Driving Design

Collective approaches enriching design principles

Edited by Distributed Design Platform

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Introduction

Jessica Guy, Distributed Design Platform lead at Fab Lab Barcelona | IAAC

Driving Design is the fifth of seven publications from the Distributed Design Platform. Established in 2017 and co-funded by the European Union, the Distributed Design Platform brings together Fab Labs, Makerspaces, cultural organizations, universities, and design centers from around the globe. The community is growing in members, local and global collaborating organizations, and Creative Talents in Europe and beyond. Over the past four years, the platform designed and supported the development of local and global programming, strengthened a network of creatives and fostered opportunities to learn and exchange.

Each publication is an opportunity to explore the advances and challenges in the field of Distributed Design while also reflecting on the values of collaborative, openness, regenerative, and ecosystemic practices and how these contribute to the exchange of knowledge, skills, value, and power. In the last book, This is Distributed Design, we consolidated best practices and state of the art interventions in the emerging field of Distributed Design. In this year's edition, we highlight the motivations, opportunities, and challenges that drive the practitioners and the field of Distributed Design.

In increasingly challenging times - the climate emergency, divisive political situations, escalating conflicts, and systemic inequality - it is even more important to question why and how we intervene as creative practitioners. How can Distributed Design create more equitable presents and futures? What are the gaps and challenges to overcome? How can we foster reciprocal relationships between diverse communities and the environment? What new worlds are we going to explore when we investigate designing with extended and other intelligences? And with that, we ask who and what are the drivers of Distributed Design in 2023?

An open call was launched to explore possible answers. Designers, makers, craftspeople, and scholars have answered our call and shared their approaches and areas of exploration in a selection of emerging themes. Each of the five chapters build upon the other. First, we connect to the last article in the This is Distributed Design book from 2021 - The Bauhaus Society - to explore new areas of intervention for Distributed Design. Then we dive deeper into how we learn and unlearn the design practice in the first place. We highlight the importance of reconnecting to ancestral wisdom and the potential to share knowledge, skills, and power by connecting it with emerging technologies. Then we explore how we can create and reclaim agency through design practices. Finally, we reflect upon the evolution of the commons in the age of technology and how we can use collective responsibility to manage it.

Enjoy a glimpse into the field of the ever-evolving field of Distributed Design.

Table of content

BOOK INTRODUCTION 08

CHAPTER 1
Value driven - Systemic approaches to design 16

Systemic objects 18

Gareth Owen Lloyd, Nat Hunter, James Tooze

How distributed design might drive the circular transition 22

Therese Balslev

Innovation processes in distributed textile labs across Europe 30

Adriana Cabrera, Elena Knispel, Hala Aissaoui, and Niels Lichtenthäler

Application of distributed design and circular economy principles to the event industry 44

Soumaya Nader

Design beyond the decline 48

Sara de Boer & Faezeh Mohammadi

Grounding production design in space and activity 54

Max Kersten Boll

Feel Refill 72

Maria Levitskaya, Daniil Chechin

VAU.R308 78

Arthur Grethen & Léo Sprimont

TYPE

- Article
- Review
- Profile

TAG

- Fashion
- Health care
- Place
- Education
- Food

CHAPTER 2
How to future: new forms of learning and (un)learning 82

Developing maker-centred learning programs to promote critical thinking about technology and design for emergent futures 84

Dafni Gerodimou, Eduardo Chamorro & Santiago Fuentemilla

Prototypes as learning tools for exploring biomaterials 100

Patrizia Bolzan and Carlo Emilio Standoli

Recentering design education 112

Twisha Mehta

Popping the designer's bubble 120

Angel Yoon Kyung Cho, Didac Torrent Martinez & Vikrant Mishra

Association of Women in Agriculture, Kenya: Resilient Recovery for Vulnerable women 126

Judy Matu

Breaking walls 130

Liting Liao

Master's in Distributed Design and Innovation, New Frontiers in Distributed Education 136

Tomas Vivanco, Tomas Diez & Josefina Nano

CHAPTER 3
Uniting ancestral wisdom and contemporary knowledge 140

Distributed design for plant-based food 142

Massimo Bianchini, Luca Grosso, Laura Cipriani & Stefano Maffei

Indira Table Loom- Part of Smart Handloom Project 148

Nanditha Nair

PET Waste into Value 154

Paola Zanchetta

Testing Oven 160

Veronica Tran, Gabriela Garcia, Julia Bertolaso & Sarah Muir-Smith

Human Material Loop 164

Zsofia Kollar, Leonardo Avezzano

Sustainable Hi-tech Fashion: B.O.R Wearables 168

Batoul Omar al-Rashdan

CHAPTER 4
Design for agency

172

Provoking Manifesto 174

Natalia Pérez-Orrego

Civic design: from activism to located collective intelligence 184

Domenico Di Siena

ImPulse 198

Bashar Zapen

From accessibility to inclusion: Dreamy case-study 210

Miriam Ronchi and Andrea Avalli

Habibi.Works 220

Esther ten Zijthoff, Michael Wittmann, Mimi Hapig, Franziska Wirtensohn

Crosshabit 224

Borbála Moravcsik

reCOVER 228

Georgina Török, Dávid Gál and Balázs Rados

CHAPTER 5
Tech humanism and the commoning of knowledge

232

Embracing openness; Why cede access to design? 234

Alex Kimber

Radical Data 242

Jo Kroese & Rayén Jara Mitrovich

Wind Empowerment 248

Katerina Troullaki, Kostas Latoufis

Repairables 252

Gaia Rubino

Fab Island Challenge 256

Mitalee Parikh, Daan Sonnemans, Tomas Diez, Kate Armstrong

Lemna 262

Ruben De Haan and Vikrant Mishra

BIBLIOGRAPHY & APPENDIX 268

Distributed design for plant-based food

Massimo Bianchini, Luca Grosso, Laura Cipriani, and Stefano Maffei;
Polifactory, Department of Design, Politecnico di Milano

In our contemporary society, we are witnessing a push towards increased consumption of plant-based foods. Underlying this drive is the desire to counter the environmental and social impact generated by modern food.

It is a systemic change that affects people's behaviour and lifestyles, stimulating the agri-food industry to create a new generation of plant-based products that can satisfactorily replace animal-based food such as meat, fish, eggs, milk, etc. The production of innovative plant-based aliments needs research that focuses on the different properties of plant ingredients and the innovation of the production processes required to convert them into food products or, alternatively, cultivate food products using proteins derived by vegetables. But, within this framework, there is also a space to (re)think solutions that help the production of plant-based foods starting from recovering food waste and renewing food processes having a strong local tradition and, in some cases, an ancestral history.

Historically, fermentation has been relevant in transforming a large variety of foods, increasing their nutritional value and shelf life. Pasteurisation, the appearance of electrical appliances such as refrigerators, and the development of other modern food preservation techniques have made certain types of fermentation less necessary and many forgotten products. Today, especially among the younger generation, we are witnessing the rediscovery and revival of fermented foods and traditional fermentation processes together with a growing interest in fermented foods from other cultures such as kombucha, kimchi, tempeh, kefir, and miso. Plant-based fermentation is aligned with the principles of the circular economy because it ranges from the valorisation of food waste to the adoption of natural, energy-efficient food processing, production, and preservation processes.

Beyond the production of alcoholic beverages, distillation also allows the production of natural extracts such as essential oils and hydrolats from wild and aromatic plants and herbs (leaves, flowers, fruits and twigs) and food waste such as citrus peels. Extracts obtained through distillation have been known since ancient times and used not only for cooking but also to alleviate the symptoms of diseases, flavour foods and, more recently, even to prepare liqueurs and cocktails with zero alcohol content.

We can look at fermentation, distillation, and other food transformations as a large catalogue of plant-based food spread across our planet. These food processes result from a slow accumulation of experience and knowledge that are now waiting to be re-discovered to understand their principles and values, not only nutritional but also social, economic and environmental. Distributed Design represents the ideal approach to study and experiment with these processes in a key of digital transformation and circular transition, making them accessible, renewable and sustainable even outside their contexts of origin.

Open Food Factory. Experimenting open and circular food process through Distributed Design

Open Food Factory is an experimental initiative conceived by Polifactory, the makerspace of the Politecnico di Milano, for the design and prototyping of innovative open-source solutions dedicated to plant-based food fermentation and distillation. Open Food Factory focuses on developing micro and self-production food processes connected to emerging food behaviours and regimes in a circular economy perspective. Developed throughout April 2022 and February 2023, Open Food Factory started with the launch of an open call for ideas. Twenty-six young designers submitted six proposals relating to fermenters and distillers. Three of these, two focused on fermentation and the other to distillation and extraction, were selected by a jury of experts in design, making, and urban manufacturing. The teams develop their projects in collaboration and with the technical-scientific support of Polifactory, working in the makerspace as "makers in residence." The designed and prototyped solutions were released and are promoted on the Distributed Design Platform.

IMAGE 1. The HACKO System for the preparation of Nukadoko with its elements and components

HACKO. An open-source kit for nukazuke.
Nukazuke is a type of Japanese pickles produced by fermenting vegetables in rice bran. Nukazuke is not an ordinary food preservation technique but a food processing technique. It is a practice hundreds of years old, and for the Japanese, it is considered more than a technique, but an art firmly rooted in family traditions, handed down from generation to generation. Nukazuke is healthy food because it contains good bacteria for the intestinal flora and, traditionally served at the end of a meal, can aid digestion.

Various vegetables are used to prepare Nukazuke, including roots such as radishes and carrots, or aubergines and cucumbers. Within a box, vegetables ferment covered by moist, salty rice bran called nukadoko. The colony of lactobacilli that proliferates in nukadoko transforms the vegetables into pickles in a few hours. Lactobacillus culture must be healthy to ensure that fermentation correctly works. Nukazuke preparation requires constant effort and care.

The microorganisms that make possible vegetable fermentation only survive if correctly aerated by preventing the overproliferation of anaerobic bacteria that are harmful to the fermentation process. Usually, nukadoko must be hand-mixed daily for a few minutes. In this way, it is possible to inoculate the harmless bacteria that live on our hands, let the nukadoko breathe and keep the colony of lactobacilli healthy. The correct handling and monitoring of the health of the nukadoko and the draining of excess fluid in the rice bran are fundamental for preparing nukazuke. All this requires experience, knowledge, and even mastery.

But how can such a healthy and sustainable but complex food processing process, deeply rooted in a local tradition, be made accessible?

The HACKO project tries to address this question by exploring the potential of distributed design and making nukazuke a more accessible food transformation, reproducing and adapting this process in a distributed way in different cultures. The Japanese entrepreneur, Kentaro Sohara, along with a group of young designers - Giovanni Bruno, Gaia Rubino, Martina Comola, Federico Denni, Andrea Somenzi and Valerio Libardo in collaboration with Polifactory - starts to translate his family's traditional knowledge on nukazuke into a kit composed of elements and accessories that can facilitate the production of Japanese pickles in different contexts.

For more than three months, Polifactory turned into a temporary food lab where a team of designers experimented with the preparation of nukazuke, ranging from using local raw materials to re-producing the techniques by unskilled people. This activity allows designers to understand fermentation by analysing its physical and chemical conditions. The experimental work has inspired the design and prototyping of HACKO, an open-source kit enabling people to prepare their Nukazuke using ordinary food boxes and a system of designed elements: a set of 3D printed trays of different shapes and sizes to regulate and facilitate the drainage of the nukadoko's liquids, a multipurpose tool that can assist the handling of the nukadoko (in case handling it generates allergic skin reactions) and, finally, a digital device to monitor humidity and temperature within the fermenter boxes, the two fundamental parameters to keep nukadoko healthy and maintain the ideal conditions for fermentation.

BREATH. A parametric valve for lacto-fermentation

BREATH project analyses traditional food preservation processes with a design perspective on the food of the (next) future. Conceived and developed by the young designers Alberto Ambrosini, Daniele G. Fotia, Alice Monti, Vittoria Pagliaroni and Luca Vergani, BREATH focuses on lacto-fermentation, a method of preserving food that does not require energy and allows each part of the food to be enhanced, enhancing the flavours and reducing waste. In addition, some foods preserved with this technique enable users to enjoy the umami taste by experimenting with recipes and flavours.

'BREATH brings people closer to traditional fermentation techniques using safe and easy-to-use tools supported by clear instructions preventing possible problem with poor food preservation.'

Lacto-fermentation is a simple technique applicable to almost all types of fruit and vegetables. The surfaces of these products already contain many Lactobacillus bacteria responsible for the fermentation process and only survive in an anaerobic environment. The fermentation process involves combining the cut vegetables with salt - which prevents the proliferation of other harmful bacteria - placing them in a jar and keeping them pressed under a glass or ceramic weight.

BREATH brings people closer to traditional fermentation techniques using safe and easy-to-use tools supported by clear instructions preventing possible problems with poor food preservation. BREATH is a three-elements system. A cap containing a valve and two silicone membranes ensures no spillage of liquids and replaces ordinary glass weights that hold food in the correct position. All the BREATH elements (including moulds for silicone membranes) can be easily 3D printed. The valve cap is parametrically designed and adapted to glass jars of different sizes, and 3D-printed moulds are reusable several times. BREATH has taken great care in the study and choice of materials to make the process effective and safe. The silicone membrane associated with the valve makes the cap impermeable by preventing air from passing through even the microporosity of its structure.

IMAGE 2. The BREATH System for lacto-fermentation with its elements and components

OLEA. An open-source distiller for essential oils and hydrolats

Distillation has always been a technique for extracting alcohols, oils, and essences from a large food variety, from fruit and vegetables to wild and aromatic herbs. Following the direction of developing healthier and more sustainable diets, it is interesting to experiment with steam distillation from a circular perspective. It means experimenting with food scraps and waste for distillation and with oils and hydrolats - aromatic water derived from the steam distillation of plant flowers and leaves - that can enrich the flavours of plant-based food.

OLEA is an open-source steam distillation system ideated by Giulia Chiggiato, Irene De Biasi, Chiara Guarino, Federico Montini and Vittorio Rinaudo by adopting a design approach influenced by the practices of making and citizen science. OLEA makes non-alcoholic steam distillation more accessible by working on the hacking and "reversible adaptation" of household items such as pots, kettles, and glass carafes readily available in our homes or easily purchased at low cost. In parallel, there is the issue of the design and customisation of technical parts and components to connect the various elements to configure the distiller.

As with HACKO, Polifactory hosted several experimentation sessions of the OLEA project. The first one verified the technical feasibility of the distiller, while the subsequent ones focused on the feasibility of the distillation process. This process involved Wood*ing - Wild Food Lab, a research lab exploring the use of wild food for food and human nutrition. The

IMAGE 3. The OLEA Distiller with its various elements and components

collaboration between designers, Polifactory, and Wood*ing has been fundamental to understand how to finalise the project and what technical aspects to focus on in the prototyping phase.

The OLEA concept is based on hacking and “reversible adaptations” of ordinary household items: a steel pot with a lid and colander, a steel steamer basket, and a glass jug with a small tap. An induction cooker can provide safe heat for distillation. Other small-size components are a copper tube, a small brass valve, and two silicone tubes. OLEA designs from scratch 3D printing elements to facilitate the passage and separation of essential oils, hydrolats (perfumed waters) and water. A 3D printed mould allows the copper tube to bend, creating the coil for distilling. A 3D printed double outlet tap - one for the oil and hydrolase and the other to empty the water formed by the melted ice - is installed on the glass jug, allowing the copper coil to maintain the correct position. A component that facilitates the separation of oil and hydrolysate and two 3D printed moulds used to create silicone gaskets that seal certain parts of the distiller complete the kit.

Open Food Factory: some lessons learnt

The first edition of OPEN FOOD FACTORY with the HACKO, BREATH and OLEA projects represents a real opportunity to reflect on some aspects that Distributed Design should consider in dealing with food transformation related to local and centuries-old traditions and new forms of micro and self-production.

The first reflection concerns how tacit knowledge, often embedded in traditional food transformations, can be translated into new forms of open knowledge, fundamental for implementing distributed food transformations. More specifically, open knowledge generation must combine respect for the original food transformation cultures and practices (traditional knowledge repositories) with the need to share information for replicating and adapting open-source processes locally.

The second reflection concerns the ability of Distributed Design to operate at various scales within a systemic complexity. The development of circular solutions enabling open and distributed food transformations must connect the micro-level (how the single solution works) with the macro-level by including externalities such as materials and energy consumption (how the food metabolisms work). Moreover, open food transformation developed through Distributed Design must comply with existing food laws concerning food-safe materials, the environmental impact, and food safety. The need for systemic abilities to manage the complexity of open circular food transformation can be satisfied using enabling technologies and design, control and verification protocols ensuring effective, replicable, and safe food transformation.

The third and final reflection focuses on the ability of designers to configure distributed and inclusive networks and communities of practice interested in plant-based food transformations. These networks and communities must include a mix of stakeholders from experts and specialists - from food to citizen science labs to other civic organisations interested in plant-based food practices not only in a dimension of circularity but in a perspective of more-than-human care (individual, collective, and planetary).

The projects implemented and the consequent reflections form the basis for elaborating the future model of what could be a true Open Food Factory, real and virtual places where distributed and circular food processes co-design, co-exist, experiment and develop.

Driving Design is the fifth in a series of seven publications developed within the Distributed Design Platform, co-funded by the European Union.

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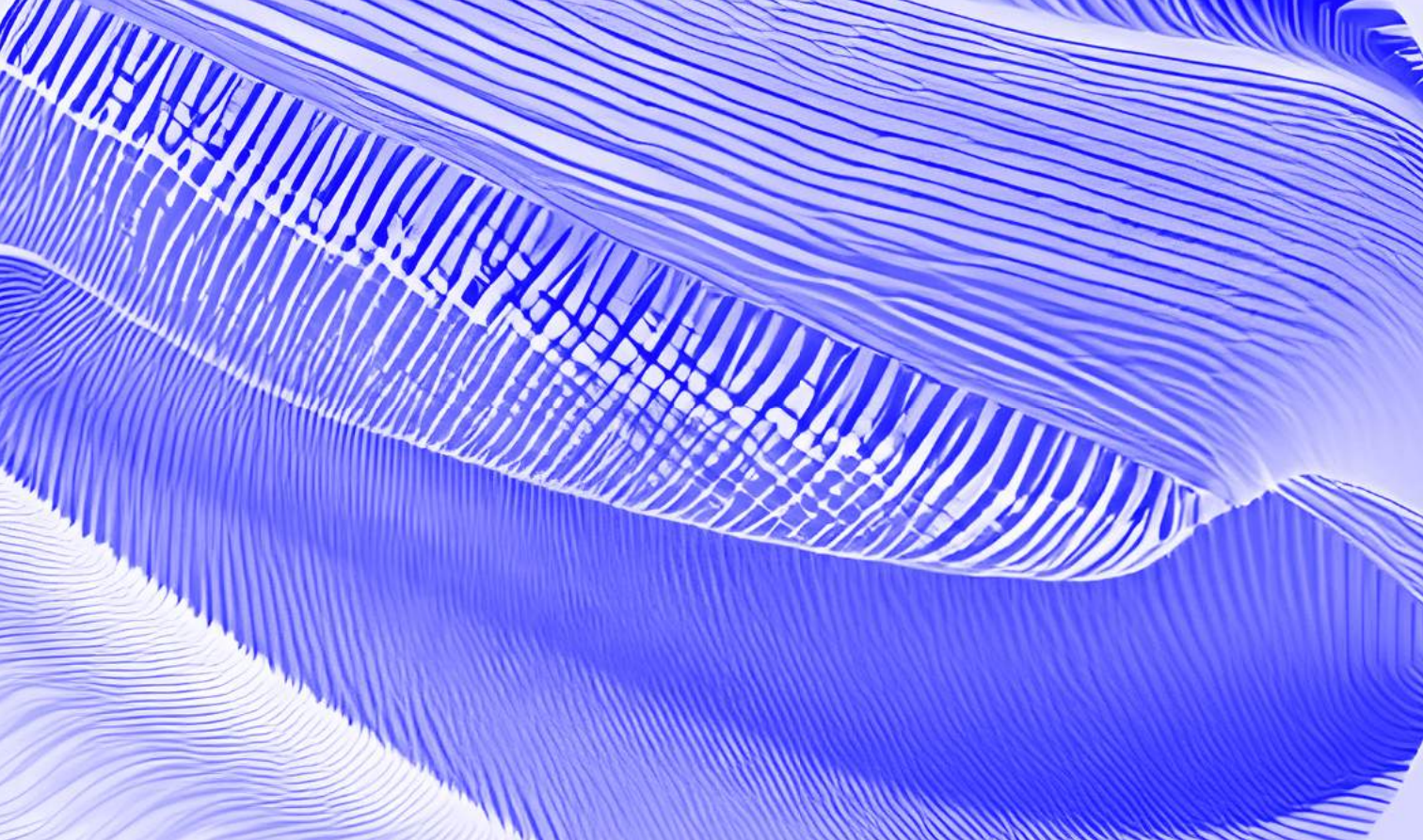

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Driving Design is a non-exhaustive collection of articles, reviews, and profiles that represents and highlights the motivations, opportunities and challenges that drive the practitioners and the field of Distributed Design.

The book curates a collection of works under five umbrella themes, each of which offers the space for the Distributed Design community to share their vision, approaches and areas of exploration to answer who and what are the drivers of Distributed Design.

The chapters explore Value driven - Systemic approaches to design; How to future: new forms of learning and (un)learning; Uniting ancestral wisdom and contemporary knowledge; Designing for agency; and Tech humanism and the commoning of knowledge.

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