



# Basque **Bio**Design Center

Biodiseño & Tecnología

**Natura eta organismo biologikoetan inspiratuz, berrikuntza eragile gisa biodiseinuaren inguruko estrategietara bideratutako zentroa da**

Centro especializado en estrategias de biodiseño, inspirado en la naturaleza y los organismos biológicos como motor de innovación

Center specialized in biodesign strategies, inspired by nature and biological organisms as the driving force of innovation



## BASQUE BIODESIGN CENTER |

BDC is a convergence space with the mission of propelling the digital transformation of future materials through experimentation, innovation, and collaboration to create technology-based solutions.

Our vision is to become an inspirational hub for creativity, the only one of its kind in Spain, aiming to bring together the talent of our region with the global community and bridge the gap between design and science.

The Basque BioDesign Center in Gueñes serves as a space for experimenting with various digital creation processes and tools. It emphasizes the strategic role of creativity as a productive model, where technology, experimentation, and sustainability converge to promote initiatives aimed at integrating these aspects into the objectives of companies.

BDC is a center where design professionals, creators, and practitioners are educated and guided to develop their own prototypes. Its objective is to equip professionals with strategic management skills that facilitate the transition and redefinition of companies, businesses, and services towards a sustainable and responsible economy. BDC supports creation and production processes, guiding them towards innovation in various artistic expressions, identifying and nurturing talent, promoting participatory management, and fostering connections with the local environment.

**BIODESIGN IS MAKING ITS WAY AROUND THE WORLD. IT UNITES DESIGN, BIOTECHNOLOGY, AND INNOVATION TO REINVENT A MORE SUSTAINABLE AND REFLECTIVE FUTURE.**



## OBJECTIVES |

- To become an international reference center for innovation in design and sustainability, both within and beyond the Basque Country, by establishing specialized resources such as Materiateque and our Labs.
- To inspire, inform, and empower the next generation of creative talent to lead sustainable innovation.
- To transform the local industry by providing support in transitioning to sustainable production and creating fashion, furniture, design, art, and other products in alignment with the principles of the circular economy.
- To promote pioneering projects focused on recycling local waste materials for application in industry and design.
- Organize public events that showcase creative practice as a catalyst for sustainable innovation.
- Our courses are designed to instruct students from diverse backgrounds (design, science, engineering, fashion) in combining design with materials research. We encourage them to explore how raw materials can be transformed into innovative business ideas within the framework of the circular economy.



## BDC AXES

**We are committed to the creative research that combines science, design, art... so that the creators of tomorrow contribute to more responsible world for the planet.** We advocate creativity, as a guide to new solutions from a perspective that someone technical would not reach, and from culture to generate narratives that reach more layers of the population.

### Materiateque

Exhibition guide of innovative and sustainable design materials.



### Art\_lab

Art laboratory with screen printing and paper printing workshop



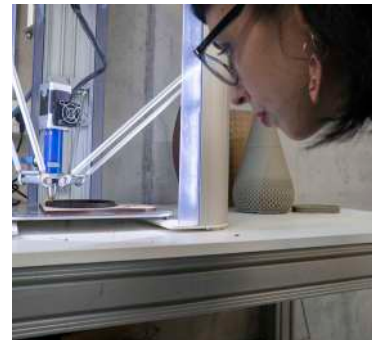
### Bio\_lab

A laboratory for the materials development with living organisms, such as bacteria, fungi and algae...



### Digital\_lab

Digital manufacturing laboratory that includes: 3D printing, laser



### Textile\_lab

Textile manufacturing laboratory that includes: digital looms, sewing machines, textile printing...



## VIRTUAL TOUR:

<https://www.youtube.com/watch?v=MG-uqgGVtm0>



# WE TRAIN THE DESIGNERS OF THE FUTURE

The Basque Biodesign Center offers flexible programs designed to develop and enhance knowledge and skills aligned with sustainable policies and emerging materials. We believe it is crucial for professionals to possess complementary expertise in specific areas of interest, enabling them to emerge as leaders in their respective fields. To achieve this goal, we bring together experts with hands-on experience and top-level academics within the field of Biodesign, creating a dynamic ecosystem.

In the years to come, our material world will undergo radical changes. The unsustainable use of existing raw materials must cease, and global consumption needs to decline. However, our need for materials will persist; in the future, materials will continue to nourish us, clothe us, provide comfort, bring delight, and sustain life. This necessitates the generation of numerous new ideas, cross-border collaboration, and diligent efforts to replace current material systems and consumption habits with more sustainable alternatives.

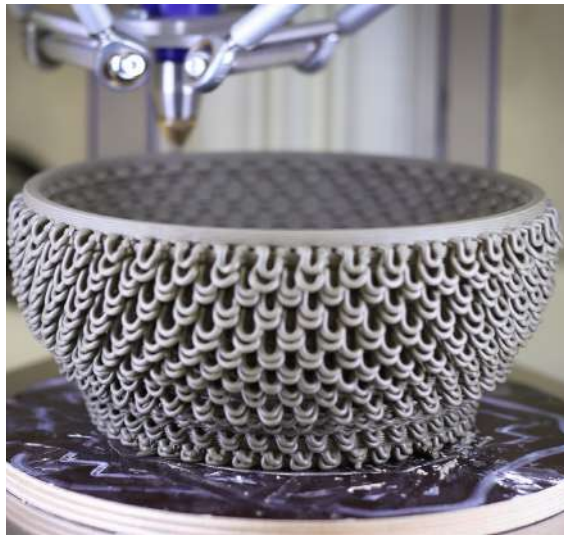


**01.** *Virtual and in-person classes that promote networking and close conversation with professors from different international centers.*

**02.** *Theoretical and practical courses in our laboratories that allow you to apply the knowledge acquired during the development of the course.*

**03.** *Courses designed to develop and strengthen skills and competencies required in current work environments.*

**04.** *Schedules and duration adjusted to the needs and time of today's professionals.*





We work on design, innovation, sustainability and creativity concepts through new materials. An experimental and transdisciplinary space that values biodesign as an innovative field of work.

SEPTEMBER 2024 - 25. 6 MONTHS

## POSTGRADUATE PROGRAM FABRICADEMY

Fabricademy is a globally distributed program featuring a series of lectures by renowned experts worldwide, specialized in design, fashion, and technology. As a prominent node within the Fabricademy network, the BDC is already a reference in training and establishing new global nodes. Its team actively participates in the global mentorship program.

The program explores the interrelationships among society, technology, and the environment, through the notions of craftsmanship, materiality, ecodesign, biodesign, smart textiles, and digital manufacturing. Fabricademy, as a transdisciplinary initiative, aims to shape and (re)define the implications and applications of technology in the textile and clothing industry, spanning from the fashion sector to consumer products. The program provides an extensive overview of the current state of the art and industry, based on “learning by doing” methodologies, addressing topics such as personal manufacturing, distributed manufacturing, industry 4.0, wearable technology, biomanufacturing, assistive technologies, and sustainability.

**VIDEO:**  
<https://www.youtube.com/watch?v=pp4EnAb8x8M>



## CUSTOMIZED COURSES

2024

### Interactive Experiences BDC

Workshops and visits to the BDC for other centers and universities

Duration: Half day

At the Basque Biodesign Center, we aim to initiate conversations about citizen and designer responsibilities, exploring actionable measures in support of the environment. By instilling an understanding of biodesign and sustainable material values, students will develop new skills through practical and theoretical projects. These activities allow them to immerse themselves in the subject, breaking down the barriers between art and science.

In this program we explore into the key trends in the world of materials in a didactic and immersive manner, with a specific focus on sustainable and regenerative innovation, inspiring participants to explore and surpass traditional uses and applications of materials in product design.

The sessions include a presentation highlighting the key values of sustainability, using samples from the material library as tangible examples of change and innovation. This encourages the group to pose critical questions about the roles of design, materials, and even themselves in creating a product, examining ecological, social, and cultural impacts. The more theoretical segment is complemented by a practical activity, offering students the opportunity to explore and experiment by creating their own biomaterials, such as vegan leather and algae-based plastic.



## BOOTCAMPS BDC

### BIODESIGN, OVERCOMING THE ERA OF PLASTICS AND MOVING INTO BIOFABRICATION



During the 5 weeks, the BDC will focus on a specific creative sector, emphasizing the integration of concepts, processes, and solutions inspired by nature. This interdisciplinary approach spans various creative disciplines, including fashion, advertising, architecture, product design, technology, and other creative fields.

The challenge is to minimize the ecological footprint of our designs and productions while preserving the functionality of the original design, and ensuring benefits for both producers and users. In both scenarios, designers must be acquainted with and utilize new innovative technologies, which facilitate the development of novel biodegradable and sustainable materials.

8-12 april 2024

#### **BOOTCAMP. BioArtesania**

In this course, you will learn the art of manufacturing by blending artistic creativity with biotechnology and environmental awareness. This approach not only results the unique and beautiful products but also underscores the significance of incorporating sustainability and considering environmental impact throughout the creative process. Additionally, biocraft can serve as a means to explore and question our relationship with nature and living organisms.

3 – 8 june 2024

#### **BOOTCAMP. BioCouture, New Haute Couture.**

The BioCouture Bootcamp is a groundbreaking event that merges haute couture with biomanufacturing, pushing the boundaries of sustainable and innovative fashion. Over the course of a week, participants will delve into revolutionary techniques, ranging from the creation of large-format Bioleather to crystal cultivation, 3D printing, and digital pattern making. The primary objective is to design a suit that embodies the elegance of haute couture through the application of cutting-edge bio-materials.

Renowned designers from around the world will share their experiences and mentor the creation of these unique suits, enhancing the learning experience. The climax of the event will be the exhibition at EncartadaModa, showcasing the intersection of creativity, sustainability, and biotechnology in the realm of New Haute Couture. This event not only celebrates innovation but also propels the transformative potential of biomanufacturing within the fashion industry, representing a significant step towards a more ethical and sustainable future.





10 – 15 june 2024

### **BOOTCAMP. TechBioFusion: Exploring Technological Convergence in Sustainable Biomanufacturing**

The sustainable future is at the core of our Applied Biomanufacturing Technology Bootcamp. We explore 3D scanning, augmented reality, artificial intelligence, and generative design, employing them comprehensively in the realms of sustainability and biomanufacturing. From capturing reality with the 3D scanner to seamlessly integrating the virtual and real through augmented reality, the landscape of bio-material creation undergoes a revolutionary transformation. Artificial intelligence and generative design synergistically amplify efficiency and creativity, contributing to the development of sustainable solutions. Participants will engage in both theoretical exploration and hands-on application of cutting-edge technologies within practical biomanufacturing projects. This approach fosters the cultivation of innovative solutions for sustainability and the advancement of state-of-the-art bio-materials. Renowned experts in technology and biomanufacturing will guide participants through enlightening case studies, interactive workshops, and collaborative projects. Upon successful completion, participants will acquire advanced skills, propelling them to the forefront of technological convergence and sustainable practices.

17 – 21 june 2024

### **BOOTCAMP. Product Design and Biomanufacturing, exploring Creative and Sustainable Convergence**

The synergy between innovation and sustainability is at the heart of our unique Product Design and Biomanufacturing Bootcamp. This comprehensive course explores product design from fundamental concepts to advanced techniques, guiding participants in creating distinctive and functional products. Additionally, we delve into biomanufacturing, incorporating technologies such as 3D scanning, augmented reality, and artificial intelligence, applying them comprehensively to enhance sustainability. Participants not only acquire theoretical knowledge but also apply these technologies in practical biomanufacturing projects, promoting innovative and sustainable solutions. Upon completion, they will have gained advanced skills in product design and biofabricated technology, positioning them at the forefront of the convergence between creativity, technology, and sustainability.

## SHORT COURSES

We are committed to creative research that integrates science, design, art....enabling the creators of tomorrow to contribute to a world that is more environmentally responsible. We have various facilities for the development of all phases of research. We advocate creativity as a guide to innovative solutions, offering a perspective that someone purely technical might not attain. Additionally, we emphasize the role of culture in generating narratives that resonate with diverse segments of the population.



**CAD/CAM**  
Introducción



**BIOPLÁSTICOS  
Y BIOCOMPOSITOS**



**DIGITAL CERAMICS**



**TINTES NATURALES**



**CNC FOR  
FURNITURE DESIGN**



**INTENSIVO  
BIOMATERIALES**



**LASSER CUTTING**



**GRASSHOPPER**



**DIGITAL CRAFT  
FOR FASHION**



**INNOVACIÓN Y  
EXPERIMENTACIÓN TEXTIL**



**FLEXIBLE WOOD PATTERNS I**  
Workshop



**ENSAMBLAJE DIGITAL**  
Workshop



**FLEXIBLE WOOD PATTERNS II**  
Workshop



**INTRO A LOS BIOMATERIALES**  
Workshop



**INTRO A LOS TINTES NATURALES**  
Workshop



**INTRO A LA MODA  
SOSTENIBLE Y CIRCULAR**  
Workshop



**AGUAFUERTE NO  
TÓXICO**



**PUNTA SECA  
SOBRE ACETATO**



**TÉCNICAS ADITIVAS**



**LINOBRABADO**



## DIGITAL LOOMS BDC RESIDENCE

Aimed to professional designers interested in utilizing digital manufacturing tools such as Rhino and Grasshopper, the course is designed to empower participants to be self-sufficient in their use. It encourages experimental exploration and application of these tools in the development of future crafts.

### Residence with access to:

- Telar Jacquar Digital (Torund TC2)
- Textile Lab: sewing machine, overlocker, digital embroidery machine, digital textile printer, heat press machine, steam iron, large warper.
- Use of material library and textile library
- Lana Latxa en bruto (optional)
- Support to technical and teaching team



## PRINTING BIOSSUPPORTS

Aimed to artists who work with new sustainable supports and non-toxic artistic techniques.

### Residents

- Federica Bau. Italy (january 2023)
- Julian Pesce. Buenos Aires (april 2023)
- Silvayn Konialy. France (june 2023)
- Santiago Crespo. Buenos Aires (february 2024)
- Kira Dominguez Hultgren (Chicago)

RESEARCH

# Innovation projects





**PROJECT: BMLAB. PAULA FRANCO HERNANI**

This project will explore the future of emerging creative disciplines. A journey into new plastic languages where art, design, technology, and science converge, enabling artists to embrace novel possibilities in creation. Technological advancements and the introduction of new materials signify an evolution in the production of artwork, presenting new challenges for artists. The primary objective of this project is to establish a self-sufficient and circular mini-laboratory that is accessible to everyone. What sets this laboratory apart is its ability to obtain biomass through the cultivation of microalgae and cellulose—two significant products gaining traction in the realms of food, cosmetics, and plastic prevention.



**PROJECT: MYCOTHERAPY. ZIORTZA AURREKOETXEA URRUTIA**

Project inspired by Mycotherapy, a discipline that explores the therapeutic properties of mushrooms for the treatment and prevention of diseases, as traditionally used in Eastern cultures for centuries. A variety of medicinal mushrooms exists, each with distinct qualities contributing to specific well-being.

What?

The idea is to develop a transdermal or wearable fabric that imparts the beneficial properties of mushrooms topically. The concept is to perceive the act of dressing as a moment of self-care and personal well-being.



**PROYECTO: INTERPLAY. LISA BOULTON**

Inter:Play explores functional objects within the home that invite a light element of adult play. Designed for contexts that undergo changes in use and location. The project capitalizes on an already intimate relationship that has been disrupted by forestry: pine needles on forest floors interacting with mycelial networks. Textile and structural materials generated from pine and mycelium will be investigated. The resulting material, which will influence the final forms and usage practices, will largely be discovered after the materials are selected.

Inter:Play is about rekindling relationships and reconstructing narratives that reconnect people with their own environment; an evolving ecology within the home. Furniture is designed to encourage playful engagement while materially reproducing relationships found in nature.

## PROJECTS



### **PROJECT: TEXTILE. AINOA FERNANDEZ TORRES**

The main objective of this textile project, focused on the practice of looming, is to use as many natural and biodegradable resources as possible, either when dyeing a textile or creating it.

The challenges of this project are:

That is alive and changes over time.

Use natural and local resources.

The possibility of being able to sit inside the work.

Make it biodegradable.

Which has a sensory and sentimental function.

Find a material that covers all waste.

Reflect the importance of manual and ancestral work.

Unify the past with the future thanks to new technologies.

Represent nature and freedom in a closed space.

That a concern for the land is created in the visitor.

Finding a new possibility for Latxa wool waste.

Make people feel that whoever comes to admire art is art.

Creation of seasons and harmony of colors.



### **PROJECT: TEXTILE ART THROUGH BIODESIGN. LAURA SANCHEZ MONTÁS**

This project will focus on the application of biomaterials, inks, cultured materials and bacteria to a haute couture piece; emphasizing the hand embroidery technique, replacing both support and added materials with compostable and in some cases ephemeral materials, which leave a mark of the passage of time on the canvas.



## BioMaterials. Konponbidea

At the Basque Biodesign Center (BDC), we engage in biodesign strategies, drawing inspiration from nature and biological organisms as catalysts for innovation. Our focus lies in the development of novel materials derived from biological and sustainable elements, incorporating a high degree of innovation. Situated in the rural environment of Gueñes, Enkartaiones, we find inspiration in nature as we undertake projects centered on biodesign strategies and biological organisms, driving innovation forward.

Our work encompasses two main lines, with one dedicated to materials applied in the design sector: 'La Tierra de las Encartaciones,' encapsulated in a project called Buztin-Min, and 'La Lana Latxa,' encapsulated in a project named Liminal.

### Goals:

- Develop sustainable materials of international reference, distinguished by a high degree of innovation in their composition, contributing to energy savings and a reduction in the carbon footprint.
- Reduce surpluses and the sources that generate them. Reducing the global production of materials may not decrease the need for consumption, but our goal is to develop biomaterials with the end in mind.
- Remove the line between science and design
- Transform the local industry, supporting it with these materials in the transition to sustainable production and the creation of fashion, furniture, design, art.... other products aligned with the circular economy.
- Promote pioneering projects in the recycling of materials

and local waste applied to industry and design.

- Create new concepts for sustainable development by combining the design and science of natural materials.
- Create a community with other European and global projects investigating local waste.

### Benefits:

1. Planet: Design products and services that support sustainability, utilizing waste as a raw material.
2. People: Design that empowers individuals and communities with a local discourse.
3. Value: Promotion of action and education in sustainable design thinking, adding value to a resource that is typically wasted.

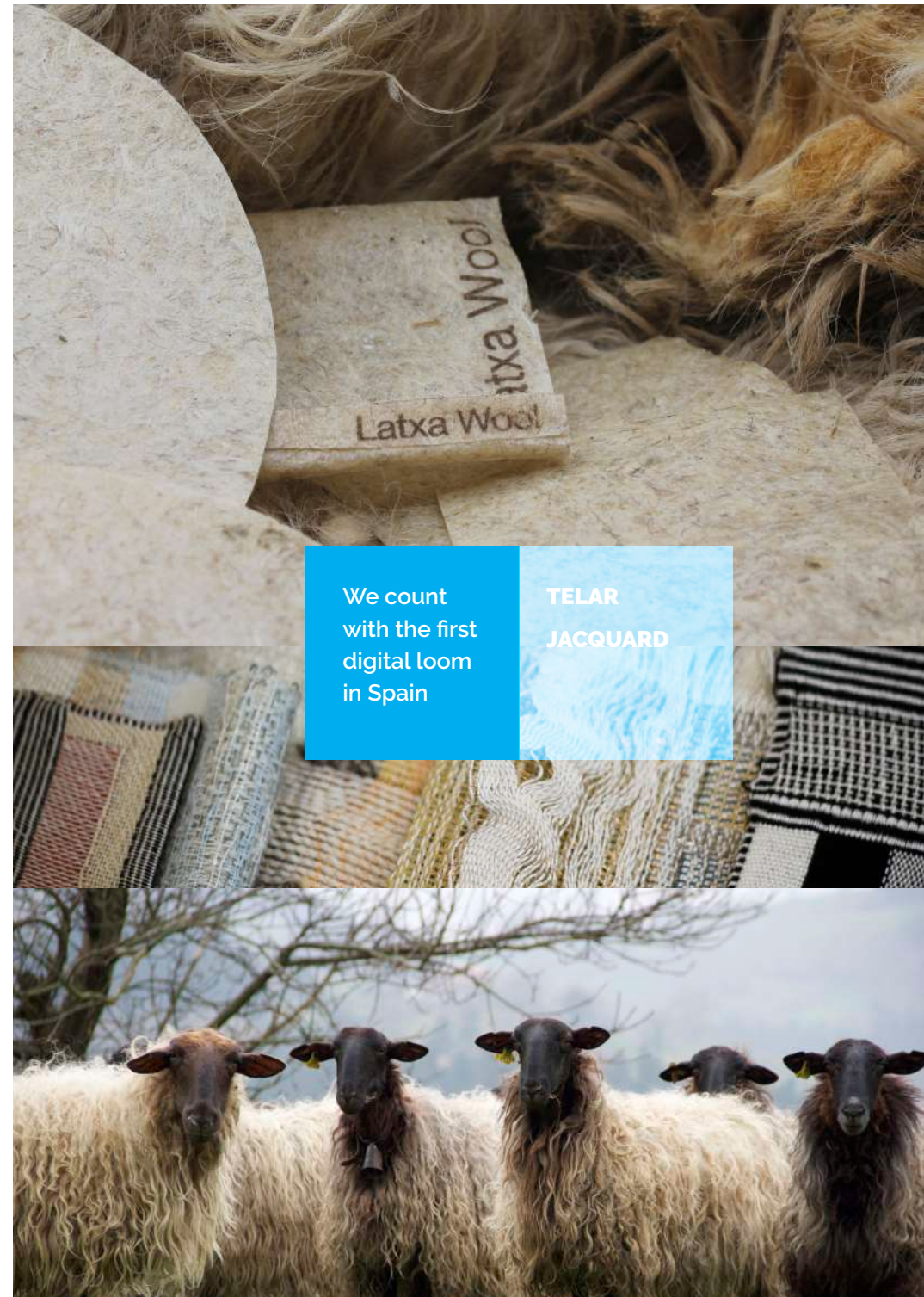


## BIODESIGN PROJECTS CONTINUATION

### Sendoa Artile

creation of a biomaterial with local wool for the construction of furniture MADE IN ENKARTERRI.

We aim to establish environments that encourage the emergence of new circular economy enterprises. These territorial innovation systems are designed to facilitate the creation of innovative companies that explore novel applications for agricultural and livestock waste, such as Karrantza sheep wool, resulting in the development of new products.



## **Olatz Pereda**

Biomaterials for textiles with natural clays

“Have you ever thought about whether the ground beneath our feet could become something else? This project seeks to value the local resources that we have available almost everywhere, especially the local clay that we can find around us, turning it into a flexible textile material. When clay becomes ceramic, it becomes something rigid and strong, however, our goal is to demonstrate that clay collected from our closest environment could also become something we could use, carry and even wear. ”

## **Eduardo Loreto**

Different possible solutions for the Lana Latxa surplus. Concrete

Why does it become a problem? The initial step involves comparing the structure of Latxa wool with that of other species that are currently used and have successful businesses associated with them. In this regard, I was able to get to the bottom of the problem since the hair of merino wool is between 18 and 22 microns but latxa wool can reach 45 to 60 microns which makes it extremely robust and difficult for machinery, which it makes it very unattractive and the companies that process wool do not find it beneficial to process Latxa wool.

Considering the challenge of processing the 26 tons of Lana Latxa received annually, I have explored various potential solutions, with a focus on applications in construction, interior design, and cosmetics. The goal is to streamline the transformation of Latxa wool, thereby reducing production costs for these products. The steps in the process are interconnected to generate income and create a market at each stage, starting from the dirty fleece.

The first step involves extracting lanolin from the wool for use in the cosmetic industry. The subsequent step is carding, where aligning the fibers opens up two processing options. One method involves cutting the fibers, creating material ready to reinforce concrete. This material can compete with synthetic fibers like polypropylene, which are widely used. Offering a biodegradable and organic alternative, it presents an eco-friendly option for construction, paving, and various building projects. The remaining carded wool can be combined with sodium cellulose to create a composite material. Through this process, a durable product is obtained, particularly useful for crafting panels for interior design. The resulting material exhibits insulating, noise-reducing, and air-repellent properties, along with being fireproof, making it a valuable component in construction projects.

In this way, the objective of the residency is to generate practical materials that enable the design of a system wherein a network of processes can yield diverse products and allocate wool based on demand trends. This approach reduces the likelihood of not establishing a successful business model. Sustainability, ethics, locality, and the ability to address a problem extend beyond economic and environmental considerations to encompass emotions and the preservation of a native breed.



## Galdames

### BioDesign. Art Construction

Symbiotic installation in the territory of a 'living' sculpture, a biome, to be immersed in Aguas Juntas Park in Galdames. This sculptural intervention, characterized by organic shapes, comprises a central piece and small interventions placed in the trees. These interventions are aesthetically integrated with the natural environment, enhancing the life of the surrounding flora and fauna and creating a new symbiotic space within the enclosure.

The forms of the intervention draw inspiration from the observation of non-human architecture in nature: branches, corals, mangroves, nests, and burrows. The aim is to achieve total symbiosis with the environment. The structure is designed from separate modules for 3D printing in ceramics, interconnected to generate organic shapes. These shapes incorporate holes and cavities to provide shelter for a wide variety of species, including aquatic and terrestrial animals, microorganisms, insects, and birds. Supported by online graphic material and strategically placed QR codes at the lake's viewpoints, visitors can take a tour that explains the local natural environment, ecosystems, the manufacturing process of the piece, and its functionality.

As part of the creative process, a large-format 3D ceramic machine is built using open-source documentation. This transdisciplinary project aims to create a sculptural installation that interacts with the natural environment, particularly water, in a holistic way. It will also function to protect and enhance the park's wildlife. Materiality is a central focus in this project, allowing the public to witness the mutation as it becomes inhabited by different species and undergoes subsequent biodegradation.

Beyond the artistic sense of the proposal, this intervention promotes an instructive-educational aspect for the population on topics such as sustainability, bio-manufacturing, and new technologies.

It serves as a measuring instrument to assess the pulse of the local ecosystem and functions as an indicator of the pathways of various species interacting with the facilities, including the human species.



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