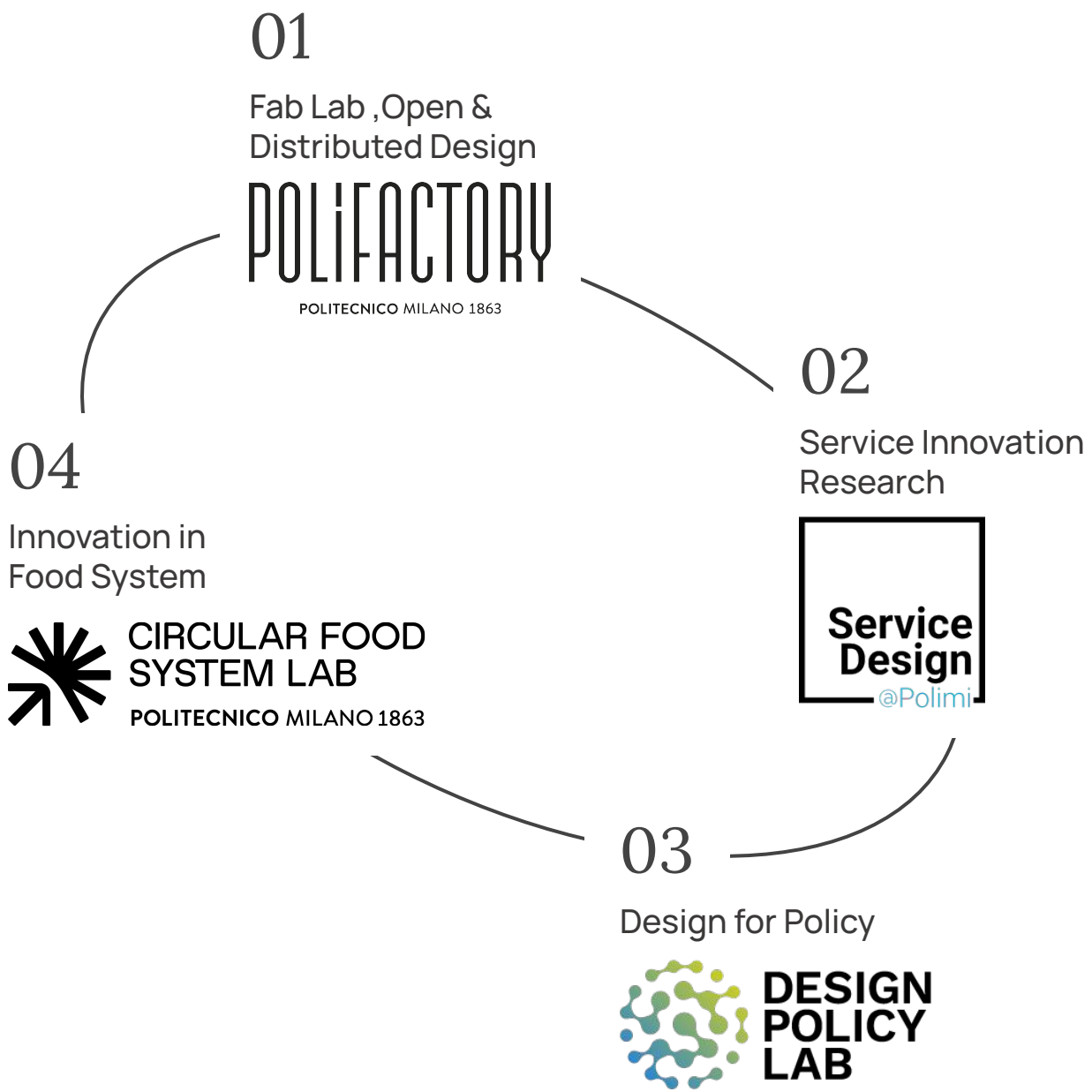


LAURA CIPRIANI
PhD Candidate

ABOUT US

A multidisciplinary Research and Living Lab

One Research group across **four connected realities** which create an Ecosystem of Innovation led by professor **Stefano Maffei**.



ABOUT US

CFS Lab as a modular and distributed Lab

Design module (coordinator)
c/o Polifactory, B3, Design Department

CIRCULAR DESIGN FOR FOOD SYSTEM

Research, design, and prototyping of interactive product-service systems for Food Systems

DEIB module c/o ioTLAB - MADE B8, Electronics, Information and Bioengineering Department

CIRCULAR LOGISTICS FOR FOOD SYSTEM

Tech solutions (IoT and ICT) for logistics, traceability, and monitoring of circular agri-food supply chains.

Mechanics module c/o VP Lab B23, Mechanical Engineering Department

RECOVERY AND RECYCLING FOR FOOD SYSTEM

Recovery, recognition, sorting, and treatment of post-consumer materials from food systems

ABOUT US

CFS Lab as a Living Lab

collaborates with external contexts through the active involvement of citizens, businesses, and institutions in the co-creation of sustainable solutions.

It organizes **events**, **workshops**, **open calls**, **thesis mentorships** and **partnerships**



WS Food for Extreme Environments, February 2026

Talk Food Labs Innovation, October 2025

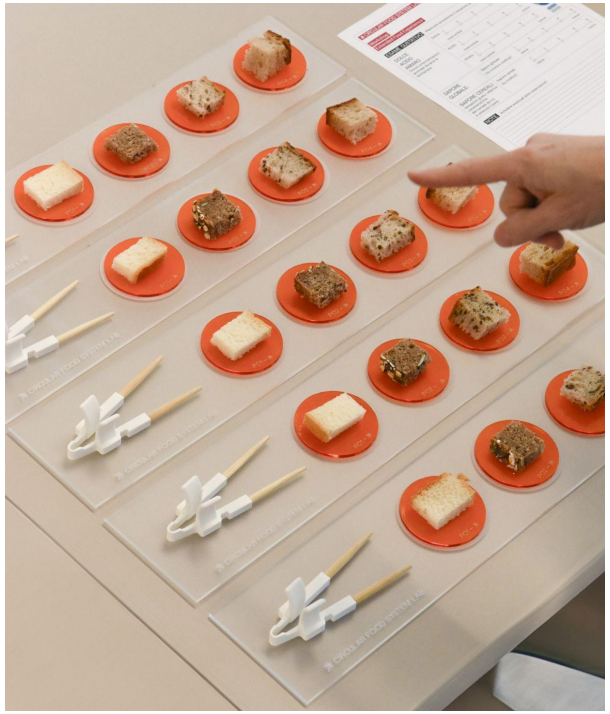




WS Edible Futures, June 2025

School of Design, A.Y. 25-26





WS Extended Food Experience, May 2025

WHAT WE DO

Research-action approach

CFS Lab builds on Polifactory's **eleven years of experience** in the **Food Topic**, maintaining an approach deeply rooted in the maker culture.

Pilot projects and proof-of-concept, with a **user-centered/driven** and **open innovation approach** and **practical experimentation** on a sectoral and territorial scale.

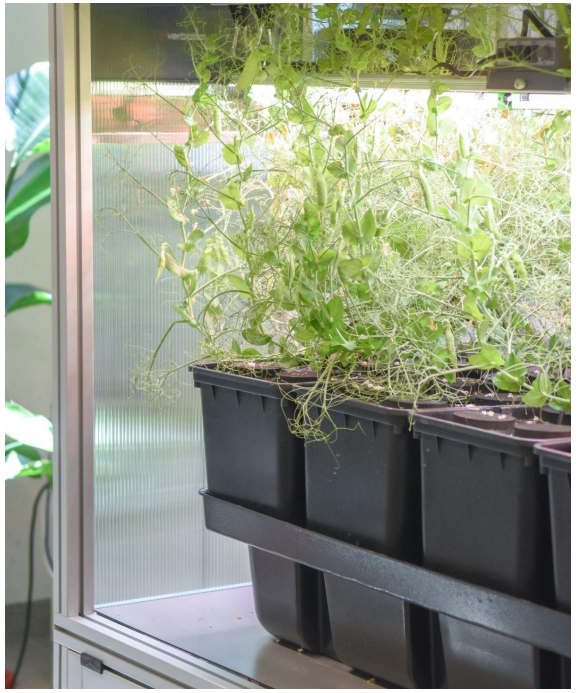
- Competitive research
- Consultancy research
- Public engagement
- Patent development and start-ups

Open Farmer Kit, a modular open-source station for urban farming spaces



Hacko, open-source nukazuke fermenter



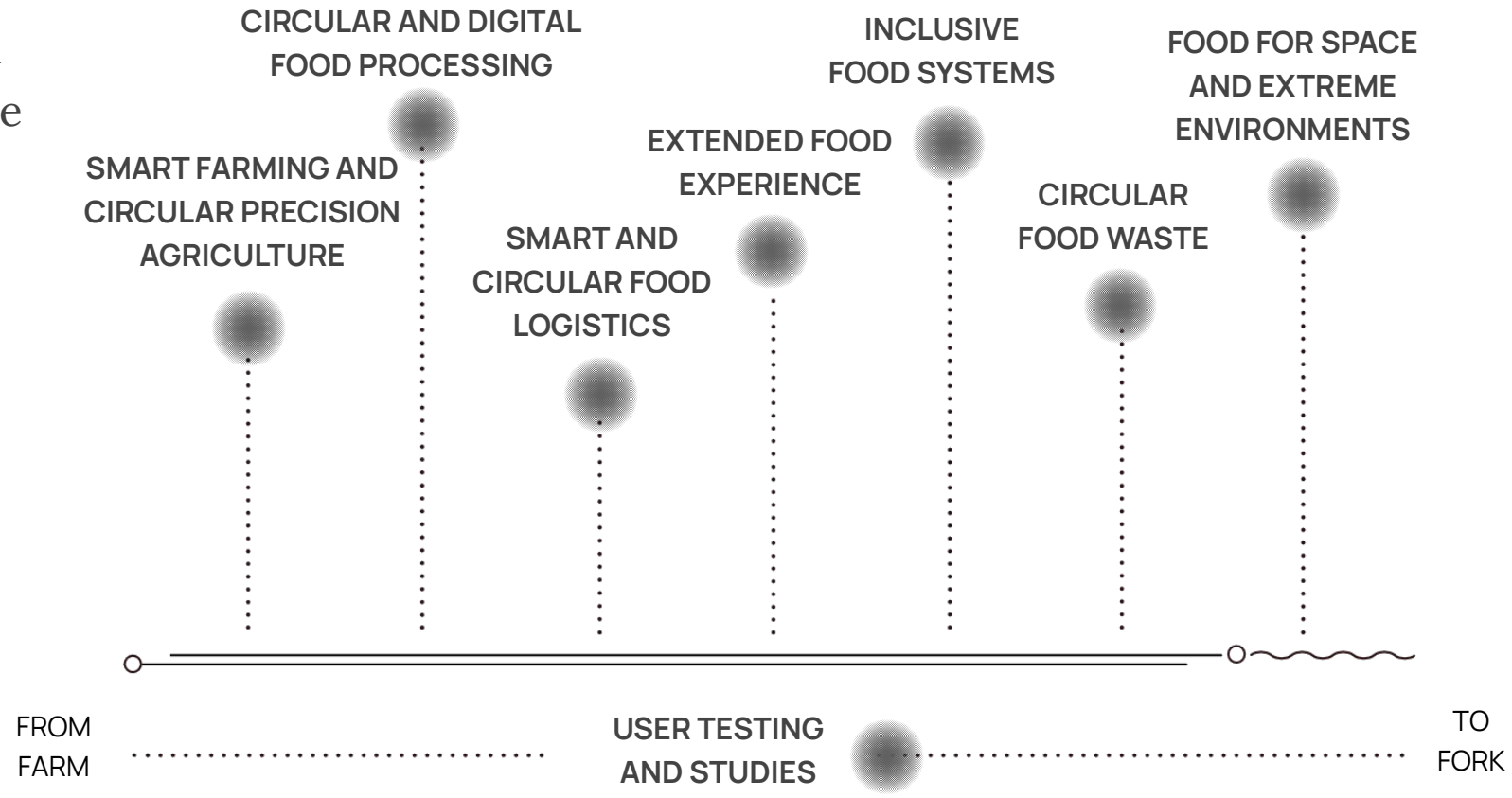


Aeroponics vertical farm, design and assembly by CFS Lab

WHAT WE DO

Areas of Research

CFS Lab operates throughout the agri-food supply chain in line with the objectives and guidelines of the **Farm to Fork Strategy**.



FACILITY AND ASSETS

Design Module

CFS Lab coordinator module, with **two dedicated areas** in the Polifactory space, the Fab Lab and Makerspace of Poiltecnico di Milano.



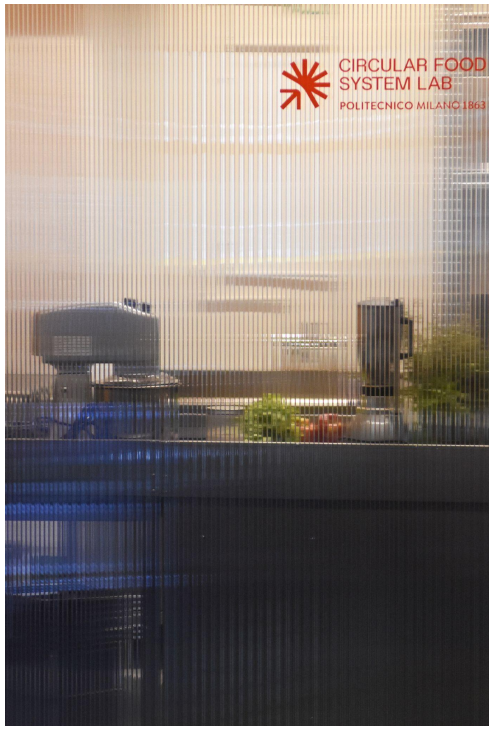
FACILITY AND ASSETS

Design Module

An area dedicated to experimenting with **food processing**, featuring a kitchen equipped with innovative professional tools such as a **Food 3D Printer, Freeze Dryer** and more.





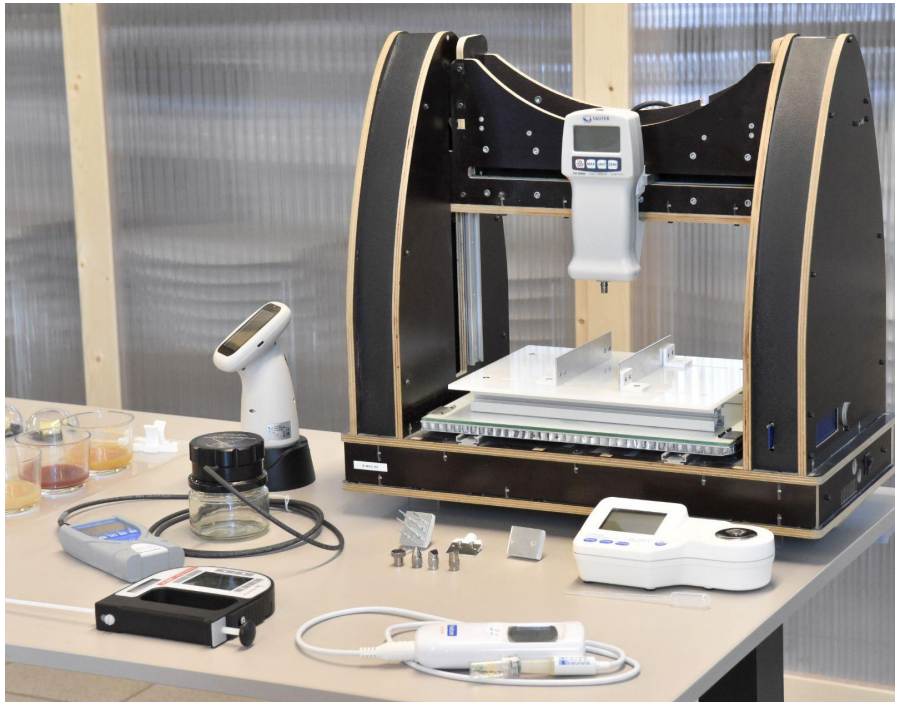




FACILITY AND ASSETS

Design Module

Other areas dedicated to host **workshops** and **events** and to experiment with instrumental analysis, smart farming, waste recovery, and prototyping activities.



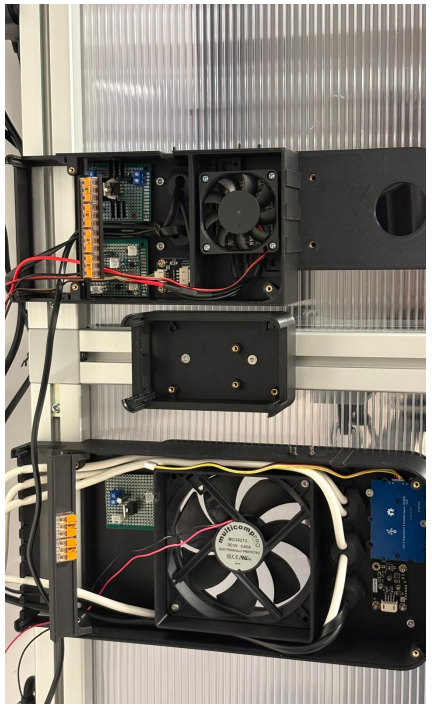


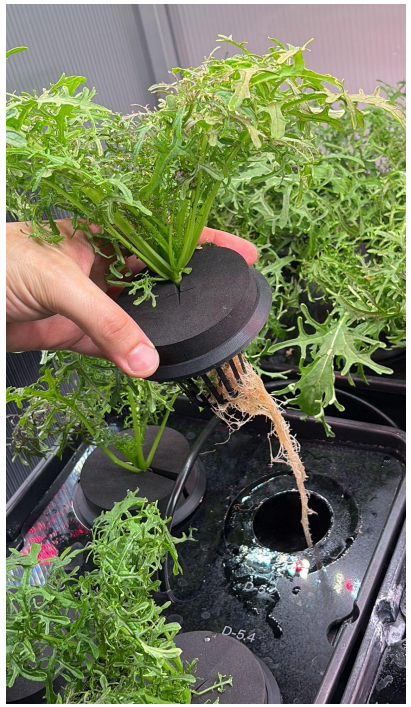


FACILITY AND ASSETS

Design Module

Modular platform with **four controlled chambers** (up to 128 plants). Independent control of temperature, humidity, irrigation, and light spectra, with O2/CO2 monitoring.









FACILITY AND ASSETS

Additional Assets

The CFS Lab has access to and shares the equipment of **Polifactory Fab Lab**.

These include digital fabrication technologies (laser cutting, FDM, SLA, SLS, and LDM 3D printing), ceramic kiln, robotics systems, AR tools, and additional prototyping and experimentation facilities.





Food Market 4.0 - REFLOW

Horizon 2020

REFLOW is a project addressing circular and regenerative urban systems, with a focus on material flows.

The Milan pilot investigated the Food System **logistics in fresh food distribution and local markets**. The work examined how markets can evolve into inclusive, circular food hubs, addressing key challenges:

- Fragmented, largely analog traceability
- Limited digital infrastructure and skills
- Inefficient stock management leading to food loss



One of the covered market where the on-field testing phase was conducted.

PROJECTS

Food Market 4.0 - REFLOW

Horizon 2020

The project developed into a product-service system combining **physical infrastructure** and **digital interfaces** to improve traceability and reduce inefficiencies.

The system was designed to be non-invasive and easily integrable into existing market practices.

- RFID crates for tracking products
- A smart scale linking sales data with physical flows
- A smart gate monitoring the movement of goods
- A real-time dashboard for data visualization and decision-making





PROJECTS

Distributed Design

Creative Europe

Project aimed at strengthening the global Fab Lab network and improving connections between makers, designers, and the European market.

Across three editions, the CFS Lab staff developed and released a series of **open-source projects** for the community, focusing on areas such as

- **Fermentation and food production**
- **Smart Farming**
- **Foster Biodiversity**



1. Open Farmer Kit, 2. Green-Eye,
3. Breath, 4. Demetro







PROJECTS

Distributed Design

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5. HiveDock, 6. 3ee,
7. Olea, 8. Circle Fermenter







PROJECTS

Sensory and Instrumental Analysis

Research and experimentation on **sensory and instrumental analysis**, with a focus on processes, tools and standards, and on the **intersection** between these two domains.

The aim is to translate both organoleptic and physicochemical food analysis into an **accessible and modular toolkit**.







PROJECTS

Cesare

Is an ongoing project in partnership with **Caritas Reggio-Emilia**, a local Catholic organization offering **social and food assistance**.

The project aims at developing a new territorial food donation system to tackle **Food Loss**, improve food quality and variety.

Starting in 2026, it will implement a centralized **warehouse and digital infrastructure** for food collection, storage, tracking, and redistribution, integrating logistics optimization with a co-design process involving all actors of the donation ecosystem.



PROJECTS

Other Funded Projects

Explore all the past projects, events and activities on Polifactory and CFS Lab websites.

Link to CFS Lab Website
Link to Polifactory Website

European Projects

Yourban | 2023-2025
Distributed Design | Creative Europe | 2022–2025
T-Factor@MIND | Horizon 2020 | 2020-2024
Food Market 4.0 – REFLOW | Horizon 2020 | 2018–2022
Circuloop | 2022-2023
BODYSOUND – SISCODE | Horizon 2020 | 2018–2021
FabCare DDMP | Creative Europe | 2018-2020

National Projects

Circular Sofa Platform | 2023-2025
Iris.Lab JOINT RESEARCH PLATFORM 2023-2025
Circular Food System Lab | 2024
Polaris – BASE 5G | Bando MISE 5G | 2020–2023
Fabric-Action | 2016-2017
Next Design Innovation | 2016
Design From Idea to Market | 2015

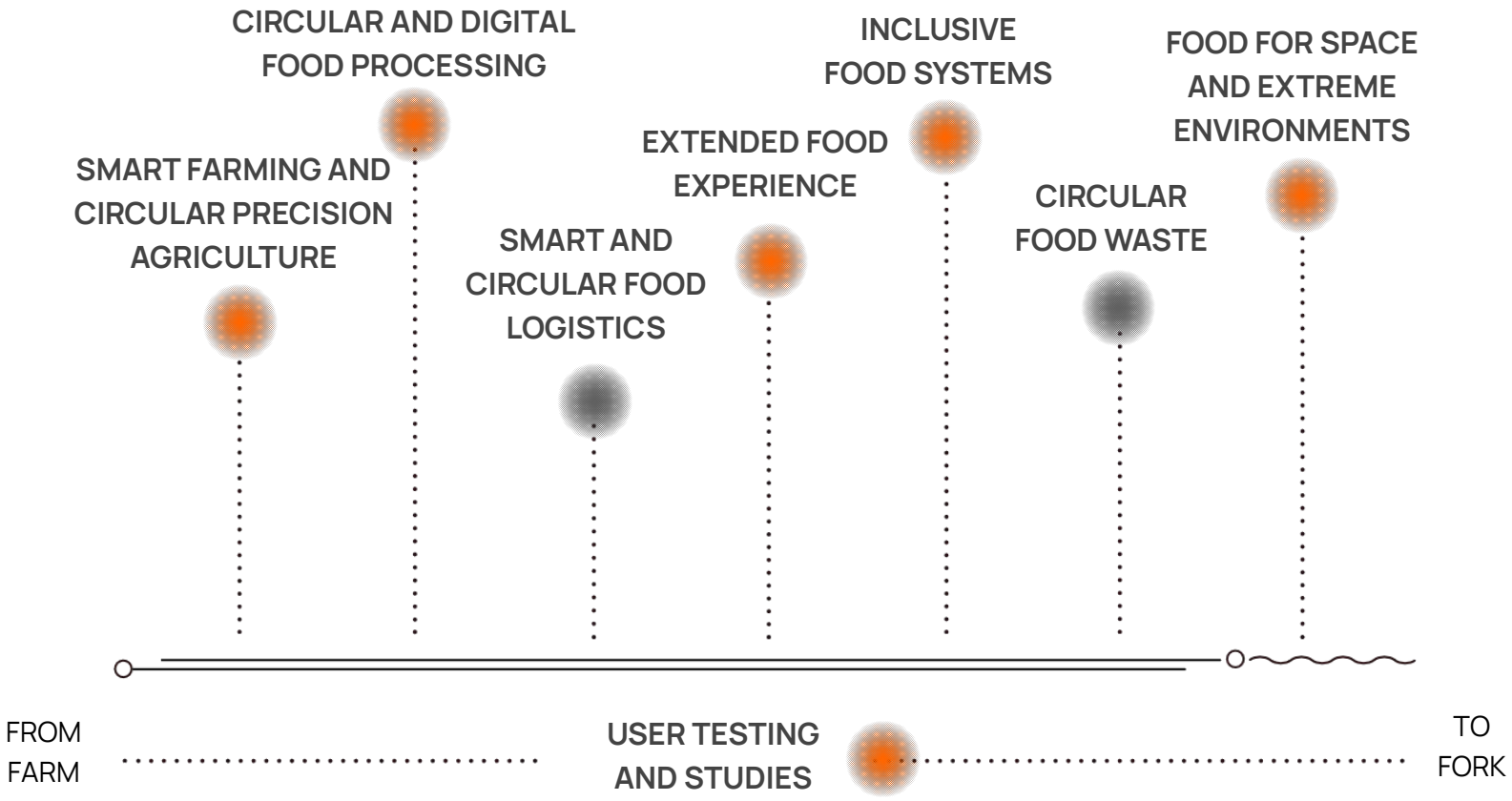
Private Funding

CESARE - Banca D'italia | 2025-2026
Design NOW - Fab City Summer School | 2020–2023
Proxim - Smart Saddle | 2017
From Mind to Reality | 2016

CALL TO ACTION

Research topics for collaboration

We are particularly interested in developing collaborative projects that enable **parallel experimentation across different contexts**, exploring how approaches, cultures, and geographic settings can shape and enrich innovation processes.





CIRCULAR FOOD SYSTEM LAB

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cfslab.polimi

Circular Food System Lab - Politecnico di Milano

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