HOMO FABER

3.0 APPROPRIATIONS OF DIGITAL FABRICATION FROM LATIN AMERICA >>>2022

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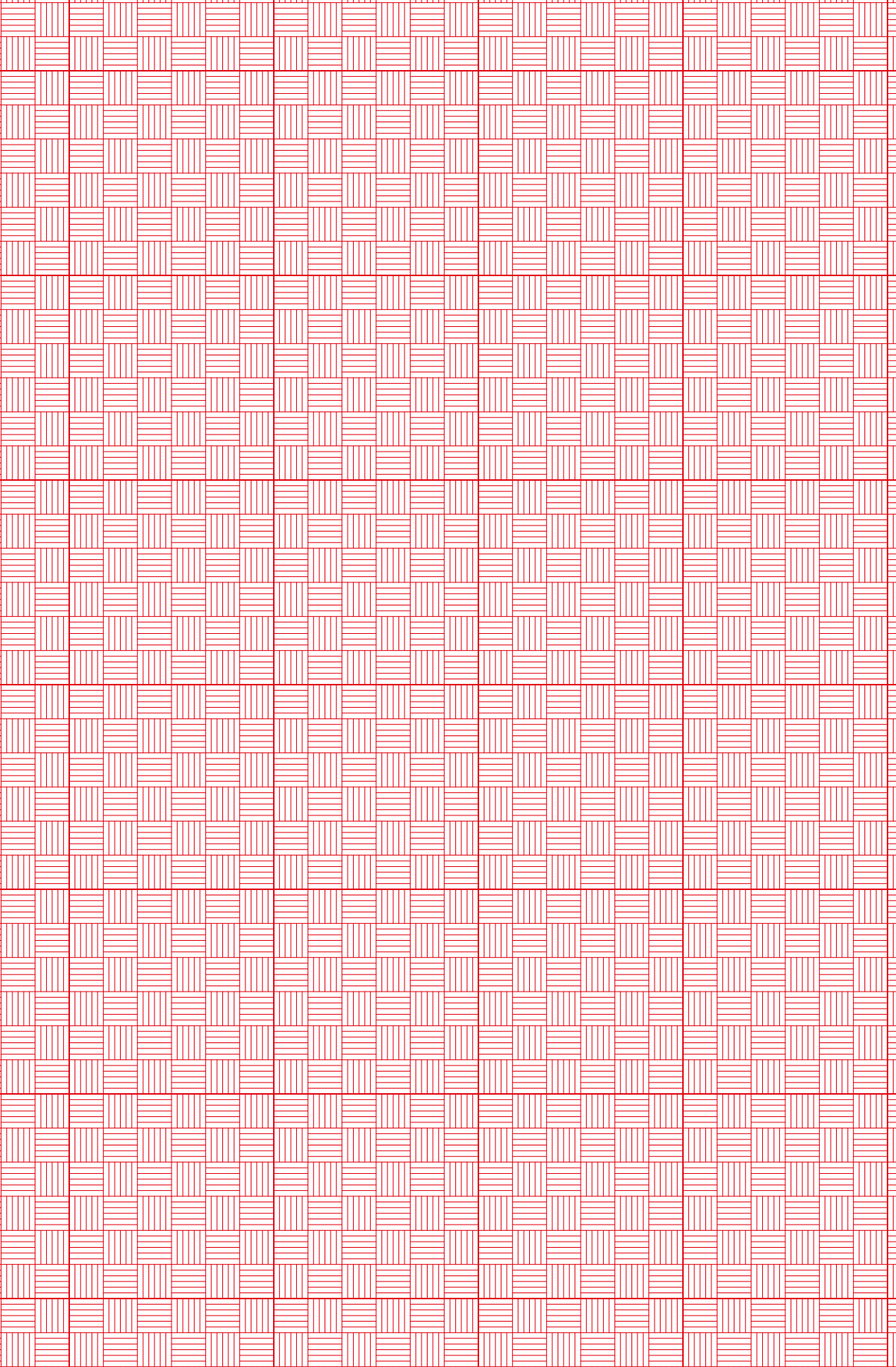
>> SEEING THE DIGITAL *FROM* LATIN AMERICA

Narratives about the digital in architecture have primarily sought to disseminate and promote the adoption of these technologies, often making them synonymous with social and economic progress, and assuming them as fundamentally universal and transferable. However, this stance reproduces epistemic asymmetries and obfuscates a much richer and complex picture. Notably, it places Latin America and other regions of the so-called "global South" in a subordinate position, essentially as receptacles of foreign innovations. But — as the materials compiled in this volume attest — the adoption of technologies is fundamentally creative and full of frictions.

Refocusing the discussion on the digital involves, on the one hand, demystifying the origins of these technologies in the "developed" world, and to critically scrutinize the promises that accompany them. These technologies, it is important to remember, are always local. Indigenous, if you will, to a political climate in the post-war global North, whose governments' investments in technological research aimed at ensuring military and economic supremacy through new technologies for manufacturing and design. On the other hand, this re-focusing involves cultivating an inquisitive look — a disposition to formulate empirical questions — which help to unveil the textures of the adoption of the digital in a critical key, attending to its social and material settings without losing sight of its enchanting facets.

Herein lies the importance of the Homo Faber project, developed by Pablo C. Herrera, David M. Sperling, and Rodrigo Scheeren over several years. In this version, the curators' emphasis on hybrid practices and critical appropriations paints a complex portrait of a varied territory where the use of digital technologies is not limited to the designs of their developers, but unfolds in a range of visual, material, and interactive possibilities markedly influenced by local contexts, and concerns. Thus, we are led to question simplistic ideas of noiseless, frictionless technology transfer, and to see the digital *from* — rather than simply *in* — Latin America.

Daniel Cardoso Llach
Carnegie Mellon University



>>> CRITICAL PANORAMAS AND THE CHALLENGES OF TECHNOLOGICAL APPROPRIATION IN LATIN AMERICA

After more than two decades of implementation, diffusion and development of digital fabrication technologies in Latin America, we can indicate a broader perspective of their permeability and adaptation in the face of different realities and their changes over time. Digital fabrication laboratories in Latin America were created by self-managed initiatives during the first years of the 21st century. The early stage of installation and use of technologies took place around 2007 through research groups in educational institutions; in later years, the first Fab Labs and offices using these technologies emerged. In 2012, there was a growth of laboratories in public educational institutions and in private enterprises, a movement intensified around 2016, driven by new Fab Labs and studios incorporating digital fabrication technologies.

The first labs were raised without being linked to global networks like MIT's Fab Labs or McNeel's Rhino FabLabs. Today these networks promote the creation or adaptation of laboratories to the global configuration. Still, it was also necessary to understand those laboratories that were promoted without the assistance of global networks.

In this context, the exhibitions and catalogues promoted through Homo Faber map and categorize initiatives that are produced in the region as local inspiration, including those practices from countries that use digital fabrication as an ally of their processes and projects.

The Homo Faber project started in 2014, as a curatorial project for the exhibition entitled "Homo Faber: Digital Fabrication in Latin America", bound to the CAAD Futures 2015 conference, held in São Paulo, Brazil. Since the invitation to hold an exhibition from the Conference Chair, Gabriela Celani, we realized the opportunity and the need to establish a mapping in space and time of the initiatives and context of digital fabrication in the area of architecture, design, and arts in the context of Latin America. At that moment, the philosopher Vilém Flusser became a guide in reflecting upon these new technological manufacturing "devices", their opacity as black boxes and how they will dominate us (Flusser, 2011) if we are not able to establish, in fact, a critical appropriation. For Flusser (1999), the gesture of doing – of meeting the material to transform it into an artifact through technique – also fosters an investigation of the world. In this context, the author determines the categories "*homo faber*" and "*homo ludens*", in which the first deals with doing, and the second with manipulating information. The current condition involving the

FLUSSER, V. Filosofia da Caixa-Preta: ensaios para uma Futura Filosofia da Fotografia. São Paulo: Annablume, 2011

FLUSSER, V. The Shape of Things: A Philosophy of Design. London: Reaktion Books, 1999.

domain of digital technologies represents a synthesis between these two categories.

The first exhibition curatorial process was conceived to facilitate the continuity of scenario monitoring. Furthermore, the exhibition design articulated conceptual, contextual, and technological information, data, images, and videos of processes and their results - using the exhibition space, a catalogue and the video channel on a sharing platform as a support, which works linked and referring to each other. The strategy of using different ways of diffusion was essential to consolidate the material as a reference and repository of ideas from the Latin American scenario, which continues in the following editions.

In 2018, on the occasion of the XXII International Conference of the Ibero-American Society of Digital Graphics "Technopolitics", in São Carlos, Brazil, the "Homo Faber 2.0: Politics of Digital in Latin America" was organized. This edition expanded the boundaries of the initial mapping by adding several initiatives and new groups working in the area, covering more regions and design proposals. At that time, the already well publicized and recognized initiative of the "Homo Faber 1.0" was used to establish a theme that would not only direct the reasons for the entries and the curatorship but also suggest ways to support the discussion and thinking about future projects for the topics of architecture, design and construction, expanding the production scale and the impact on the context. From 2018 to 2022, there were many challenges, mainly due to the global pandemic Coronavirus (SARS-CoV-2), which hit the activities associated with digital fabrication, by limiting face-to-face practices, causing a significant gap in the development of projects and the reflective practice related to them.

"Homo Faber 3.0: Appropriation of Digital Fabrication from Latin America" takes place at the XXVI Congress of the Iberoamerican Society of Digital Graphics, entitled "Critical Appropriations", in Lima, Perú. Therefore, it is the third of a series of exhibitions of Latin American digital fabrication projects that began as a joint initiative of the State University of Campinas and the University of Sao Paulo, which was joined that same year by the Universidad Peruana de Ciencias Aplicadas and nowadays by the Federal University of Bahia.

Homo Faber exhibitions, with an ideal frequency of 3 years, have been supported by research and publications carried out by their curators about the Latin American context, which are fed back by the work of an extensive network of researchers and makers in the region. In these three editions, we have curated the work of 71 laboratories from 9 countries: Argentina, Brazil, Colombia, Costa Rica, Chile, El Salvador, Mexico, Peru, and Uruguay - receiving projects from more than 130 laboratories and presenting a very powerful set of investigations, local experiences, and singularities.

After opening space for reflection on "form-information" (HF 1.0), and on "politics of the digital" (HF 2.0), the third edition of Homo Faber turns to the theme of "appropriations". The

topic highlights transformative processes and actions caused or driven by the potential of digital fabrication technologies in a contextualized way and fostered by processes of dialogue, inclusion, local agendas, gender issues, fiction, and utopias, emerging from the singular character of our continent. Nascimento and Pólvora emphasize that the openness value of these design processes promotes "interdisciplinary platforms between social and technological experts and participatory processes involving citizens and communities" (Nascimento & Pólvora, 2013, p. 34). Gui Bonsiepe was one of the first authors to establish, from South America, the insightful concern about the technological appropriation that, without its local production by qualified sectors, generates a condition of asymmetry and dependence (Bonsiepe, 1983). In addition, the author fundamentally questions whether "the locally developed design lends itself to reinforcing autonomy" (Bonsiepe, 2012, p. 23) in the face of the nature of the problems that arise in a given context and, therefore, the ability to articulate social innovation agendas.

NASCIMENTO, S. & PÓLVORA, A. Opening up Technologies to the Social: Between Interdisciplinarity and Citizen Participation. Design Issues, V. 29, n. 4, 2013, p. 31–40.

BONSIEPE, G. A tecnologia da tecnologia. São Paulo: Edgard Blücher, 1983.

BONSIEPE, G. Design como prática de projeto. São Paulo: Edgard Blücher, 2012.

Homo Faber 3.0 is inspired by local challenges, vulnerable communities, and semi-peripheral geographies, from the creative strategies promoted in Argentina, Brazil, Chile, Colombia, Mexico, and Peru. The exhibition explores the domestication, interpretation, and applications of digital fabrication that early adopters, developers, and end users promote in our region as an ally of their design processes in any of their forms. The processes of each project are stimulated by the logic of technological appropriation of Homo Faber, beyond simple curiosity, automation, and personalization, to the point of distancing themselves from the technological manipulation of Homo Fabricatus. Appropriation as a critical practice makes visible processes that create the foundations of a digital culture establishing local agendas towards other geographies, and implementing technical solutions in synergy with the located ecosystems.

In this edition, we receive 61 projects from 43 laboratories, defined by their authors as works developed with strategies linked to Artistic and Hacking, Bottom-up, Community and Craft, Construction Components, Low-High Technologies, Robotic Strategies, Pedagogical Elements, and Mobile Fab Labs. Out of this total, the curatorial team selected 23 projects aligned with the following categories: Low-High Technologies (10 projects), Pedagogical Elements (5 projects), Artistic and Hacking (6 projects), and Mobile Fab Labs (2 projects).

In the context of this exhibition, the categories are understood as follows:

Low-High Technologies
Experiments that carry out reinterpretations of local construction processes and materials, or appropriate ordinary objects and residual materials, mixing varied

manufacturing technologies and investigating innovative geometries.

Pedagogical elements
Experiments that make use of representation models and prototypes with a focus on teaching architecture and arts and, in some cases, promoting social inclusion.

Artistic and Hacking
Experiments that investigate other ways of producing objects, focusing on aesthetic aspects and made possible by technological deviations, as well as creating contemporary manifestations from local ancestral cultures.

Mobile Fab Labs
Experiments that create mobile laboratory infrastructures to work in peripheral communities and locations far from large centers.

The projects presented in this third edition reinforce the characteristic of hybridization that we have witnessed in our research, such as the relationship between institutional and informal practices; between heterogeneous and unequal modernity and indigenous and regional traditions; between specialized technical knowledge and plural creative intuitions; and the local appropriation of imported technologies that had been foreshadowed in previous years. Now, these experiments are definitely:

> *"developing a deep connection with local realities, picking up demands, and then working with them to find new solutions and other lines of questioning. The pertinent question here is the synthesis these groups are making between advanced technologies of fabrication and local common situations. Instead of replicating experiments from abroad, they are applying new technologies to solve real problems, indicating ways of acting inside both socio-economic and cultural situated realities as co-participants in collaborative processes. Nowadays, they can be seen as creative findings to face and to consider the Latin American context of hybridity." (Sperling; Herrera; Scheeren, 2020, p. 59)*

Analyzing the submitted projects, we can see an investment in the creation of more robust and complex work infrastructures with robotic systems and mobile systems; strategies that expand in scale using the integration between high and low technology, the manufacture of architectural elements with results at the level of industrial production and maturity for implementation as a final product; in addition to the technical and artistic artifacts that present an expansion of the formal and symbolic repertoire for what we were facing until the previous versions. At the same time that we recognize advancements, the pandemic period has delayed or limited the progress of several projects.

The challenges to be faced in the future are many and diverse. There is a need to extend the techniques and technological

capabilities to the construction sector (Oesterreich & Teuteberg, 2016) and other industrial productive sectors (Bonsiepe, 2012); the transfer of knowledge and absorption of expertise from both emerging and institutionalized practices (Fressoli, et al. 2014); the establishment of dynamics related to the circular economy, reuse of materials and waste, and creation of new materials together with nature; in addition to practices more focused on social innovation, and the ability to explore means that go beyond the poetics of scarcity and poverty, towards a kind of creativity that exalts local capabilities.

Faced with the end of a cycle, the Homo Faber trilogy concludes a sequence of application of methods for understanding, studying, and systematizing a history between new technologies, architecture, design, and construction that was unveiled by intuition and effort of many authors throughout the walking. A trajectory that does not end here, but plants seeds and opens fields for the flourishing of other initiatives that value and publicize emergencies and restlessness from the global south.

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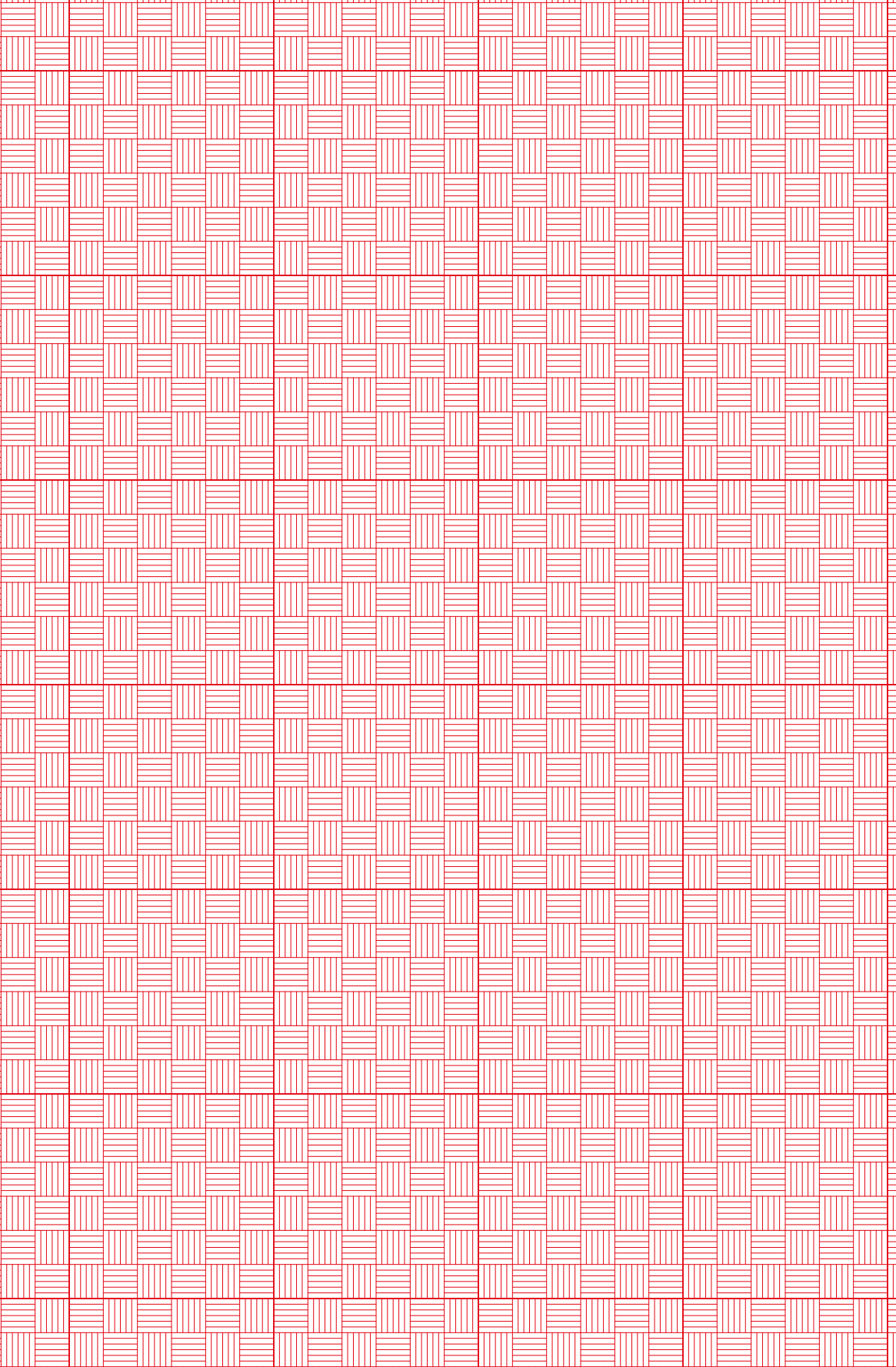
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CURATORS

Pablo C. Herrera
UPC – Universidad Peruana de Ciencias Aplicadas, Peru

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UFBA – Universidade Federal da Bahia, Brazil

David M. Sperling
USP – Universidade de São Paulo, Brazil



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SPERLING, D. M.; HERRERA, P. C. Homo faber: digital fabrication in latin america - CAAD futures 2015 > the next city. São Carlos: Instituto de Arquitetura e Urbanismo, Universidade de São Paulo, 2015.

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2021 SCHEEREN, R. Fabricação digital na América do Sul: laboratórios, estratégias, processos e artefatos para o design, a arquitetura e a construção. 2021. Tese (Doutorado em Teoria e História da Arquitetura e do Urbanismo) – Instituto de Arquitetura e Urbanismo, Universidade de São Paulo, São Carlos, 2021.





LOW-HIGH TECHNOLOGIES

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03. 22-25

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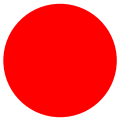
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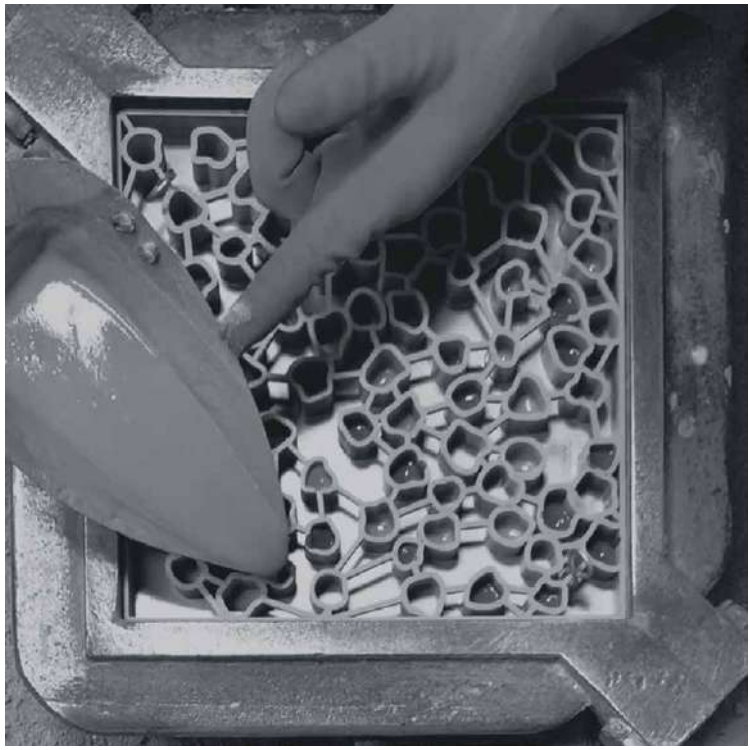
LOW-HIGH TECHNOLOGIES

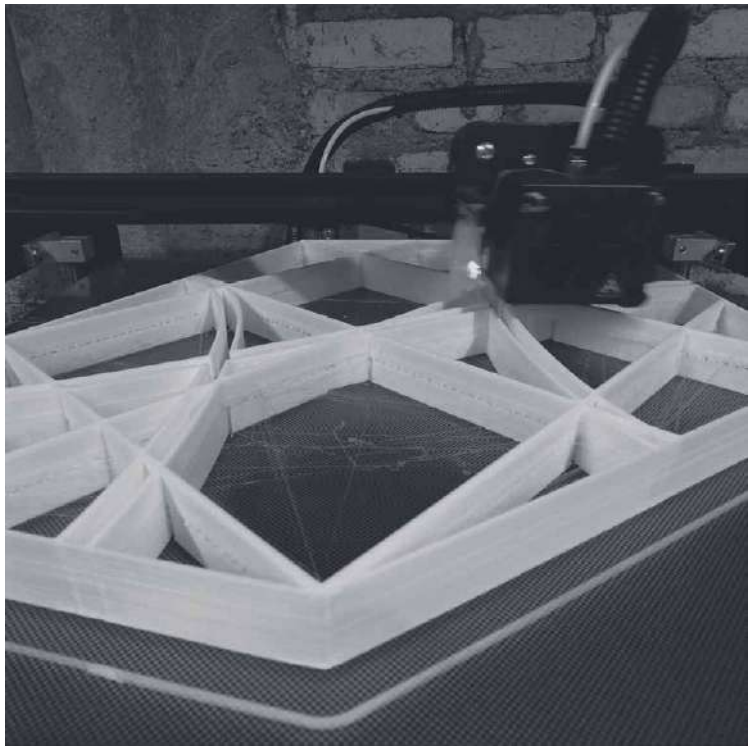
CREATIVE PROTOTYPING MEETS CEMENT TILES

SUPERLIMÃO
São Paulo, Brazil

01

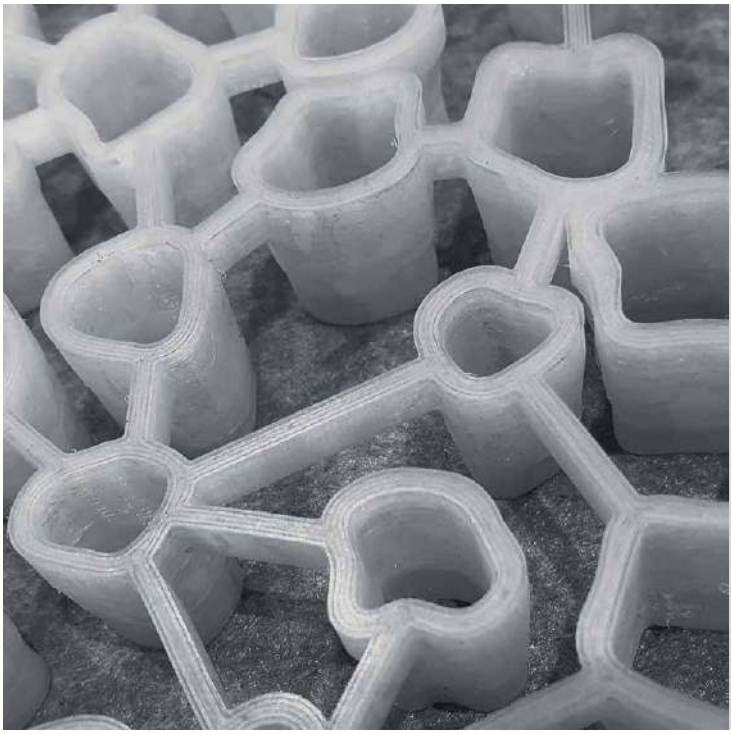
The cement tile collections designed by Superlimão for Dalle Piagge seek to incorporate contemporary production methods into a century-old technique, investigating a hybrid language that subverts high and low technologies into a product of our time.The Orgânico and Traço models amplify this craftsmanship through parametric modeling and 3D printing techniques, resulting in tiles that allow for a profusion of unconventional compositions.
Inspired by the random textures found on Hypoestes phyllostachia leaves, the Orgânico model grew from an algorithm that runs in the digital and physical worlds. Digitally, we designed the tile using a parametric model that randomly positions dots inside the 20x20cm tile. Physically, the tile maker gets one of four color-density recipes and decides how to fill the dots, creating several designs with a single mold. Beyond that, 3D printing the mold allowed us to use funneled surfaces that made it easier to pour the cement without compromising the delicacy, which was unavailable using metal molds.
Following that, we created the Traço model, reinterpreting the composition studies of Sébastien Truchet. Using Mottaghi and Khalilbeigi's Parakeet plug-in, we developed several studies with interconnected curves, creating a variety of compositions by rotating the tile and accommodating potential mapping errors. Going beyond the traditional square tile, we applied the same algorithm to other shapes, including a 30x10cm tile that connects with the square tile without compromising the continuity of the curves. Similarly to the Orgânico model, 3D printing of the mold allowed the design of a unique structure that gave a better grip to remove the mold without damaging the thin lines.
In both cases, rapid prototyping allowed the investigation of unconventional geometries while enriching the labor-intensive process of tile making. The result is a new component that enables creative collaborations across the production chain, from design to production to assembly.







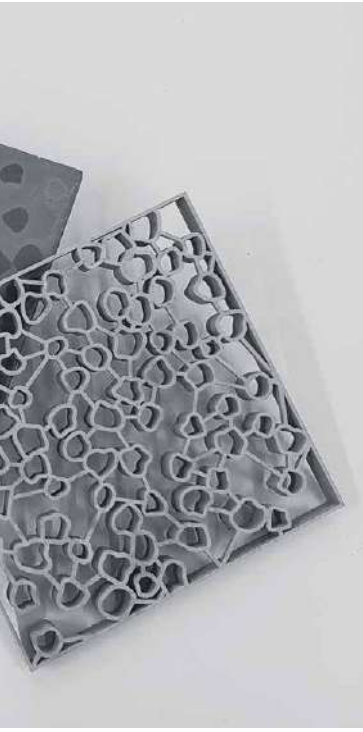












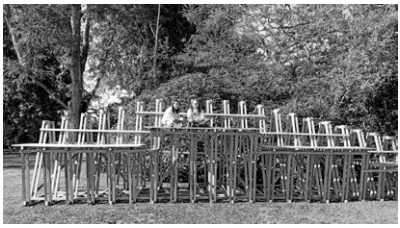


TEJA ISLAND SCENIC PAVILIONS

DUM DUM LAB
Valparaíso, Chile

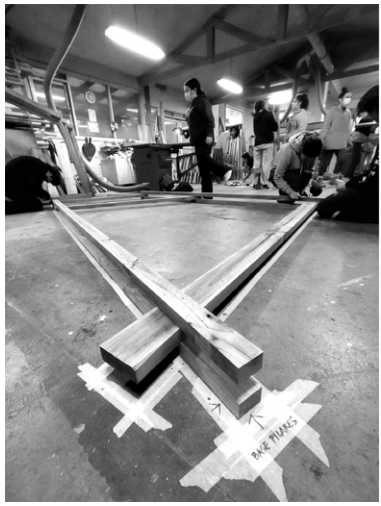
02

These pavilions are part of the Discrete Structures Project, developed by Dum Dum Lab since 2017. This project aims to show the architectural and tectonic potential of combining conventional on-site production and computer design. These small timber pavilions are fabricated as a testing tool for computational methodologies based on local adaptations for fabrication.
The three pavilions are small-scale industrialised timber structures designed using computational techniques under discrete element logic, which allowed the serialisation and optimisation of their parts. The virtual analysis and discretisation of their parts reveal and advance any possible preconceived ideas about the production standards of timber, allowing the development of innovative techniques free from conventional logic.
The pavilions are models in which the structure and space relationship is investigated iteratively. A design logic in which architecture is not described or prefigured allusively or analogically, as in drawing, but immanently simulated. Therefore, digital models are themselves architecture. The aesthetics achieved is a direct result of the capacity of industrial timber, which through vectorisation, allows the development of complex shapes with reasonable structural behaviour and simple and traditional joining systems.
The project focuses firstly on learning about the possibilities of digital fabrication in a real-world setting. Secondly, highlight the use of timber as a sustainable and versatile material. Finally, promote and consolidate the participation of the community in technologically valuable projects.








BACK PEARS











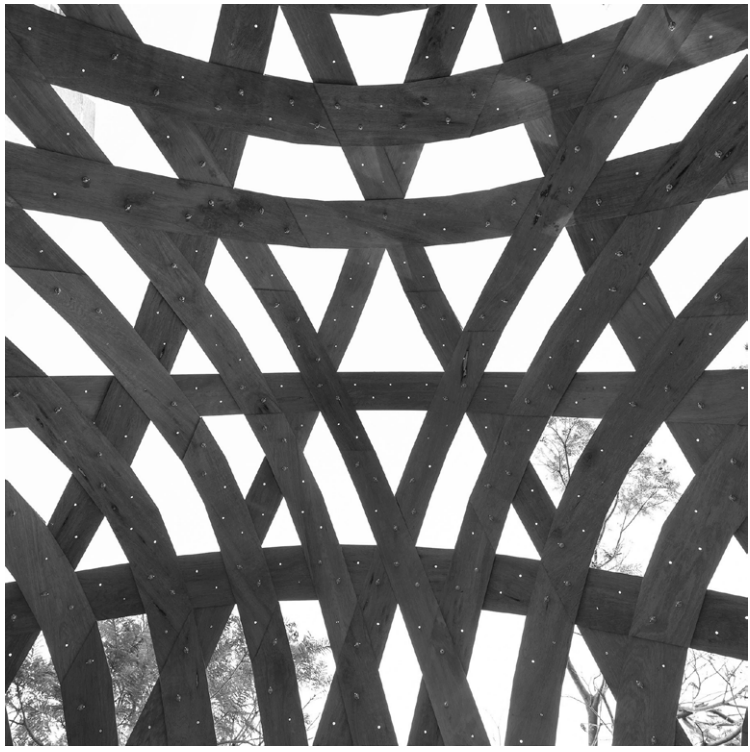

FLEXO INFORM ASSEMBLY PAVILION

RILAB | UNL
Santa Fe, Argentina

03

Flexo.In-Form is an Assembly Pavilion prototype derived from an experimental exercise in search of innovative design processes oriented to geometric-material performance. Physical evaluation and simulation algorithms use active bending behavior as a design tool applied to structures that base their geometry on the elastic deformation of laminar elements.
The tradition in the calculation of structures is to limit the amount of bending in efforts to simplify the typological behavior of a system. Our proposal is to take advantage of the bending of a material to create complex and extremely light designs, achieving greater structural rigidity. For this challenge, it is necessary to create algorithms that control the admissible ranges, optimizing the geometric-material performance. Active bending is our design tool for creating self-supporting structures with complex geometries.
The result is a low-cost mono-material pavilion; self-supporting; adaptable to any terrain topography (due to its tripartite support base and its structural dynamics); low weight and fast assembly. The dynamic adaptation that enables the algorithm, added to the above described qualities, resulting in an Ecological, Reusable, Recyclable and Sustainable pavilion.







NYMBU.
BIRD WATCHING MODULE

TALLER 1:1 | PUCP
Lima, Peru

The studio aimed to design and build temporary prototype modules capable of promoting tourism in Cusco, Peru. This module was born from the idea of creating a bird observatory, which would itself house them within its three-dimensional bamboo structure. Attached to the structure are feeders which would help attract a wide variety of local birds to the region. The prototype is composed of bamboo and medium-density fibreboard (mdf). The joints holding the bamboo together are digitally designed and then carved by a CNC machine. The angling and shape of these joints allow the bamboo to achieve the structure's desired form, which is that of a "nest" with an organic and arboreal appearance that blends into its natural surroundings.

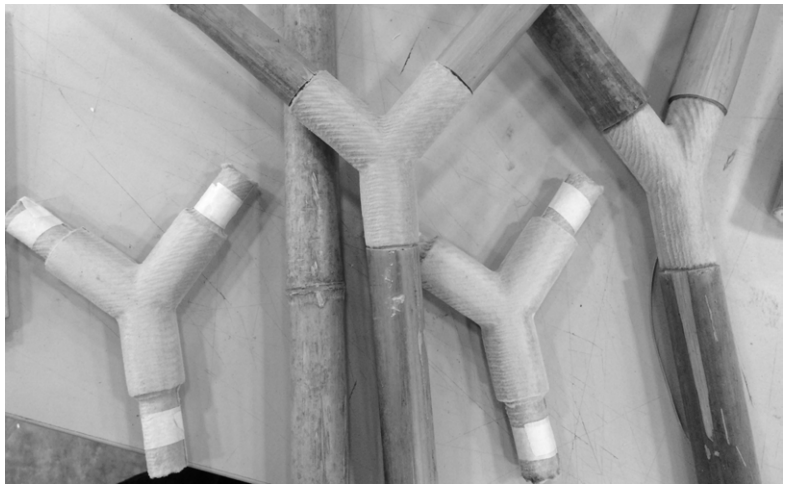
04

















DIGITAL BIOFABRICATION NODE

FABLAB U. DE CHILE
Santiago de Chile, Chile

05

The Digital Biofabrication Node project consists in the design, documentation and dissemination of a creative Open Source laboratory that assists the manufacture of biomaterials and bioproducts, from waste from the local food network. The Node is designed to be located near where the waste is generated, integrating itself into the social and agricultural fabric of the place, making the material diversity linked to the territory appear.
The laboratory incorporates a set of low-cost, desktop-format tools and technologies to address different biofabrication processes, such as 3D printing, rotational molding, and thermoforming of biomaterials. The Biomixer, the heart of the node, today works by interspersing digital and analog operations, with the aim - and unlike industrial production - of keeping the user embedded throughout the process, which we could define as a collaboration between machine, human and natural agents.
But beyond allowing the replicability of formulas and dispensing with precision, the greatest potential that we recognize in this technology from the Global South lies in being able to articulate collective intelligence networks, where communities of small distributed but connected bio fabricators can directly execute formulas and share findings, properties and processes around the manufacture of biomaterials and bioproducts that integrate a local narrative.
Biofabrication in networks, using abundant ingredients such as those left over from other vital actions such as human nutrition, could be one of the many ways to behave in a more systemic, symbiotic and collaborative way, just as the other agents of nature do.













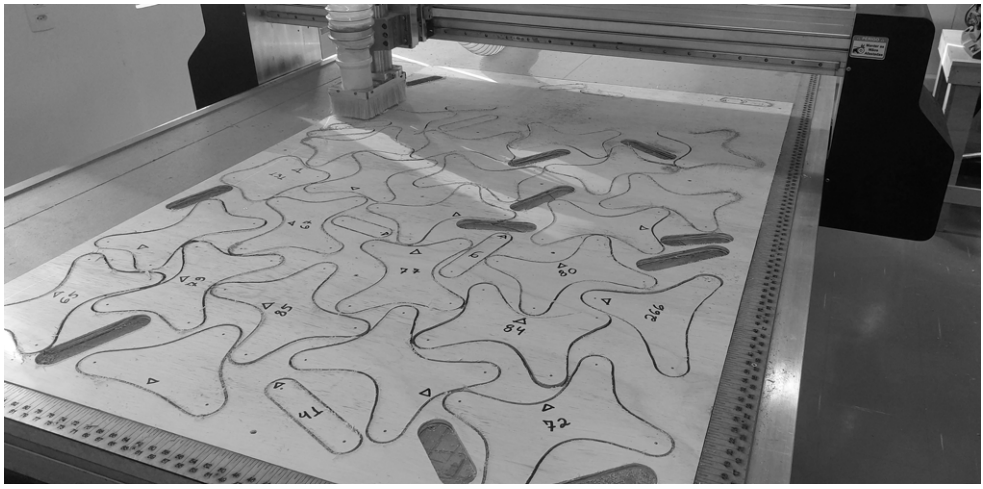
PAVILION 259

LEFAD | PUC MINAS
Belo Horizonte, Brazil

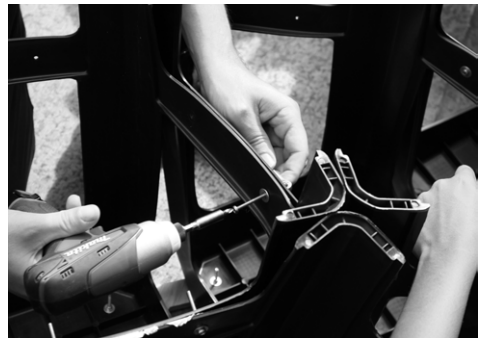
06

The "Pavilion 259" project consists of the final work of the Parametric Design in Architecture specialization course, belonging to the Continuing Education Institute of PUC Minas. The pavilion aims to explore the concept of high-low in the production of a 1:1 scale architectural object involving digital design and fabrication and on-site assembly. Faced with an experimental methodology of design and construction, the idea was that students perceive through construction the transposition between the conception of the computational form and the execution on the construction site. The proposal aims to explore the repetition of an industrialized element, available in the market as a constructive element. Through the elaboration of a code using the Rhino / Grasshopper software, this module was adapted to an existing surface, created from the analysis of its structural behavior. For this purpose, 259 plastic benches, milled connections in 10mm marine plywood, screws, nuts and washers were used. The structure was set up by the students under the supervision of the coordinators Marina Borges and Hugo Matos, accompanied by Professor Marcus Vinicius, all of whom belong to the postgraduate course faculty. The proposal illustrates an initiative to leave the digital scale, achieving a greater understanding of tectonics through the materialization of the projects.

















FROM WASTE TO POLYMER

DATLAB | UNAM
Misiones, Argentina

07

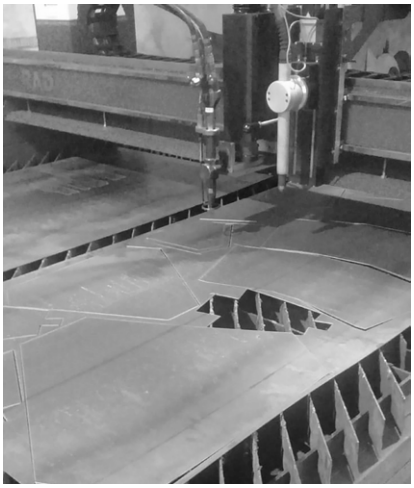
The development of the project "From waste to polymer: urban design and recycling in Oberá" is based on recycling PET containers and other polymer materials included under the umbrella term "plastic". Most commonly used as liquid containers, they result in an unpleasant view in public spaces due to their proliferation. The project aims to remove them from the waste classification to turn them into reusable commodities. The reinsertion of this material into the production chain is a reinvestment with numerous benefits: it reduces waste levels, lowers government spending protecting public finances in matters related to waste management, adds to environmental care by reducing the amount of polluting material, and results in a valuable commodity with virtually unlimited reuse possibilities. From waste to polymer: urban design and recycling in Oberá is fuelled by socially and economically sustainable development. It reopens a production cycle, expanding the potential of the regional industry; protecting the planet and activating sectors in the economy that, up until now, did not have a territorial stand. At the same time, it boosts certain social groups by opening up new mindsets and action ways within the productive world. From waste to polymer: urban design and recycling in Oberá poses that recycling today means producing for the future and to care for the future.





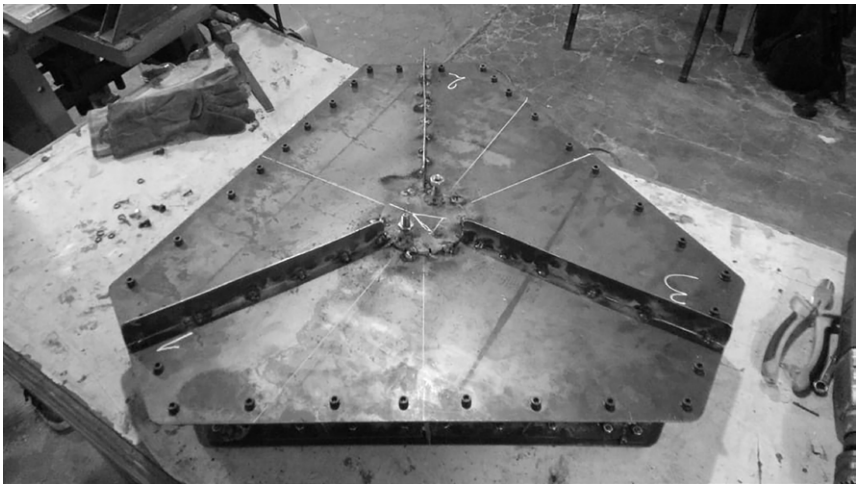




















BIO SURFACES

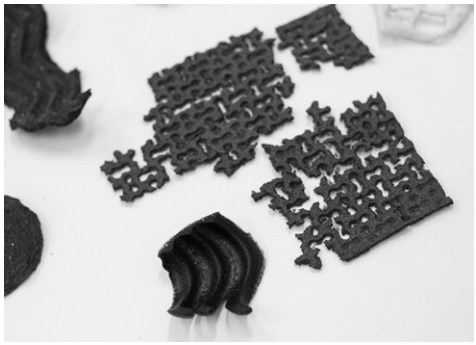
LABORATORIO BIO
Medellín, Colombia

From the waste that surges during food preparation, edible and biodegradable materials are developed through the experimentation of different recipes and the development of molds with different morphologies which enhance the possibilities of each material. In this case, materials developed with cannabis leaf, coffee grounds and egg shell are presented. These mixtures are poured into molds with different surfaces, obtained from a preform materialized using laser cutting and subsequently thermoformed. The surfaces are dried under controlled temperatures to obtain sheets with regular and irregular surfaces.

08

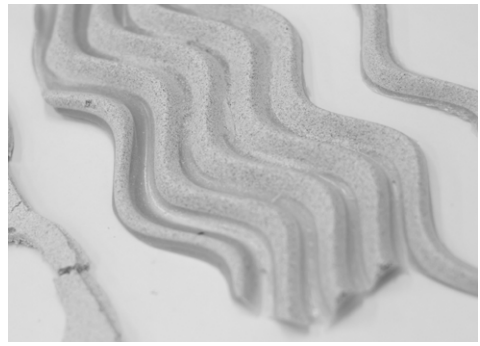








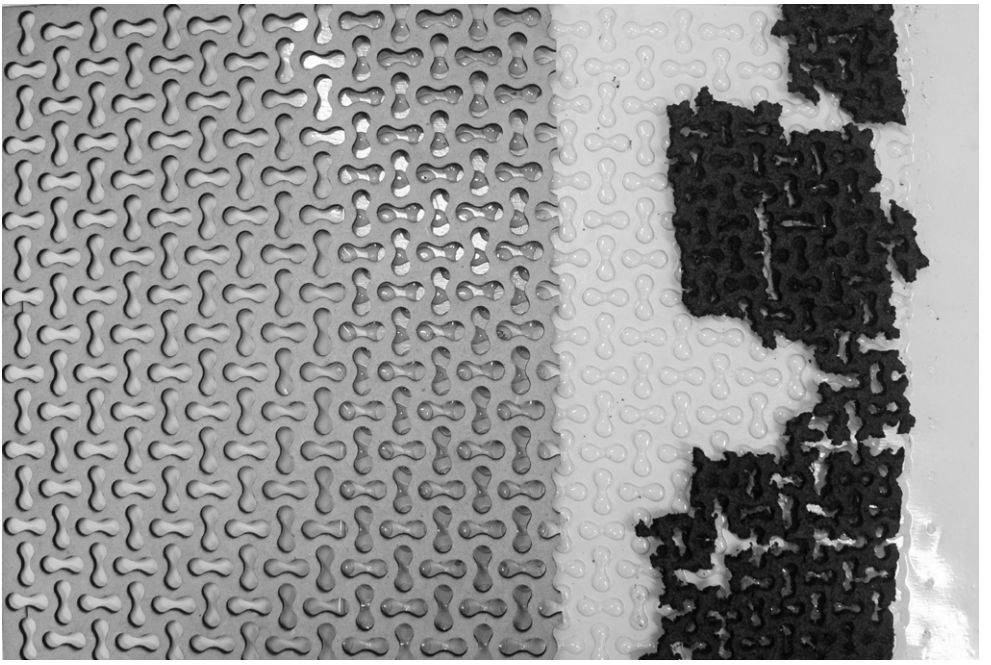
















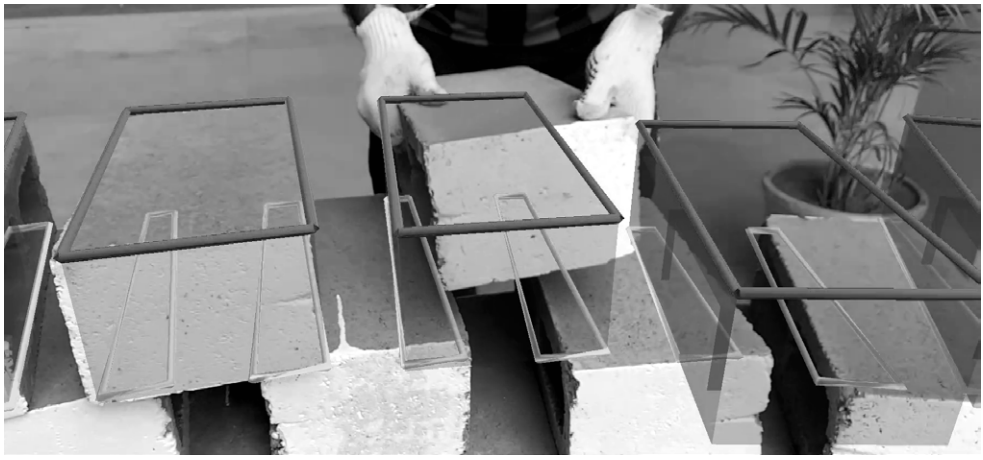
HYPHAE HOUSE

UNICAP ICAM-TECH
Recife, Brazil

09

The prototype presented here is a product of a workshop part of the biomimetics and parametric design seminar taught by André Fox, Rafael Rattes, Ana Luísa Rolim, and Victor Sardenberg. The specialization program was coordinated by Clarissa Duarte and Dyego Digiandomenico.
The students carried out an intervention in physical and digital space. On-site, it is possible to see the structure with concrete blocks called Casa Hifas where a layer of digital reality overlaps. It is a piece where the person can inhabit two realities: physical and digital. This is the purpose for exploration.
Augmented reality was used to go directly from the 3D model to construction, and parametric modeling tools were used not only to increase productivity but mainly to explore new formal aesthetic possibilities in architecture. This type of technology, for example, allows architects and designers to develop projects without producing printed drawings.
The prototype also dialogued with the academic proposal of the specialization, which is the development of a "minimum smart house". A section of this minimal house was prototyped, which in our case is the exploration of a wall element, a partition, and a closure that could avoid conventional solutions and be built in a more daring way, generating a kind of hybrid wall, not just to separate one thing from the other but to sit down, to see through.
To communicate the process of design and construction, Augmented Reality is a second time applied for an in loco exhibition containing drawings, models and videos


A0
HELP
SNAP
RESET
PLANAR
XY




CASA
HIFAS
ICAM | UNICAP
Recife-PE
2021
BLOCO
G





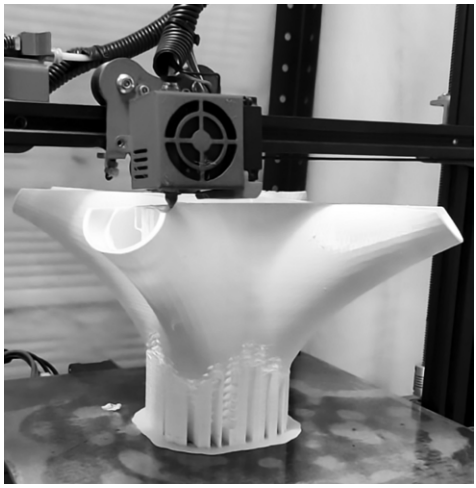


PROSTHESIS FOR THE RECOVERY OF BRANCHES

MICROUTOPÍAS LAB
Medellín, Colombia

10

In the Colombian rural area, it is usual to burn the residues from the pruning of trees, shrubs and grass. This practice is done in the open sky without permission from environmental entities, generating health problems for people and damage to the environment. The objective of this practice is to quickly eliminate the residue or make charcoal. Based on this problem, and the need to give tree branches a second life, a standing coat rack is designed based on a prosthesis that reuses pine branches. The shape of the prosthesis is developed in Rhino Software, with the Grasshopper application. This tool allowed us to parameterize the shape and program an algorithm that would respond in a similar way to how biological membranes do. The elasticity and flexibility are emulated to join wooden rods and complete the structure of the coat rack.
Likewise, biomimetic principles based on evolution, structural efficiency, and aesthetic perception were used: (i) biophilia, innate emotional attachment for the forms of nature; (ii) morphological adaptation, just as biological individuals adapt to environmental conditions, the prosthesis adapts to the different shapes of the branches thanks to parameterization; (iii) structural maximization, the geometry that supports the branches of the prosthesis are two inverted catenaries; (iv) minimum surfaces, generation of mathematical surfaces that cover the largest area with the smallest surface; (v) sustainable materials, use of a polymer based on the fermentation and polymerization of corn (PLA).








350 mm
14"
REDLINE

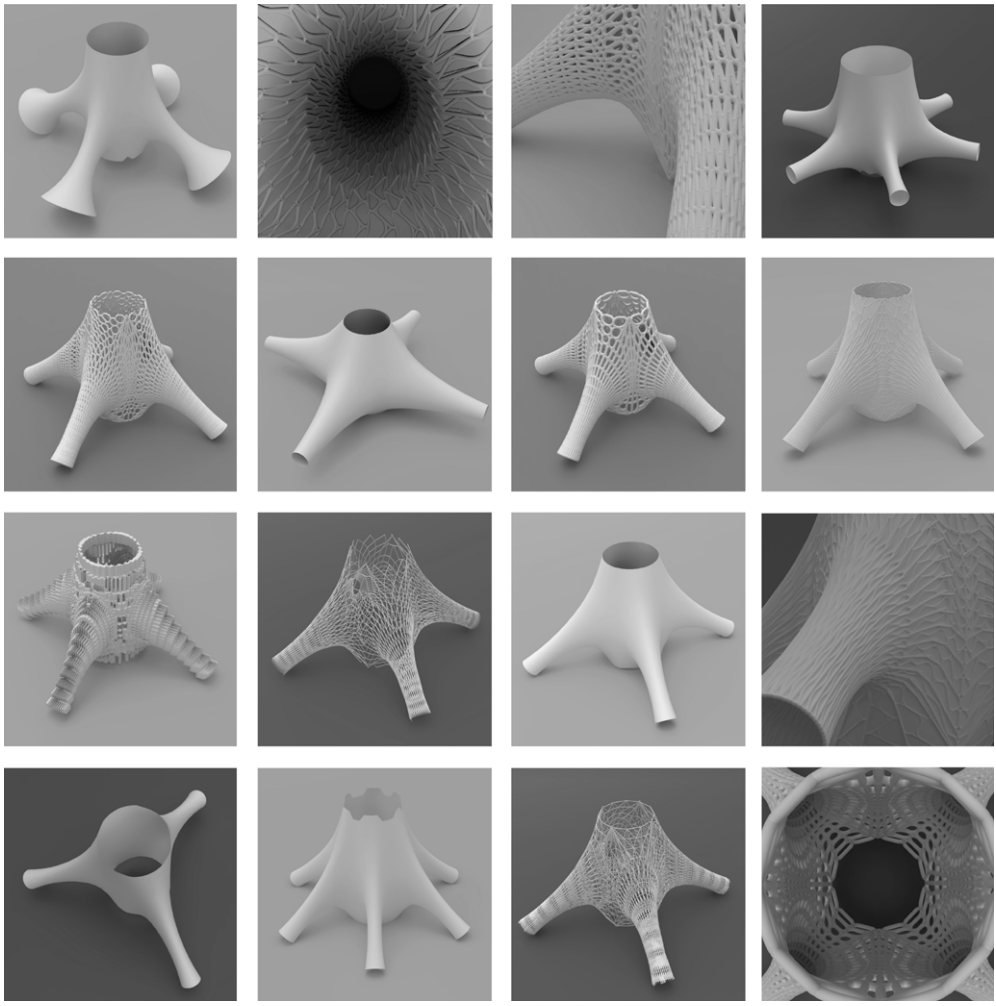






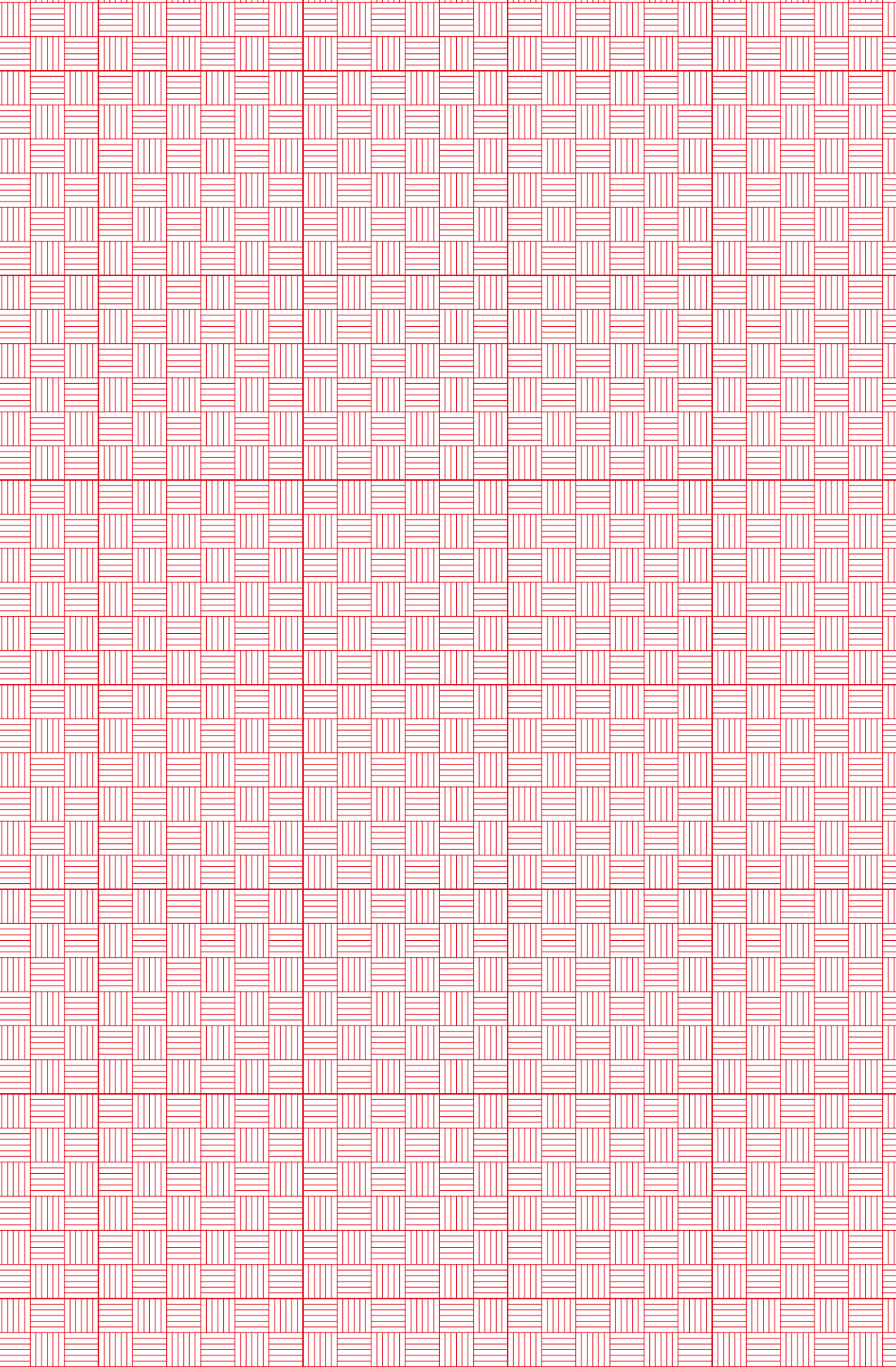








PEDAGOGICAL ELEMENTS



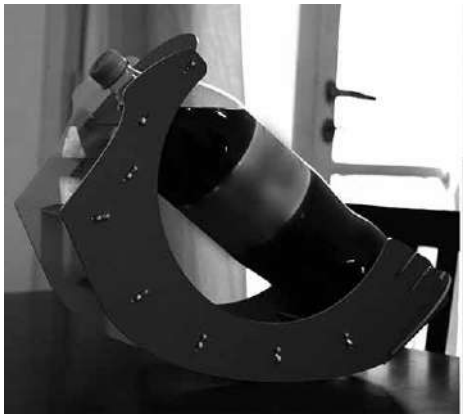
TECHNICAL ASSIST DESIGN WITH DIGITAL FABRICATION

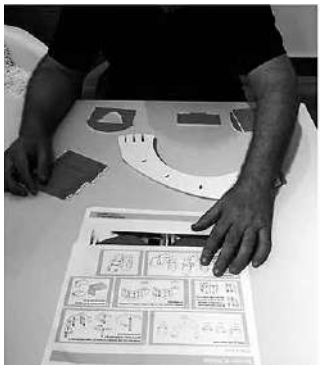
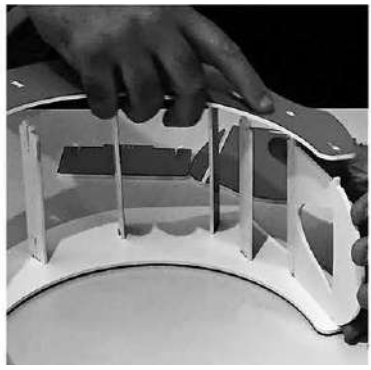
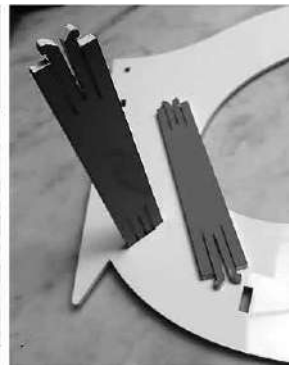
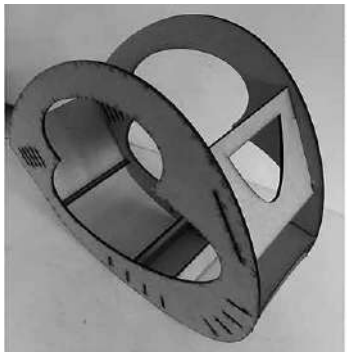
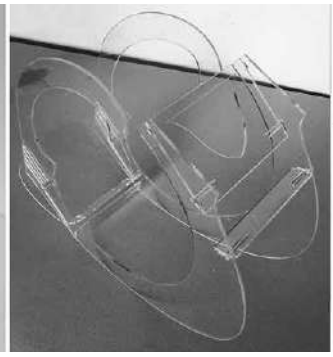
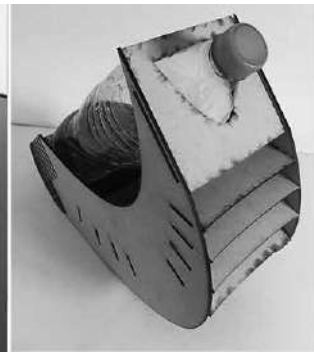
IEHU | UBA
Buenos Aires, Argentina

11

Our research project explores the connections between morphology, design and digital fabrication. One of our lines of inquiry aims to design customized technical aids for patients with a rare disease, in order to help them to gain independence. The use of CAM is crucial because there is an important need for adaptation to users, to produce in a low scale affordably, and also to access different locations. Standard supporting products reproduce the image of orthopedic appliances, pointing out the patient's obstacles. Our projects use the language of household products to integrate them to other everyday elements.
In the last 12 years, different aids were designed using laser cutting, routing, 3D printing, and casting, with diverse materials such as MDF, high-impact polystyrene sheets, synthetic leather, and casting resin. These products were answers to diverse mobility restrictions and included distance reachers, palm handlers, tableware and dressing support products.
Two products are shown in detail. The drink server is created through laser cutting, with no external fasteners. All snap joints are integrated and it is easy to assemble. It can be manufactured in MDF or high-impact polystyrene with a vinyl covering. A formal alternative can be constructed in MDF veneer sheets.

















CHILDREN FURNITURE

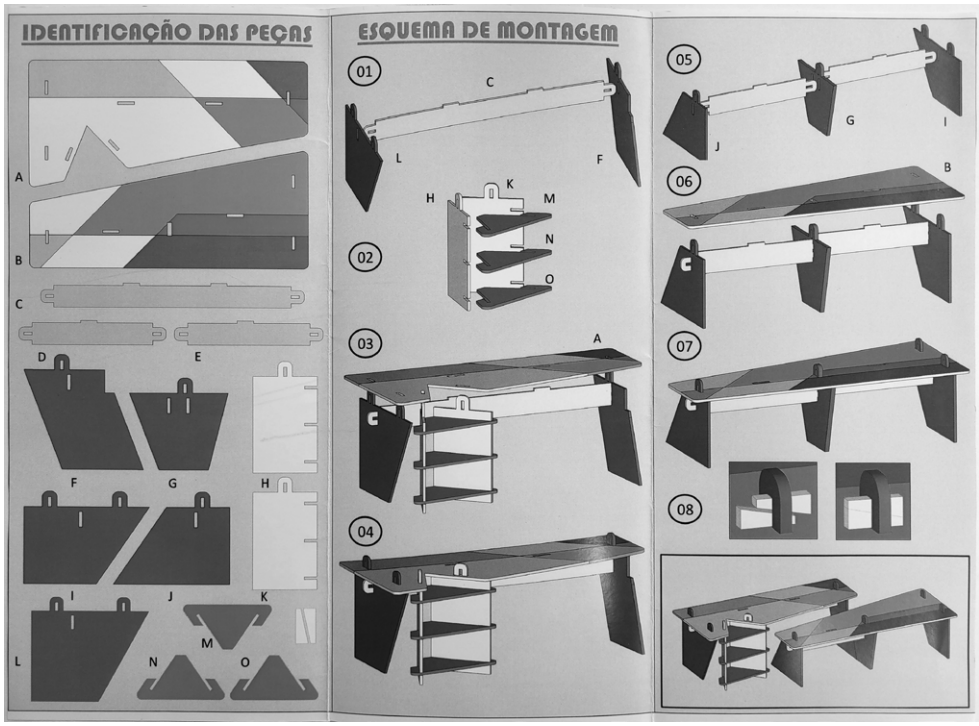
FABLAB BELAS ARTES
São Paulo, Brazil

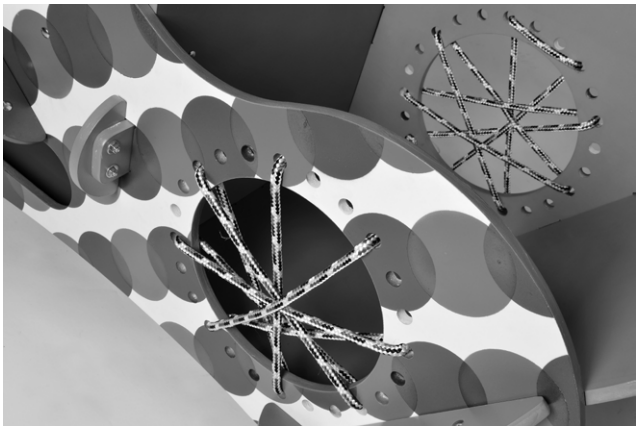
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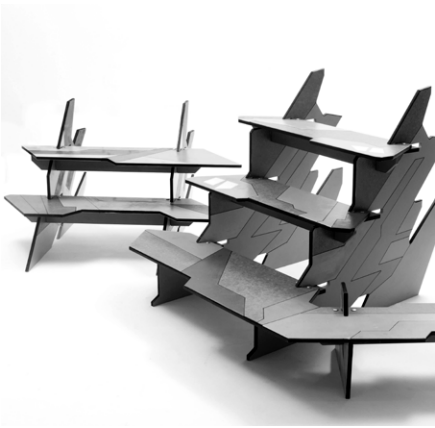
Children's Furniture is an experience developed at Centro Universitário Belas Artes de São Paulo and is a socio-educational proposal to encourage students' social responsibility. Its objective is to guide students to design furniture, build and donate it to institutions that care for children. The challenge of this activity is to create children's furniture for children from 4 to 8 years old, which promotes greater interactivity on the part of its user, stimulating the discovery and invention of multiple forms of use.
Students always begin the course by selecting a children's book to inspire them in choosing shapes and colors for furniture. The process consists of developing successive models, then culminating in making a full-scale prototype. Conceived from a closed fitting system and limited to the surface of a single MDF board, students are taken through analog and digital steps, including the use of Laser and CNC Machines, to design furniture with a structure that offers safety and simplicity to assemble, disassemble and transport.
The purpose of the course is the composition of a set of furniture for a room to play, different each semester, which will later be donated to charities. This exercise challenges aesthetic reasoning, points to circular economy concepts, and stimulates the awareness of creative activity to focus on the realization of a more just social environment.

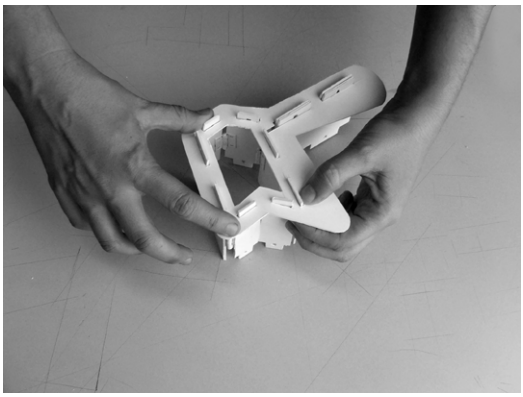


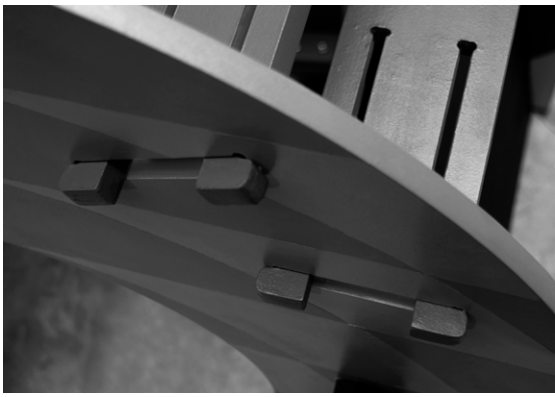

Peças
A 1x
B 2x
C 2x
D 2x
E 2x
F 1x
G 1x
H 4x
I 16x
J 8x
Centro Universitário Belas Artes
Arquitetura e Urbanismo
Prof. Denise Xavier
Plástica e desenho do objeto
Etapa de montagem
1º
Encaixar peça F e G
2º
Travar com peças B e C
3º
Colocar as peças D e E, que fará o travamento de todas
4º
Sobrepor com a peça A
5º
Colocar as peças H, I e J para parafusar
Giovanna Fusaro
Kathleen Marques
Leandro Bovi
Luna Pellicciari
Marcela Du Plessis
Marcella Boccuzzi
ANHAU
Vistas finais
CADEIRA DE BALANÇO


IDENTIFICAÇÃO DAS PEÇAS
A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
ESQUEMA DE MONTAGEM
01
02
03
04
05
06
07
08













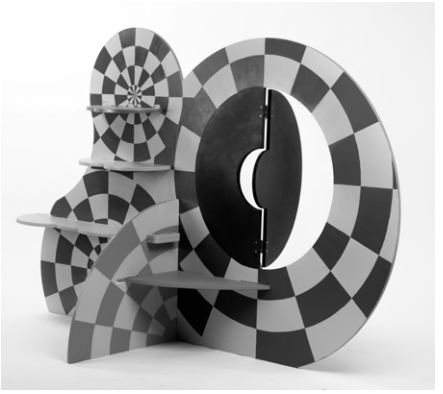


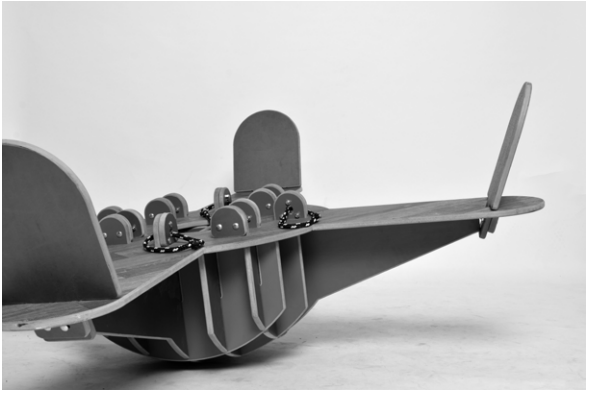





CANTO
DA
LEITURA











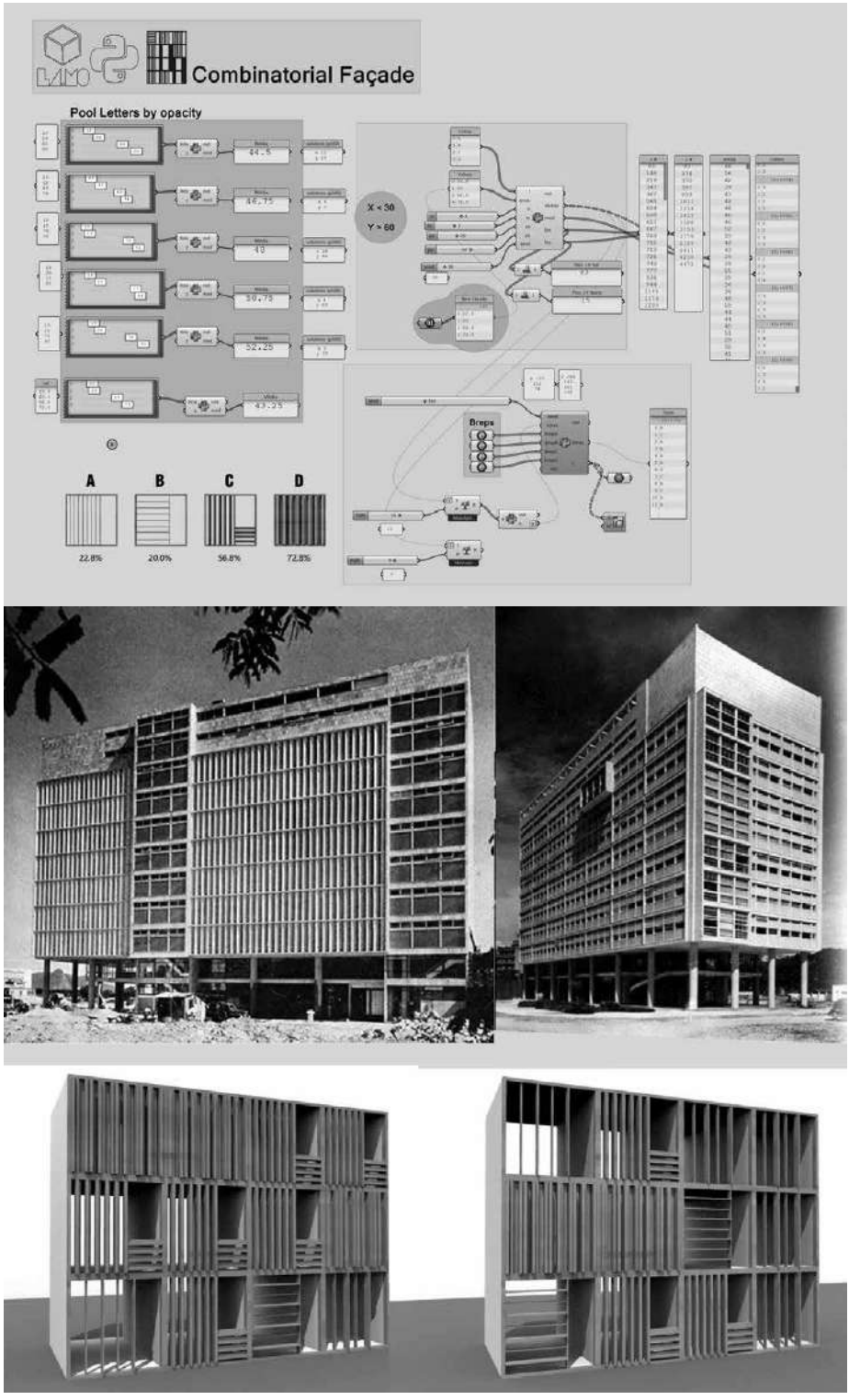


ARCHITECTURE COMPUTING, PEDAGOGICAL PROJECT

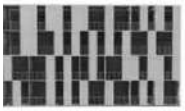
LAMO | UFRJ
Rio de Janeiro, Brazil

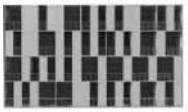
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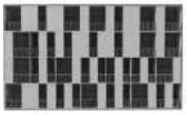
In the context of the 4th industrial revolution, information comes to life, becomes matter, then returns to data flow, and then is matter again, in a cycle of permanent transmutation. How can we separate generation, simulation and digital fabrication? New questions arise of how to translate, contextualize and operationalize the (in) formation of architecture. At LAMO-PROURB, the pedagogical project "Computation for Architecture in Python" develops research to implement Computation in Architecture, in early stages, including textual and visual programming in Python, applied to architectural thinking and making. The research initiated the implementation of two design courses to introduce computation at Universidade Federal do Rio de Janeiro in 2019. The research project translated and adapted existing computational knowledge from STEAM (Science, Technology, Engineering and Mathematics field) adapting this knowledge to design thinking and making. The images presented here are from a combinatorial facade project, developed in the first and second edition of the discipline "Computation for Architecture in Python I". In the design context, algorithms and data structures participate in the generation, simulation, optimization, fabrication and maintenance of buildings. The combinatorial façade exploration departs form modern traditional Brazilian legacy, improving the solution through data analyses and performance. Tradition is used in a prospective sense to develop new alternatives, promoting "future traditions" and local culture.


Combinatorial Façade
Pool Letters by opacity
X < 30
Y > 60
Breps
A
B
C
D
22.8%
20.0%
56.8%
72.8%



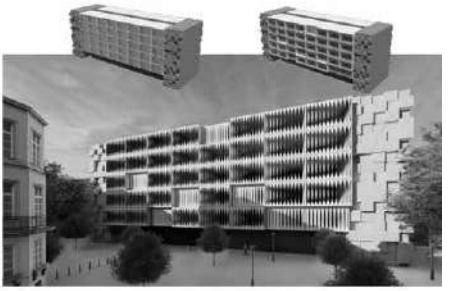


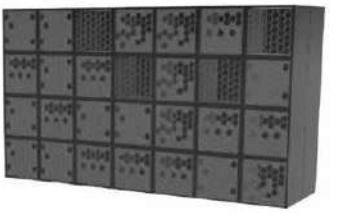


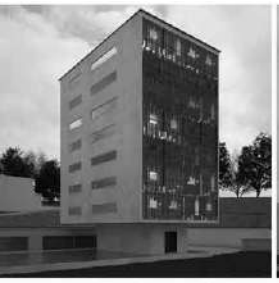


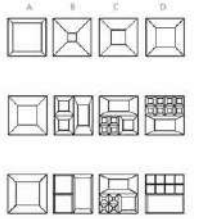


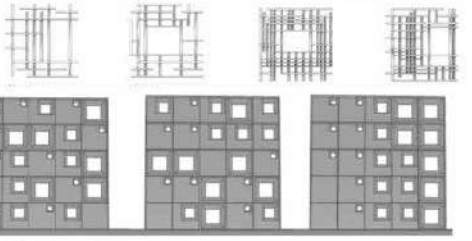


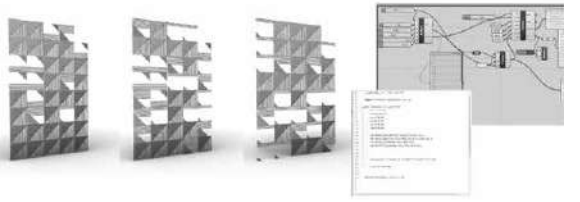












IBRIDA

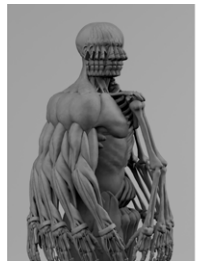
FAB LABS TECH MX
Mexico DF, Mexico



14

This workshop is aimed to contemporary artists, makers, designers, and the worldwide creative community for learning and experimenting with technology aligned to their own processes. We use Virtual Reality, 3D Printing and scanning for a contemporary, new approach to drawing. By also remembering classical drawing methods, participants merge old and new tools of observation and thinking. Our workshop was born for creating bridges between the analog and the digital practice of fine arts in contemporary art spaces such as galleries and art schools.
Our educational program has a rally-like ludic structure: We divide 25 participants into groups of five to make three rounds using the five stations; each station represents a tool and a challenge for each process. These classes open possibilities and new horizons to the creative community. By working with technology, the analog and digital conception of drawing becomes unified. The contrast between classical anatomical drawing methods like Bargue´s with the use of new technologies make students contextualize themselves and understand drawing as a way of thinking. Participants create differently and feel freedom when experimenting without technical constraints. We believe in the importance of art and technology coexisting, where a great opportunity lies in creating knowledge and contemporary art education methods. This workflow has been successful for connecting people to art experiences in different ways; a whole paradigm on education and Visual Art Teaching methods are applied and reinvented. We are currently moving this workshop worldwide upgrading and adding new tool such as AI practice with digital fabrication outputs. We are currently looking for partners,collaborators, and experimental spaces worldwide for trying our program.






















WORKSHOP

HYPER-ARTIFACTS: PROGRAMMED RUINATION

ROBOT_LAB
Bogotá, Colombia



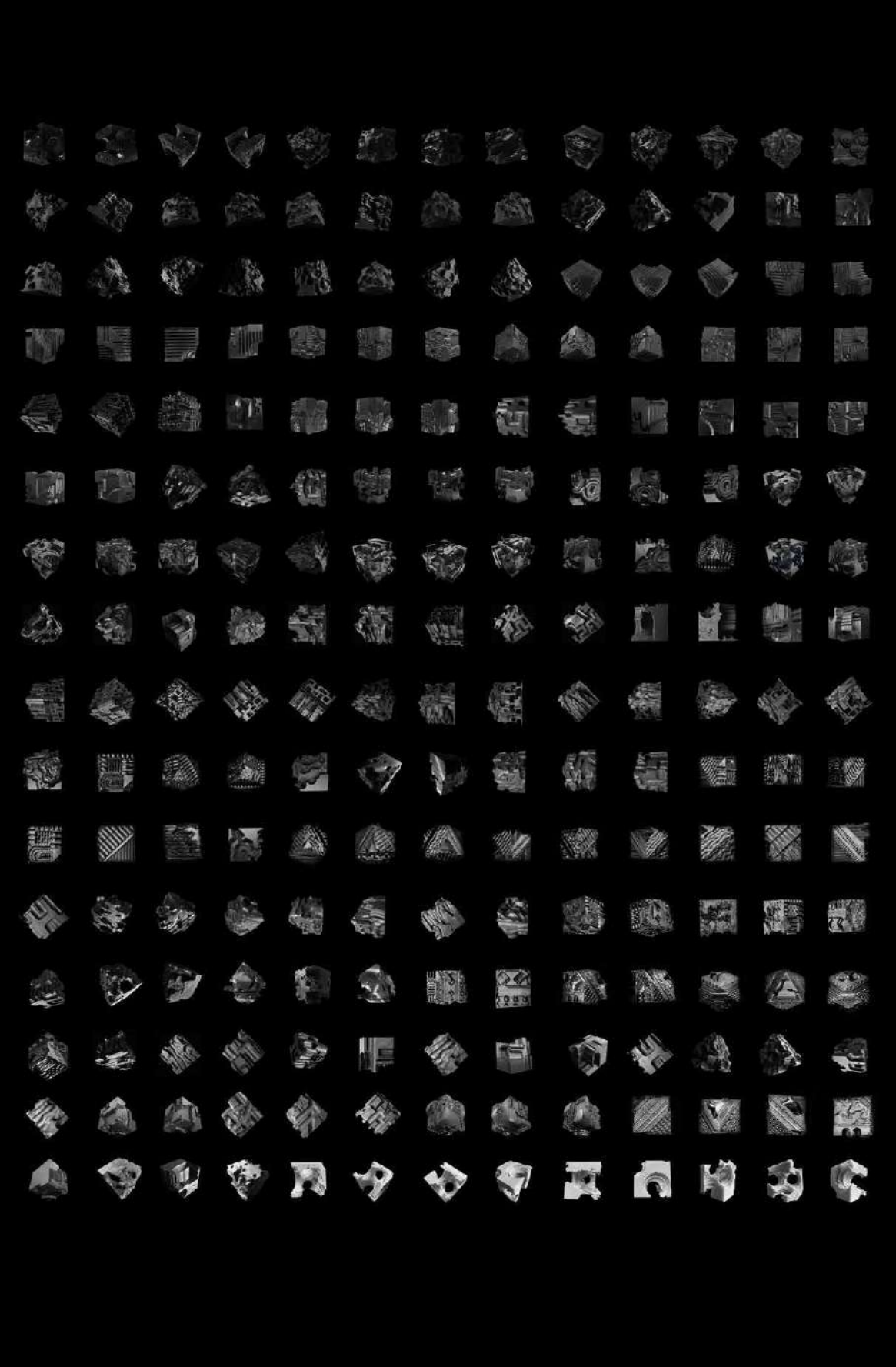
15

Robot_Lab projects are defined as transdisciplinary workspaces that aim to investigate, identify, and propose new approximations from various disruptive patterns to promote speculations and discussions on our discipline and practice in the region and pedagogical methodologies in undergraduate academic spaces.
These projects are structured in several short explorations called: translations. The main idea is to build a series of iterations, prototypes, and representations as translations of the historical cases studied. Questions such as: How can historical artifacts be re-imagined with the robotic arm? We start from a series of historical artifacts in the local context -or in a state of abandonment to initiate the sequence of translations. In 2022 we selected the XVI century military wall of Cartagena de Indias in Colombia as a piece of high significance and historical value to speculate about its contemporary resignification. This historical object became the perfect exploration scenario for constructing architectural artifacts that could "complete" the demolished parts of the wall, from its material exploration as programmed ruination and a controlled robotic manufacturing process to envision its futuristic responsibilities. A workflow is developed where images are translated into a 2D toolpath which is translated by robotic 3D controlled free-form edition of the material and later translated into the physical world through 3DScans based on robotic controlled choreographies.
The reconstruction of all pieces allows to create new artifacts informed by the reality of the pieces. Is it possible to complete the wall, re-reading its material arrangement and capacities? Understanding the processes of ruin and the climatic onslaught or the growth of the sea level? Can the ancient coral stone become a synthetic coral reef that deals with the fast-rising sea level? Robot-Lab allows us to explore these capabilities and demonstrate that it can address intriguing questions of our context through technology.






ABB





ARTISTIC | HACKING

BIODIGITAL STOOL DESIGN

MORFOLAB | UPB
Medellín, Colombia

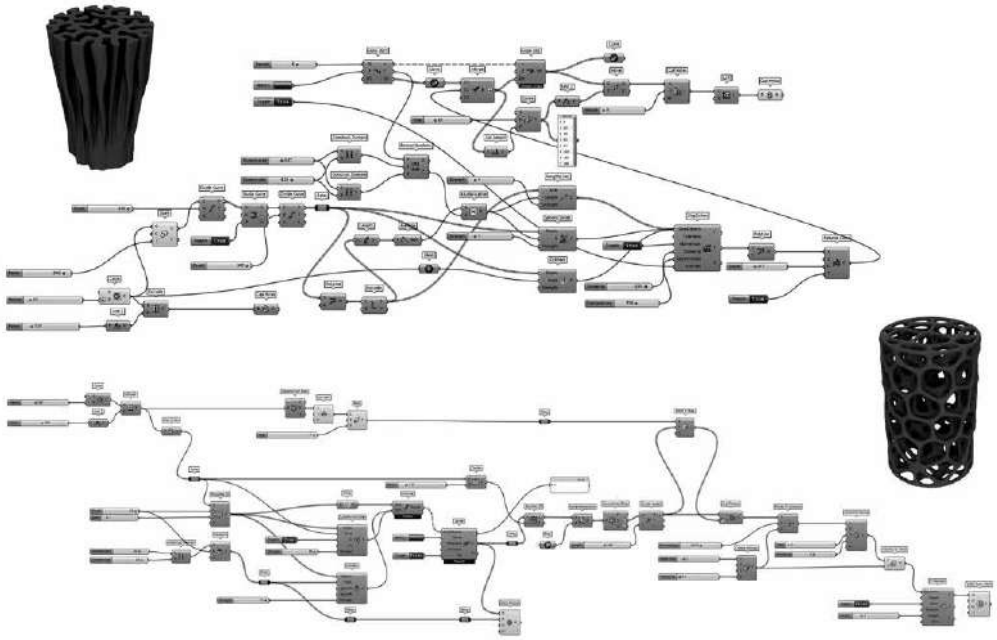
16

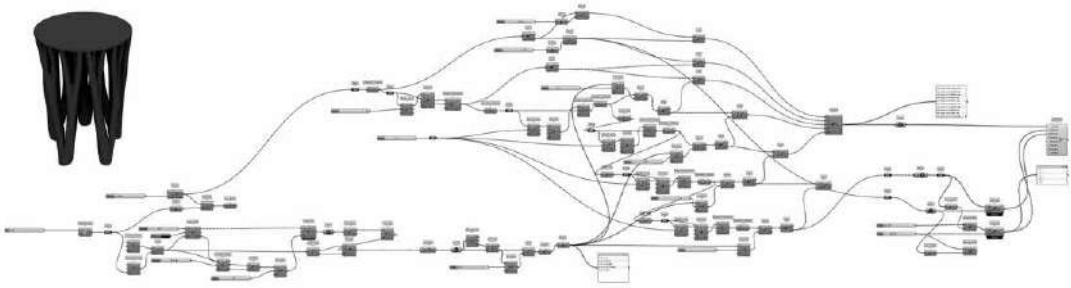
Designers and architects have used biomimicry as a recurrent tool to solve human problems through the analysis of referents from nature. On the other hand, digital fabrication technologies and parametric software have been emerging in the last decades changing the paradigms of how the designing-prototyping-validating process is made. Biodigital design emerges from a fusion between digital technologies and the possibilities of biology, integrating a variety of concepts such as nature, algorithms, cybernetics, genetics, mathematics, among others.

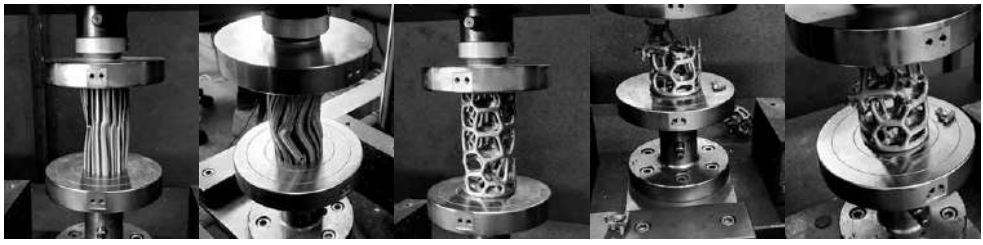
This project aimed the design of a stool based on three-dimensional patterns extracted from nature, through the integration between parametric design and additive fabrication technologies, highlighting a morphological and material experimentation.

A transdisciplinary and empirical-experimental approach was proposed, a combination of analog and digital tools, and the use of quantitative analysis methods. The project followed this methodological sequence (1) Selection of references from nature (2) Morphologic synthesis (3) Compression test (4) Analysis of thicknesses and stress (5) Fabrication of 1:1 scale prototype through Fused Deposition Modelling technology -FDM- (6) User testing (7) Conclusions and improvement proposal. The chosen referents from nature were the following: differential growth, ramifications and the Voronoi diagram. In the compression test, the branching pattern had the highest specific resistance and at the same time the lightest, this interesting information can be useful in other design projects in the future. The 1:1 scale prototype fabrication process (Voronoi diagram) presented various challenges in terms of dimensions, printing times and costs. Finally, this project has demonstrated that it is possible to materialize functional, and resistant objects through FDM technology; the proposed goals were achieved in the context of a valuable experience, a dynamic process of do and do again, trial and error, as a result of a transdisciplinary collaboration.

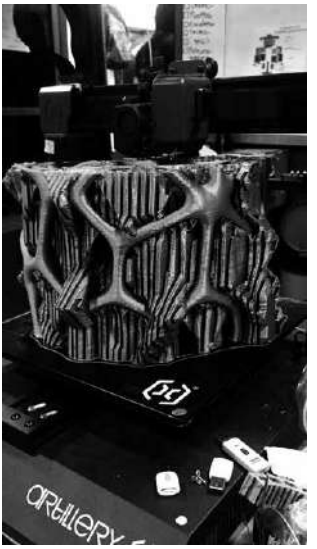























DIGITAL CROCHE

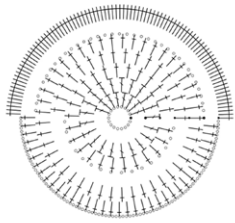
1MAGINARI0 | UFMG
Belo Horizonte, Brazil

17

Digital Crochet is a project that represents a creative process and design practice that seeks to include computational agents with a certain level of autonomy in the production of handicrafts. Since the crochet practice is a traditional craft technique that stagnated over time, the inclusion of these computational agents, seeks to potentialize the emergence of unexpected and unexplored crochet patterns. In addition, because crochet is a technique whose fabrication has not yet been mechanized, it is necessary to include the craftworker's participation, experience, and intentions in digital and manual fabrication. This feature, along with other design strategies, gives the result a greater degree of improbability and surprise. Finally, the project materializes the interest and effort to include computational technology in the context of artisanal and local production, enabling the transmission of local and popular tradition, and innovation in the production of handicrafts.

For the project, we developed a cellular automaton that uses the basic crochet stitches to generate diagrams of circular pieces. A cell represented by the crochet stitch within the grid chooses to be chain stitch, single, or double crochet according to a behavioral logic defined by the proportion of stitches found in a neighborhood. The whole piece can be read as a neighborhood, or the circular piece can be divided up into 8 slices. The graphic pattern generated by the algorithm is then read and manually manufactured by the crocheter. Since the algorithm does not produce graphics visually similar to a physical pattern, as well as the crochet recipes (materialization instructions), the interpretation of the graphic was done by the artisan who materialized the patterns according to her perception. All of these characteristics increase the degree of contingency in the pieces, and the results are organic shapes with unconventional aesthetics when compared to traditional crochet.

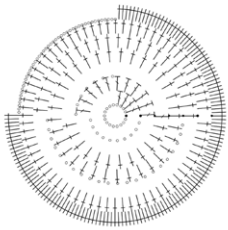




two neighborhoods



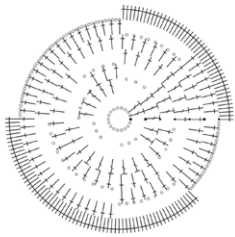




four neighborhoods

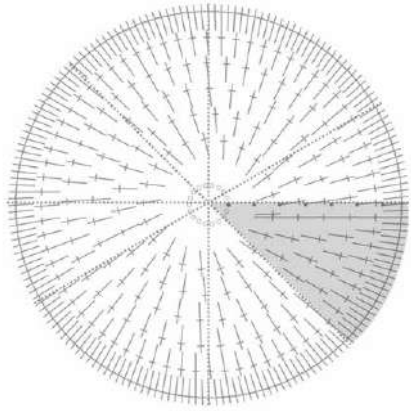




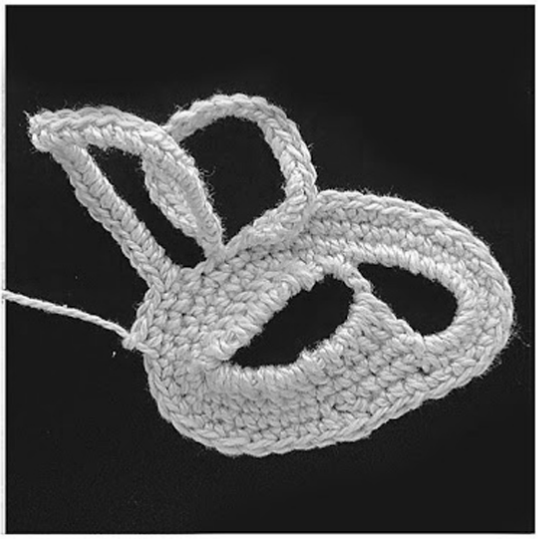


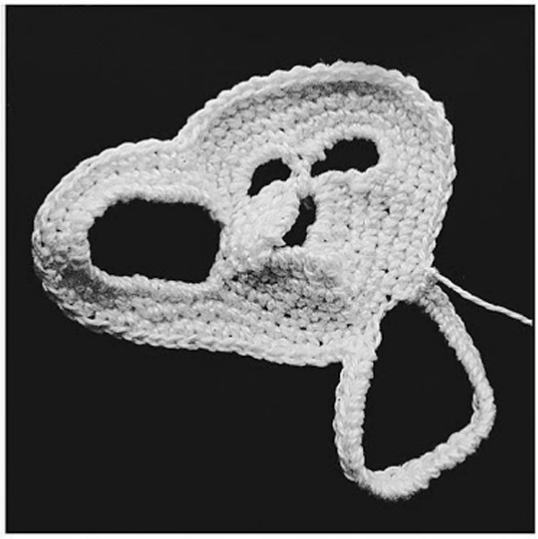
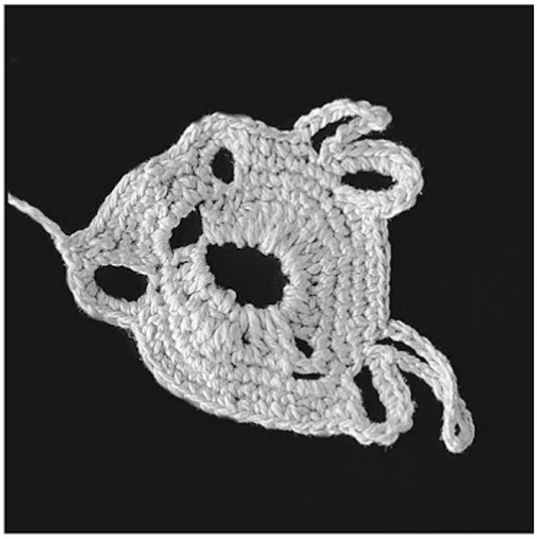
eight neighborhoods

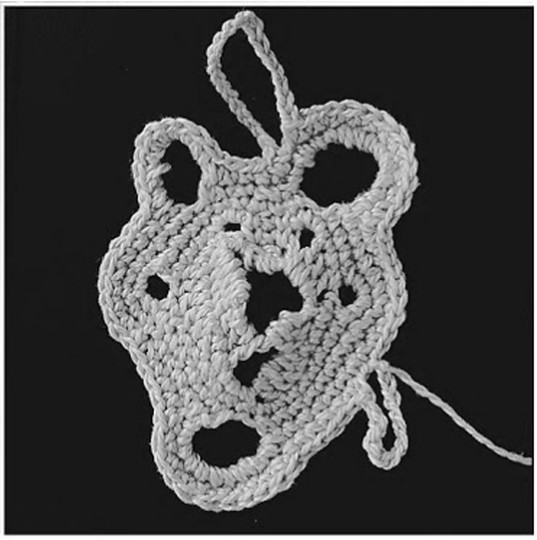


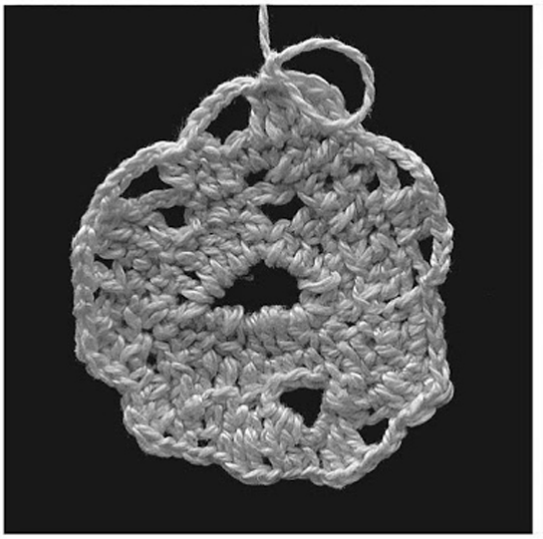
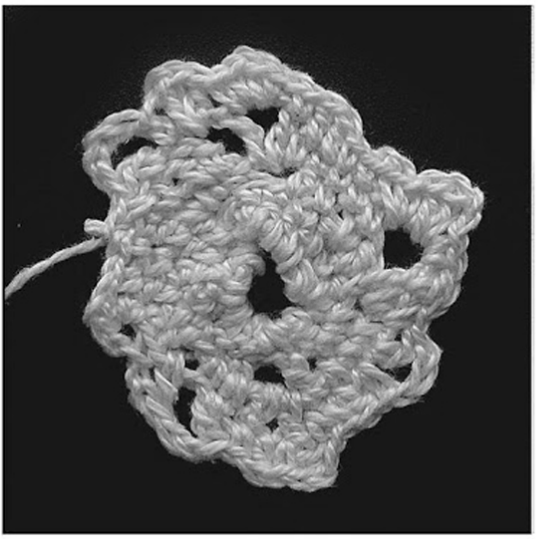
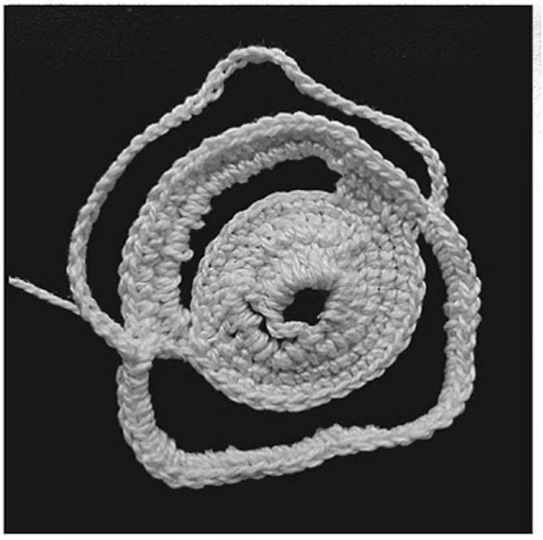
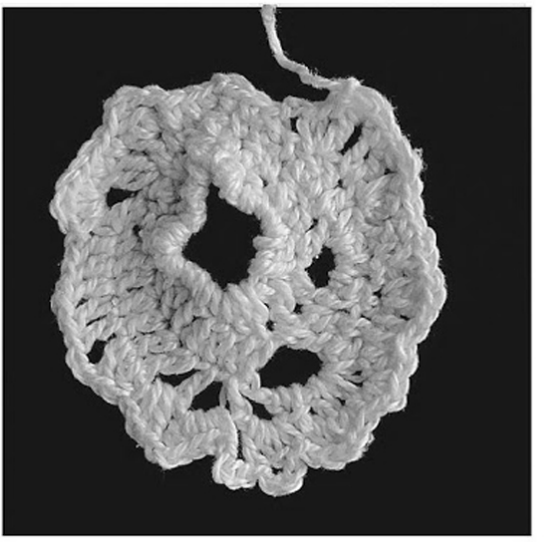


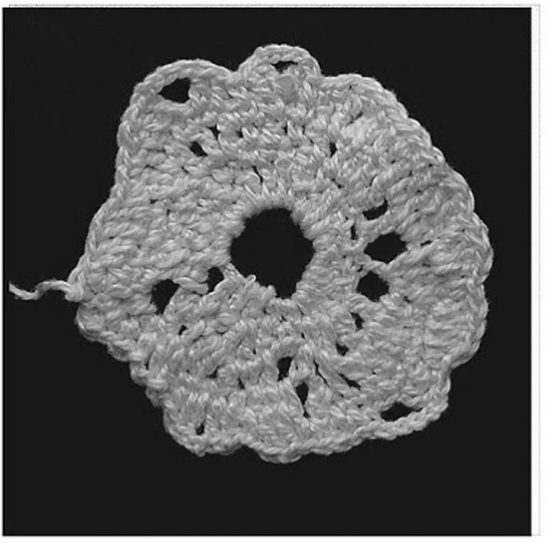
Neighborhood







VENDE PATRIAS [MOTHERLAND SALESMAN]

ESTUDIO TRUJILLO-PISANTY
Mexico DF, Mexico

18

Under Mexican law it is illegal to buy or sell any archaeological artifacts made by the country's native populations prior to Spanish colonization. In Vendepatrias (loosely translated as Motherland Salesman) photogrammetry is used to generate digital 3D models of pre-columbian artifacts from museums in Mexico which are later offered for sale both as digital non-fungible tokens (NFTs) and as plastic 3D prints. The project explores how photogrammetry, 3D printing and NFTs can be used as critical media by questioning how the act of transforming national heritage from its tangible form into digital files can strip it from its cultural value and turn it into objects purely of consumption.
Obtaining quality 3D scans of museum artifacts without collaboration from curators and archivists would have been extremely difficult only a few years ago. However the current ubiquity of mobile phones and the recent increase in their camera's quality -along with the inclusion of LiDAR technology in many devices- allows any knowledgeable visitor to capture data that produces fairly accurate reconstructions. This is the procedure followed in Vendepatrias, artifacts from several museums' displays were video recorded from all possible angles and processed to produce 3D digital copies. The museums staff was not notified beforehand and everything was done under the same conditions that any visitor would have.
The digitization of cultural artifacts often focuses on how digitality affords increased access to collections and a means of preserving vulnerable items. Vendepatrias presents a satirical method through which digitization is used to perpetuate undesirable structures related to colonial extractivism. Under this workflow objects of history and national identity become generators of status and wealth for private collectors speculating on their future value. The project thus exposes that under current techno-economic structures everything can be turned into a subject of the market.













CONSTRUCTION SKINS

VESTIBLES
Santiago de Chile, Chile



19

From the form of workshops or workshops and international talks, wearables unveils new exploration tools with new technologies that make it possible for various projects, both commercial and more experimental, to develop, apply, and expand knowledge about wearables as a technological interface. and interactive, field of work and speculation that could generate in our country a community of interested in possible future research, products and ways of teaching design and engineering, obtaining and enriching research methods from clothing or textiles in more disciplines of those mentioned as for example in scenic artists, and architects.
South America stands out for a great textile tradition, and its experience in the industry, especially that of textile traditions, an element that could enhance local creativity by incorporating new practices, methodologies and technologies from handicrafts.
The main questions that drive the VESTIBLES platform are: How to link our context with new technological developments? How to link new technological advances with local ancestral knowledge, as one of the areas of possible research with the intersection of new technologies? How to consolidate a local community interested in these issues?"







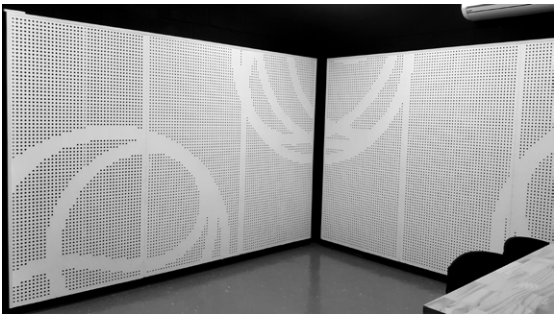


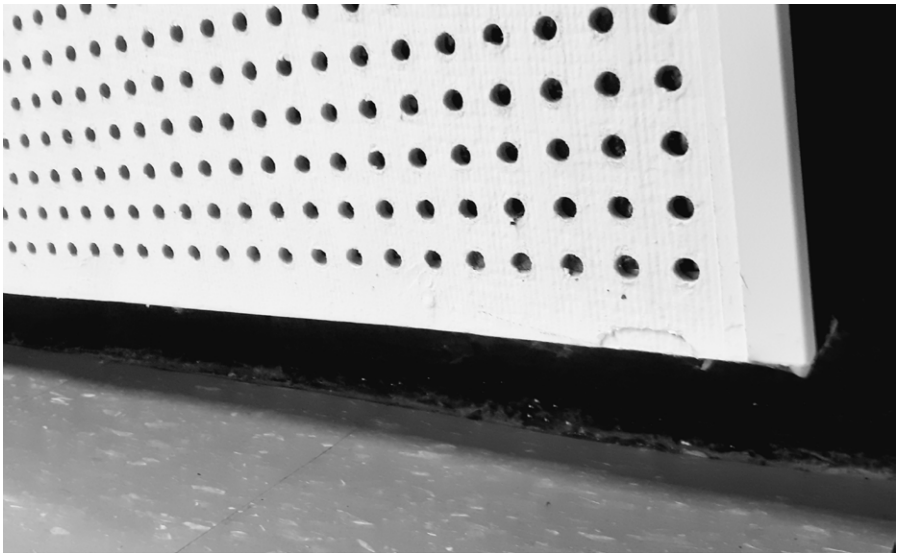
ACOUSTIC CUSTOMIZED PANEL FOR PLASMA

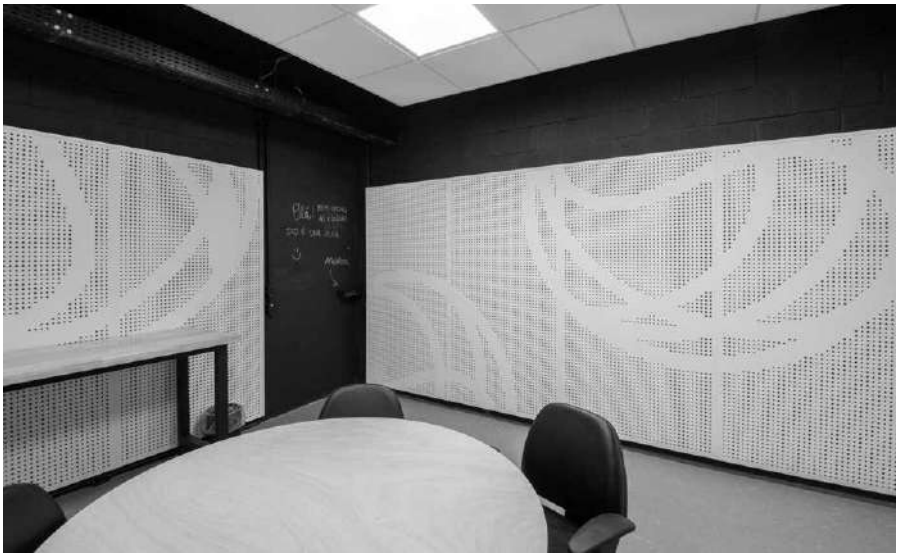
PLASMA | UNICAMP
Campinas, Brazil

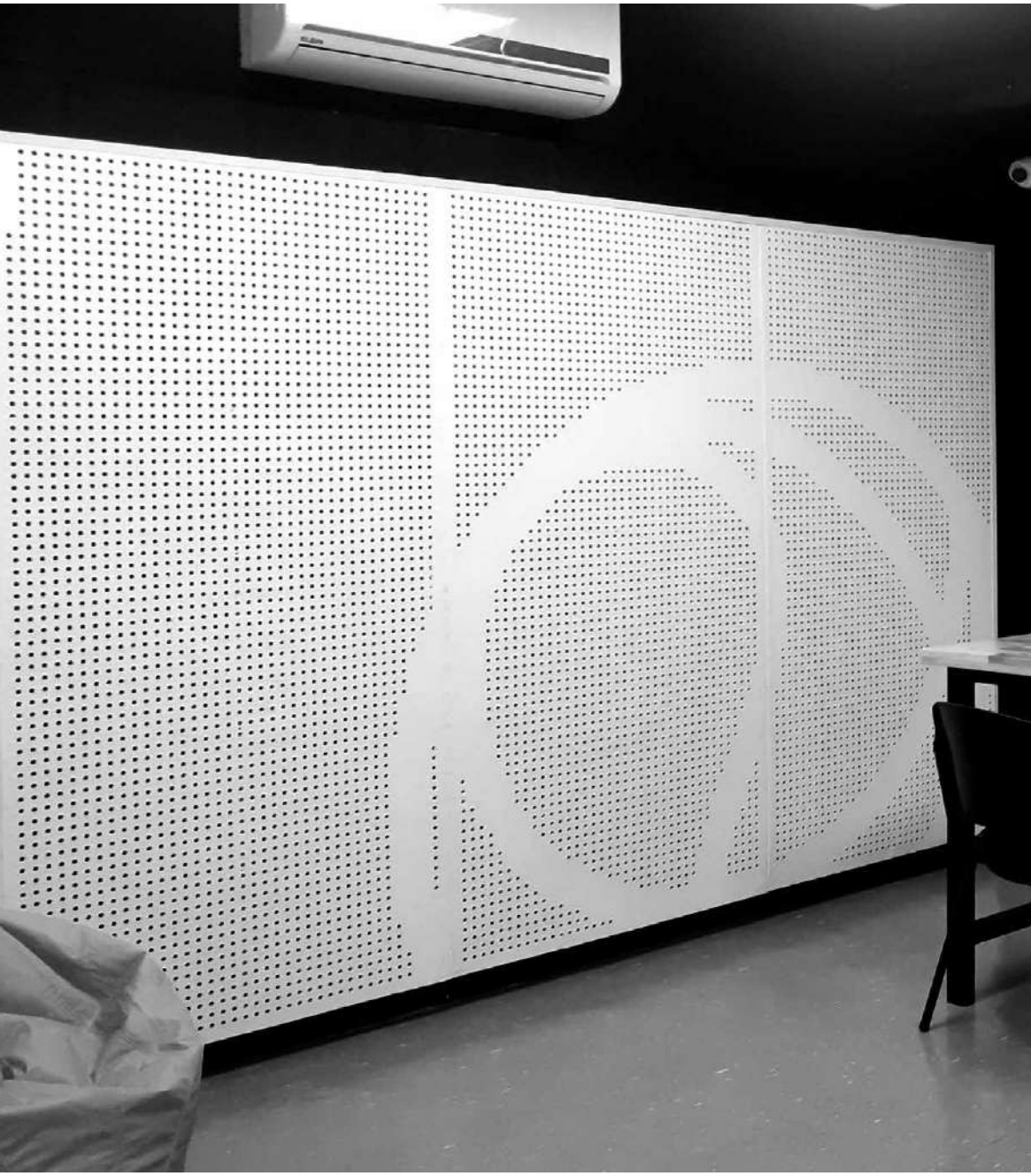
20

A team from the Faculty of Civil Engineering, Architecture and Urban Design developed a customized sound-absorbing panel for Plasma's recording studio. With the intention of promoting the culture of do-it-yourself (DIY), the boards were designed and produced using the machinery available in the lab.
These consisted of 8mm thick fiber cement plates (1m wide by 2m high), which were milled using a computer numerical control machine (CNC), forming a pattern with the Plasma logo. The fiber cement, over others material, is a low-cost alternative that can be easily customized with paint or cut-outs. The panels were installed 70mm away from the wall, with a rockwool filler between them. The holes in the panels are 12mm in diameter and are 13mm apart. In total, 14 boards were used, each with a unique design. The CNC used in this project is the Router CNC Scriba from Victor Ciola. The process of designing and cutting the panels took one week, and the installation was done in one day.
Under the coordination of Prof. Dr. Gabriela Celani the team that developed the project of Acoustic Customized Panel for PLASMA Laboratory was composed by Prof. Dr. Stelamaris Bertoli (acoustic study), Architect Barbara de Holanda Maia Teixeira (plates design) and Laboratory Technician Rafael Corrêa Remédio (use of the CNC to mill the plates).











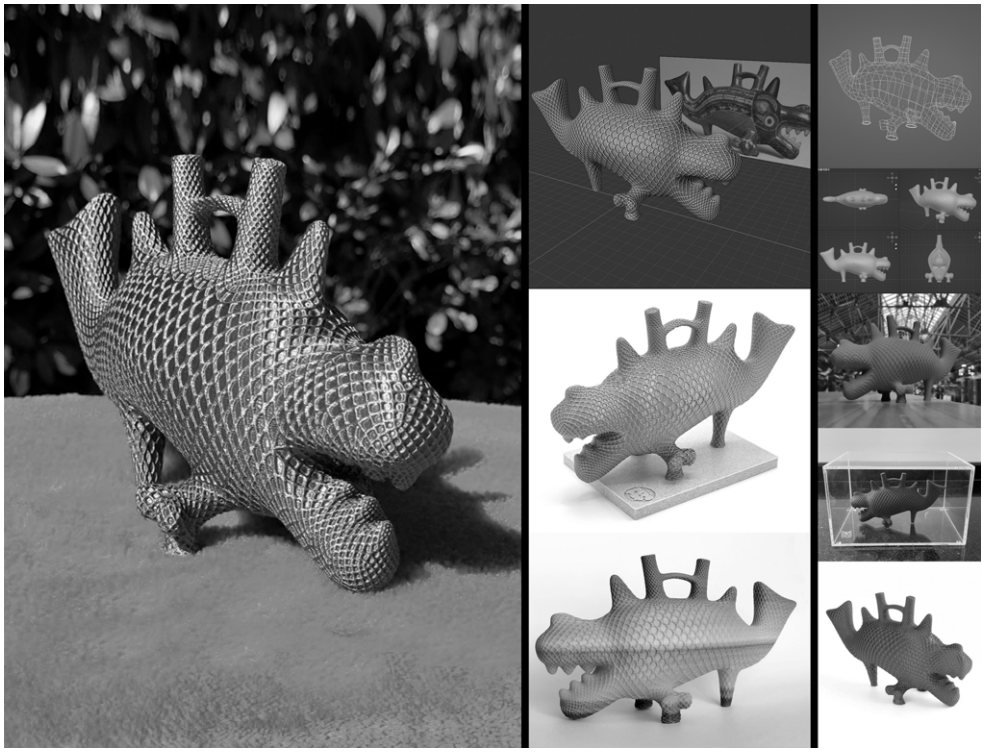
PERU-POP -
PERU ART FOR THE WORLD

WE-LABS
Lima, Peru

Peru-POP's mission is to tell the story of Peru around the world through its sculptures, all of them have a story to tell at a time in our history.
PERU-POP products are small works of art that are born from the fusion of 3 factors: history, art and technology.
PERU-POP was inspired by ancient Peruvian pottery to create current objects while preserving their original shapes, thanks to 3d printing. Each object is researched, then digitally designed and 3D printed

21

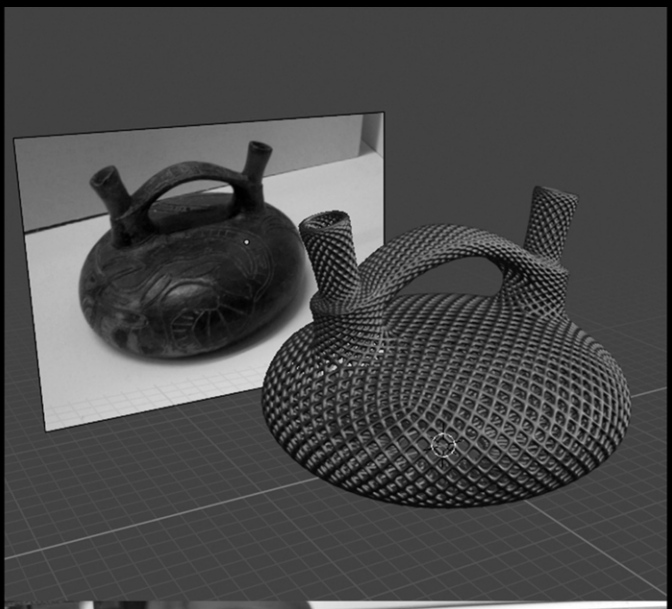


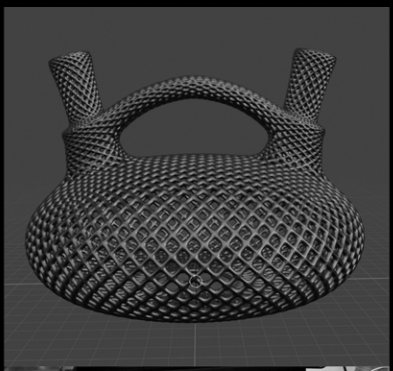


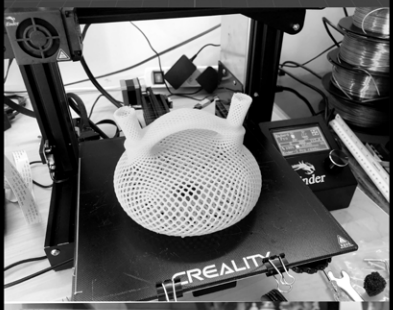


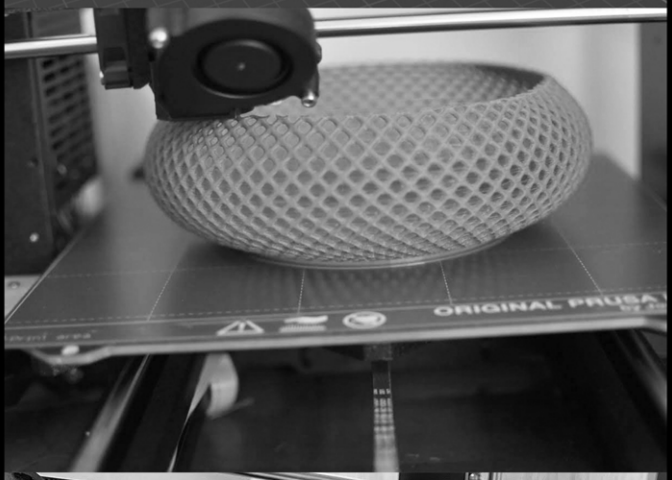






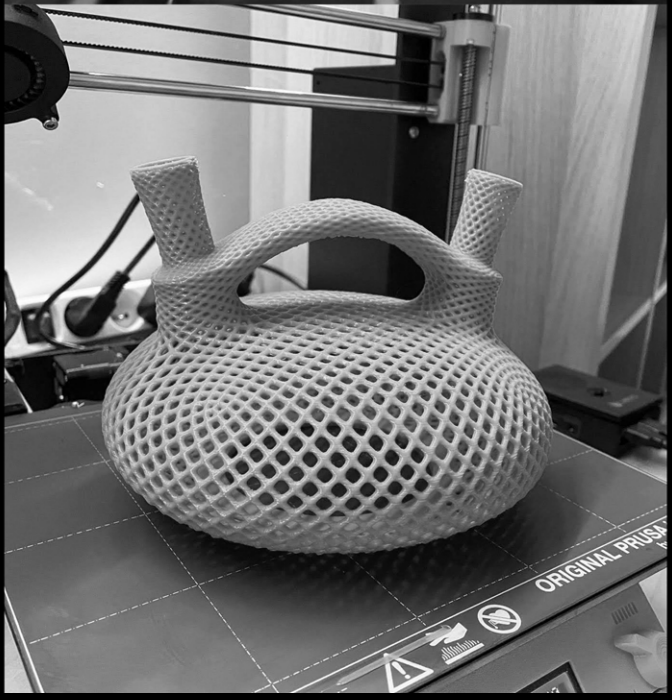




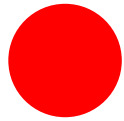












MOBILE FAB LABS

FABLAND

FABLAB UNAL
Medellín, Colombia

22

FABLAND – Itinerant Laboratory of Innovation - aims to provide access to technological tools for communities outside the University and thereby promote the development of social innovation processes. It is conceived as a Manufacturing Laboratory (FAB), which reaches (LAND) out to local communities offering digital manufacturing methodologies and machinery to help them build an ethos of change in cultural dynamics to generate alternatives in ways to ask, learn and solve their own problems. The technological challenge in this project was to create a workspace for 12 people using the teaching/learning of digital manufacturing techniques that could be assembled in a short time with a minimum tools and training. The entire surrounding skin of the workspace was created using 8cm-wide plywood slabs tensed in bolted joints to create surface stresses that increase rigidity, thereby generating 9 arches, 70cm wide and 5m in diameter, which together laterally cover an approximate area of 35m2. The furniture consists of chairs, study tables, machine support tables and workshop tables designed specifically for the workspace, with the condition that it be built in plywood and disassembled to be packaged and transported. The workshop tables and machine support tables were designed to store all the pieces of the workspace and equipment inside, thus facilitating the storage and transport of the project. The project was developed by a group of 7 people over 90 days, of which 30 days were used to generate the final model and cut and assemble the workspace. This project was financed by the Faculty of Architecture at the National University and Cotrafa Social, which is a non-profit cooperative organization.












SALIDA DE EMERGENCIA









DIGITAL STRAITS

FABLAB AUSTRAL
Puerto Williams, Chile

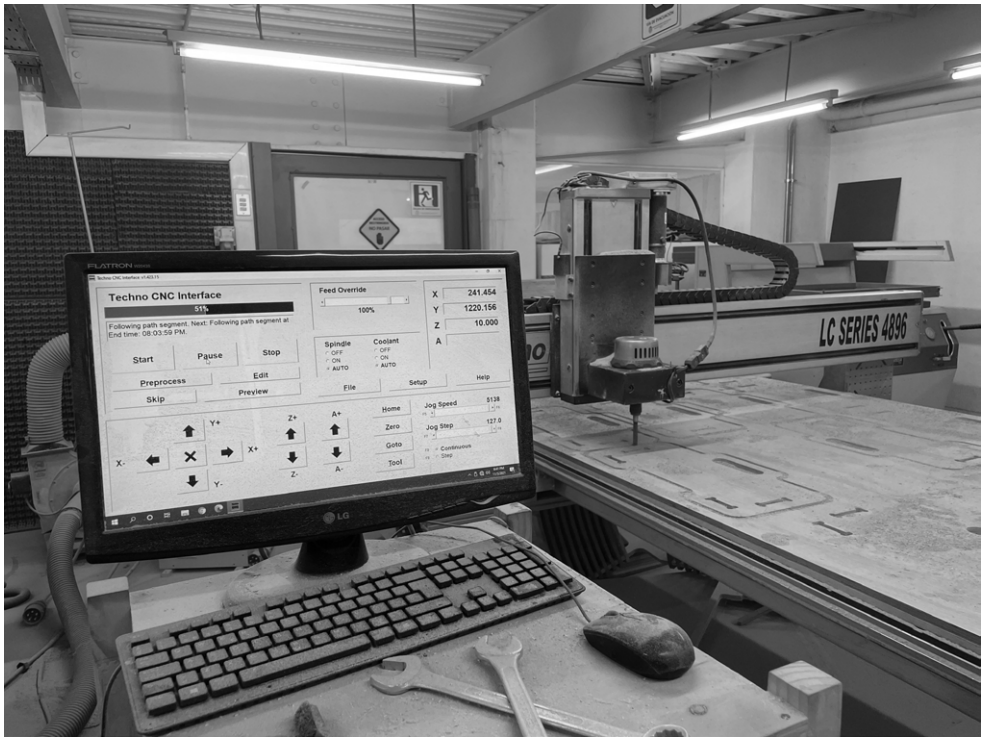
23

In 2021 we developed the project "Estrechos digitales; Cultura y Tecnología Austral" that stated to develop a cultural and technological encounter that generates an ecosystem that favours creation through design tools, digitalisation, participation and teamwork. Understanding design as a tool that generates cultural value to the regional and national social ecosystem. Making this posible took effort from the FabLab team to manufacture and implement an itinerant laboratory in a pop up format. This mobile laboratory was temporarily installed in 3 cities in the Región de Magallanes, in the Chilean Patagonia. It was equipped with state-of-the-art technology and travelled more than 1000 kilometres by sea and land in the southernmost area of the world, withstanding snow, winds and low temperatures. This Pop - Up Lab was designed and built using the digital fabrication machines allowing it to adapt and transport to new locations. It was custom made and it is an example to the community of what can be achieved using these technologies. The modular design helped with the transport, itinerancy and care of the laser cutter, 3D printers and other machines that where of essence for all the educational activities that under went though out the journey. Lastly, the design promoted a modular installation which facilitated and expanded in the different spaces where the laboratory was situated.
A continuum of educational activities were promoted alongside with collaboration with experts from the region allowing the participants to learn about the possibilities of digital technologies such as programming with Scratch and Arduino, artificial intelligence with Teachable Machine and 3D modelling with TinkerCAD, as well as digital and analogue processes for their designs and prototypes.





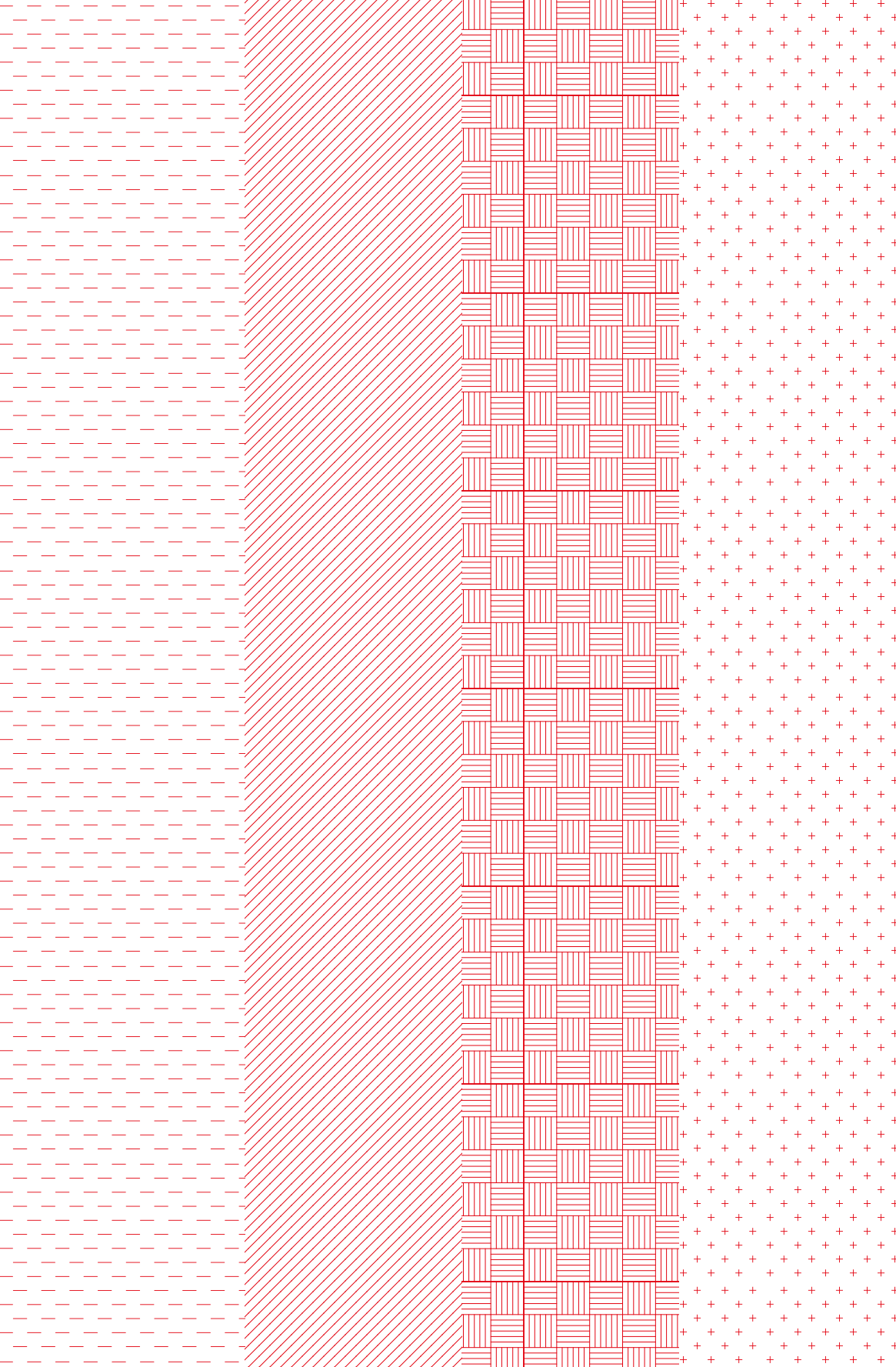



Techno CNC Interface
Feed Override
100%
X 241.454
Y 1220.156
Z 10.000
A
Start
Pause
Stop
Preprocess
Edit
Skip
Preview
File
Setup
Help
Spindle
Coolant
Home
Zero
Goto
Tool
Jog Speed
Jog Step
LC SERIES 4896




MAKERSPACE
Hernando de Magallanes
FAMILIA AUSTRAL





INFORMATION ABOUT THE LABORATORIES

SUPERLIMÃO

SuperLimão Studio
http://www.superlimao.com.br/
@superlimao

São Paulo, Brazil

DIOGO MATSUI, FERNANDO FERRARI PIETROPAOLO, THAIS DE MATOS ILKIW, VINICIUS MIZOBUTI, MARINA BRANT & VITOR CURTI

2002

Superlimão is a multidisciplinary team of creative minds. We believe that architecture enables daily inspiring human experiences. Through innovative processes, we conceptualize spaces that challenge existing models to deliver solutions that allow people to live out their life stories to the fullest. Within our ecosystem, the Product Design Unit works to push the boundaries of the design space, exploring the use of geometry, matter, and technology across scales: from chairs, rugs, and tiles to facade systems. Our work seeks to adapt creatively to constraints by enriching, reusing, and resignifying materials and production methods, promoting our outlook for a sustainable future.

DUM DUM LAB

Dum Dum Lab Laboratorio de
Arquitectura Avanzada
www.dumdumlab.cl
@dumdumlab

Valparaíso, Chile

KATHERINE CÁCERES & FRANCISCO CALVO (DUM DUM LAB), MAYA GLARÍA, CONSTANZA GRENETT & VALENTINA CABRERA

2008

DUM DUM LAB is an architecture studio founded in 2009 by architects Katherine Cáceres Corvalán and Francisco Calvo Castillo based in Viña del Mar, Chile. Their main areas of interest are the research, dissemination, and generation of knowledge on architecture and computational design and the interaction between digital fabrication technologies and traditional fabrication systems. This research is deployed in a framework that includes academia, applied research, publications, symposium curatorship and workshop development. Among his most relevant projects are the Workshop Series from 2011 to date, Symposium Performa: Architecture and Technology developed from 2013 to 2017, the Pavilion Series Discrete Structures 2015 to date and the finalist selection in the Young Architect Program YAP-Constructo 2019 competition with the Trama Pavilion.

RILAB | UNL

Representation and Ideation Laboratory
Universidad Nacional del Litoral
https://competition.adesignaward.com/design.php?ID=114604

Santa Fé, Argentina

MAURO CHIARELLA, MARTÍN VEIZAGA & LUCIANA GRONDA

2010

Augmented graphic thinking operates by integrating algorithmic, heuristic and manufacturing processes. It broadens horizons through the instrumental resources of representation, simulation, computational design, digital manufacturing and computational making. The Representation and Ideation Laboratory (RILAB) works from the augmented graphic thinking exploring the cultural and instrumental conditions of the Architecture and Design, where creativity is expanded through collective authorship, digital databases and hypertextual construction generating multiplicities and mixtures both in its procedures and in its results.

TALLER 1:1 | PUCP

Pontificia Universidad Católica del Perú
https://www.youtube.com/channel/UCOXBDFPaHGjoRGERVJ_iD-Q
@t1.1_pucp

Lima, Peru

FELIPE FERRER & PETER SEINFELD

2011

The Workshop focuses on the experience of understanding by doing. We are interested in understanding the construction detail as part of a process in which the material and the system in which it is implemented participate. We propose a process in which, based on the understanding of a construction system, it is built on a real scale. We always seek innovation in all or some of the parts of the process, encouraging the integration of hi tec and low tec methodologies.



FABLAB U. DE CHILE

Universidad de Chile
http://www.fablab.uchile.cl/
@fablabudechile

Santiago de Chile, Chile

DANISA PERIC

2015

FabLab U. de Chile is a creative and transdisciplinary community that promotes projects aimed at generating social and environmental well-being, through the development and application of emerging manufacturing technologies. We are located in the Faculty of Physical and Mathematical Sciences of the University of Chile, in an open laboratory, and connected to the worldwide network of FabLabs. We operate under the principles of collaboration, horizontality and openness of knowledge.



LEFAD | PUC MINAS

Laboratório de Experimentação e Fabricação Digital
[Open Source Laboratory for Design, Art and Technology]
Pontificia Universidade Católica de Minas Gerais
@lefad.pucminas

Belo Horizonte, Brazil

HUGO ALKMIM DE MATOS, MARCOS VINICIUS AUGUSTUS FERNANDES ROCHA BERNARDO, MARINA FERREIRA BORGES & SÉRGIO DE LIMA SARAIVA JUNIOR

2016

The Laboratory of Experimentation in Digital Fabrication (LEFAD) of the Architecture and Urbanism course at PUC Minas is a structured space to promote and improve the development of practical teaching, research and university extension activities. The laboratory's mission is to present teachers and students with the challenges and perspectives that arise when working in an integrated way with computer-aided design (CAD) and machine-aided manufacturing (CAM), strengthening the link between theory and practice in the generation of prototypes in reduced or real scale.

DATLAB | UNAM

Laboratorio de Diseño, Arte y Tecnología de Código Abierto
Universidad Nacional de Misiones
https://www.fayd.unam.edu.ar/la-facu/espacios/DAT-lab-UNaM-FAyD
@datlabfayd_unam

Misiones, Argentina

GASTALDO RUBEN & PASQUET DANIELA

2018

DATLab is a space that aims to bring together digital open manufacturing technologies, along with areas for analogue and manual production, already present at our School. It combines processes from different projects towards practical experimentation in pursuit of innovating, producing, editing and publishing content with a transdisciplinary approach. It brings together shared views and practical experiences carried out by teams of highly experienced research professors and undergraduate and postgraduate student cohorts, whose combined synergies deliver any resulting development to the academic community, in general, and to productive and social environments, in particular. In addition to this, it allows members of the FAyD (Spanish acronym for School of Art and Design), as well as the aforementioned social groups, to claim and reclaim knowledge, procedures and experiments, as part of an ongoing joint and communal pursuit of knowledge, its advancements and practical uses. As a result, it proves a decisive tool for integration, and a ground-breaking territorial and methodological structure in the region.

LABORATORIO BIO

Instituto Tecnológico Metropolitano
@foodesignmed

Medellín. Colombia

ANDRÉS FELIPE RAMÍREZ ARANGO & DIANA URDINOLA SERNA

2019

Due to the complex challenges of today's societies, the conventional ways of doing design are linked to new disciplines that open up a universe of transdisciplinary and co-creation possibilities. Understanding design as an agent of change, enriches the connections between different types of knowledge that contribute to the development of fair and sustainable futures. From this premise emerges the study and research group in biomaterials conformed by students and teachers from the design department of the Metropolitan Technological Institute in Medellin Colombia. From there, the development of biodegradable materials and morphological explorations are proposed in a way that, through the combination of technologies for digital manufacturing and the processes that food experiences in the kitchen of the domestic space, the development of objects is allowed identifying other ways of producing them through slower processes and mass production democratization.

UNICAP ICAM-TECH

Universidade Católica de Pernambuco

Recife, Brazil

LUISA ROLIM, VICTOR SARDENBERG & DYEGO DIGIANDOMENICO

2021

Unicap Icam-TECH is a partnership between Unicap – Universidade Católica de Pernambuco (Brazil) and Icam – Institut Catholique d'Arts (France). It offers three post-graduate specializations in design technologies, complexity engineering, and mega-projects management.

MICROUTOPÍAS LAB

Instituto Tecnológico Metropolitano

Medellín, Colombia

EVER PATIÑO MAZO

2022

The MicroUtopías laboratory reflects on the role and function of the designer, of the discipline of design and contemporary creation in society. It does this through strategies of speculation, exploration and experimentation that allow us to think critically about the present, and propose micro-scenarios to imagine a fairer, more equitable and sustainable future.

IEHU| UBA

Instituto de la Espacialidad Humana
Universidad de Buenos Aires
http://ieh.fadu.uba.ar/
@morfycam1

Buenos Aires, Argentina

**PATRICIA MUÑOZ &
ANALÍA SEQUEIRA**

2006

The IEH, Institute of Human Spatiality is an academic space where different investigations dealing with morphology in design, architecture and urbanism take place. It includes six research units, including the Laboratory of Morphology, created in 1985.
The Institute is the seat of different postgraduate studies, internships, scholarships, and theses. It groups professors and researchers from diverse design disciplines. Three central research lines are the socio-spatial perspective of inhabiting, the transformative potential of project activities and form as a cultural product. Several universities and cultural organizations have hosted numerous national and international exhibitions of its production

FABLAB BELAS ARTES

Centro Universitário
Belas Artes de São Paulo

São Paulo, Brazil

DENISE XAVIER, ANDREA MACRUZ, LILIANE SIMI AMARAL, JACQUES JESION & LUIS OCTÁVIO ROCHA

2010

Children's Furniture is an activity carried out within the Craft environment of the Faculdade de Arquitetura do Centro Universitário de Belas Artes de São Paulo. It is made with the support of technicians from FabLab and the institution's Carpentry Workshop (Oficina de Marcenaria). In addition, there is a partnership with the company ARAUCO to supply MDF boards to manufacture the prototypes.

LAMO | UFRJ

Laboratório de Modelos e
Fabricação Digital
Universidade Federal do Rio de Janeiro
http://www.lamo.fau.ufrj.br/
@_lamo3d

Rio de Janeiro, Brazil

**GONÇALO CASTRO HENRIQUES
SENIOR RESEARCHERS: ANDRES
PASSARO E PEDRO ENGEL.
TEAM: 2022 DANIEL LENZ,
LAIS KAORI, THIERS FREIRE,
ADRIANE OSSAILLE, LUCA BISPO,
JOÃO VICTOR FRAGA,
VICTOR DE LUCA, PEDRO XAVIER,
RONALDO MENNA,
TAIANE NEPOMUCENO, MIGUEL
FONTES, ANA CLARA MORO &
LUCAS MONSERRAT.**

2012

LAMO is an educational, research and practice laboratory that evelops, manufactures and builds projects. LAMO is part of PROURB Postgraduate Program in Urbanism, Faculty of Architecture and Urbanism of the Federal University of Rio de Janeiro. Integrates design processes, including generation, simulation and manufacturing processes, using algorithmic and parametric design together with digital manufacture and robotics, using subtractive, additive and transformative techniques (robotics, laser and cnc cutting, 3D printing, etc.). LAMO operates in a distributed network with partners from UFRJ, from Brazil and abroad.

FAB LABS TECH MX

@ibrida_org ,@fablabmexico,
@fundacion_arteymundo

Mexico DF, Mexico

**FERNANDA OLIVARES &
EDUARDO RAMÍREZ**

2015

FabLab Tech Mx was created in 2014 as a space for experimenting with materials and digital fabrication processes for artists based on our current context. In 2017, we were certified by Fabacademy for being part of the International FabLab Network. We believe in the Fourth Industrial Revolution, where machines do not only perform a specific task but have become more hybrid in possibilities and are based on phygitality. Fab Lab Tech has become a place where machines are creative and coexist along with human collaboration, where we explore new materials, additive and subtractive techniques as well as educational programs for artists and creatives all over the world.

ROBOT_LAB

Universidad de Los Andes
https://www.youtube.com/watch?v=3uEHhIYmaaM&t=22s

Bogotá, Colombia

DANIELA ATENCIO & CLAUDIO ROSSI

2021

Robot_Lab focuses its attention on two topics associated with the technological emphasis in the research-creation pedagogies of architecture. On the one hand, the design approach from certain tools (software and hardware), specifically concentrated on the interaction with the robotic-arm (computer-controlled), to deepen the implementation of design strategies and methodologies that can amplify the debate on the design practice. On the other, advanced prototyping and hybrid representations as the process of exploration allowing to question disciplinary issues through new techniques and unlock new material capabilities informed by the Latin-American context through a programmed ruination workflow based on a series of translations.

MORFOLAB | UPB

Universidad Pontificia Bolivariana
https://www.upb.edu.co/es/investigacion/nuestro-sistema/grupos/grupo-investigaciones-estudios-diseno-medellin/morfologia-experimental

Medellín, Colombia

DAVID A. TORREBLANCA-DÍAZ & JUAN PABLO VELÁSQUEZ

1997

Since 1997 the Experimental Morphology research line with its Morfolab hotbed of research group have been working on topics such as biomimetics, non-conventional structures, form finding, materials and design, digital fabrication technologies, generative and parametric design and food design. The research line is integrated by a multidisciplinary team, which through experimentation and combination of different tools, techniques, processes and methods propose new paradigms for design, architecture and engineering. Morfolab has been working permanently to include Industrial Design students in research projects, with the aim to acquire their research skills in a constant transfer of knowledge and experiences.

1MAGINARI0 | UFMG

Universidade Federal de Minas Gerais
http://www.1maginari0.art.br/

Belo Horizonte, Brazil

MARÍLIA BERGAMO

2008

Children's Furniture is an activity carried out within the Craft environment of the Faculdade de Arquitetura do Centro Universitário de Belas Artes de São Paulo. It is made with the support of technicians from FabLab and the institution's Carpentry Workshop (Oficina de Marcenaria). In addition, there is a partnership with the company ARAUCO to supply MDF boards to manufacture the prototypes.

ESTUDIO TRUJILLO-PISANTY

Centro de Diseño, Cine y Televisión
http://trujillodiego.com/
@dtpisanty

Mexico DF, Mexico

DIEGO TRUJILLO-PISANTY

2012

Diego Trujillo-Pisanty is an artist, designer and educator from Mexico City working with information both as concept and material. He focuses on the role that information and its related processes play in shaping identity, culture, and politics as well as the individual meaning we assign to them. An important part of Trujillo-Pisanty's practice revolves around information's materiality, often questioning what its tangible components are and how they create, store, transfer and even destroy information. The studio is currently focused on surveying as a performative act, where the very action of recording data 'in the wild' changes our interpretation of it.

VESTIBLES

Independet designer
www.vestibles.cl

Santiago de Chile, Chile

MARIA JOSE RIOS ARAYA

2015

Vestibles is a platform for research, development, and education, which was founded in 2015 and whose proposal consists of bringing people closer to analysis and reflection on the intersection of clothing with new technologies in the space of contemporary culture, with its political, social and economic implications. Vestibles seeks to update, promote, and spread the intersection of disciplines, stating that education itself is changing, because the generation of intersections between disciplines for the development of projects is being promoted by leaps and bounds, a phenomenon that is having an impact on our lives, to settle as part of our daily lives.

PLASMA | UNICAMP

Universidade Estadual de Campinas
https://sites.google.com/unicamp.br/plasma
@plasmaunicamp

Campinas, Brazil

STELAMARIS BERTOLI, BARBARA DE HOLANDA MAIA TEIXEIRA & RAFAEL REMÉDIO

2020

The PLASMA is a coworking space and rapid prototyping laboratory (makerspace) for the community of the University of Campinas (UNICAMP, Brazil). Its creation was an initiative of a group of students and supported by some professors and the rectory. The physical space is a retrofitted laboratory, which the new design aims for it to become a sustainable and perennial collaborative space for the community, encouraging sustainability and maker culture in the long term. PLASMA is already recognized as a space for the development of interdisciplinary projects and exchange between different technologies and the community.

WE-LABS

Independet designer
https://www.peru-pop.com/
@perupop3d

Lima, Peru

EDUARDO ESAINE

2021

WE-labs is a laboratory whose purpose is to learn and teach S.T.E.A.M.
WE are a Think-tank that invests in the development of innovative projects through the use of technology and offers STEAM technology training to companies and institutions.
WE provide joint research services in the development of products or services and our own projects as a result of R+D.
The laboratory specializes in the investigation of new manufacturing methods or digital solutions.

FABLAB UNAL

Universidad Nacional de Colombia
https://www.facebook.com/FabLabUN/

Medellín, Colombia

EDGAR ALONSO MENESES BEDOYA

2013

FABLB UNAL is part of the Faculty of Architecture at the National University of Colombia in Medellín and was created with the support of the Fab Foundation. This is where teaching activities are developed for programs of Architecture, Plastic Arts, Construction, Control Engineering, Physics and Mechanics, among others; research is conducted for the development of products designed by students and research groups; and external works using the CNC Router, 3D printing and laser cutting services are provided for the academic community, as well as the development of social impact projects in the general community.

FABLAB AUSTRAL

Pontificia Universidad Católica de Chile
http://www.fablabaustral.org/
@fablabaustral

Puerto Williams, Chile

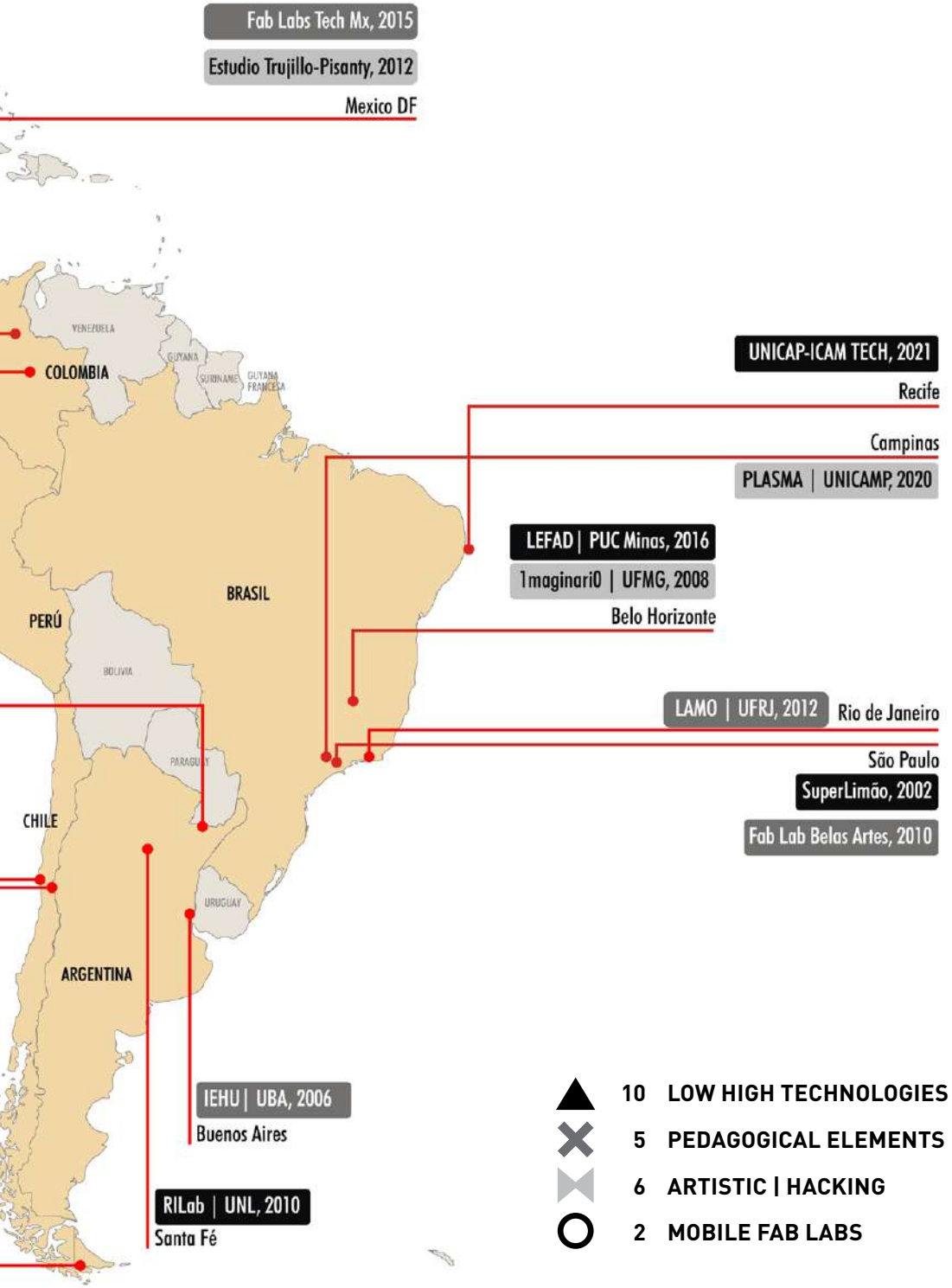
TOMÁS VIVANCO

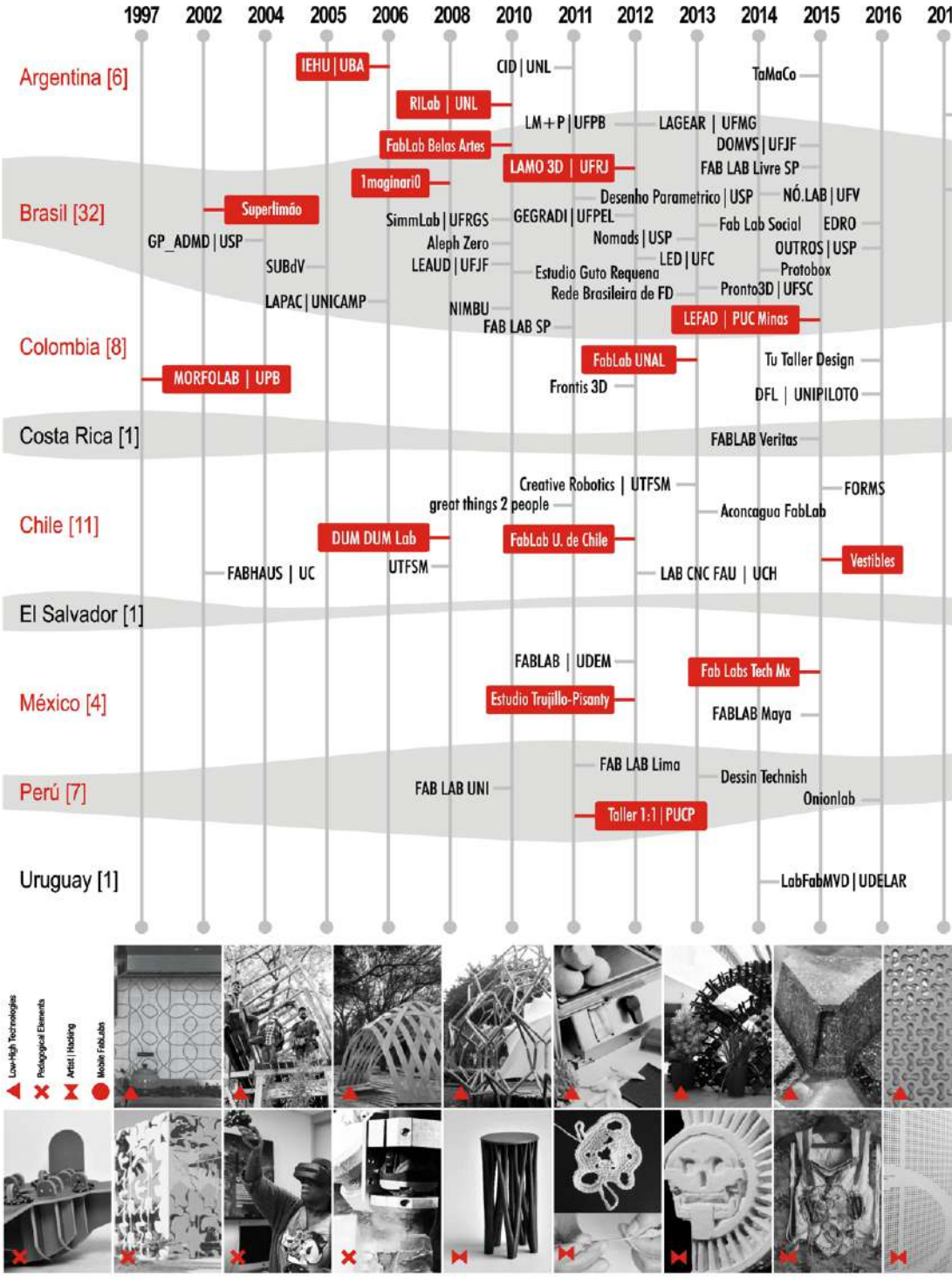
2019

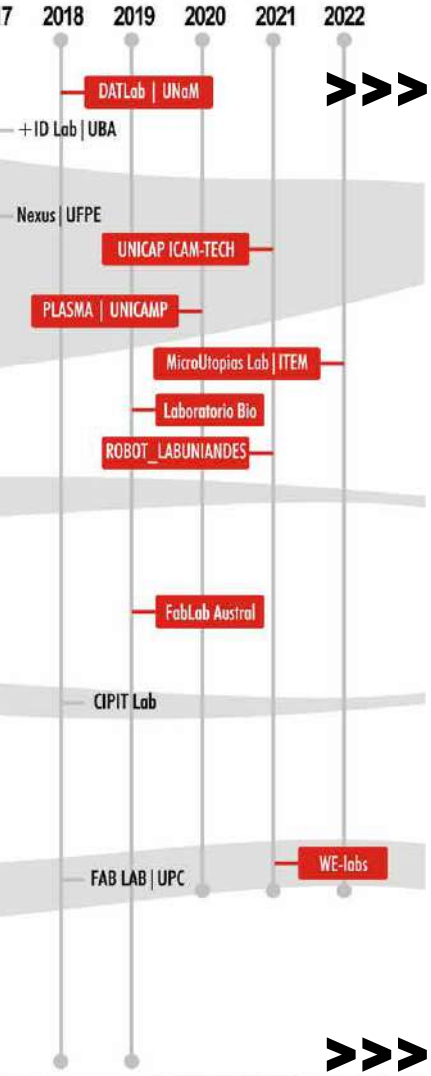
Fab Lab Austral is the southernmost FabLab in the world located at the end of the supply chain. This laboratory promotes a digital culture, based on technological education, sustainability, prototype and research. Its aim is to be a hub of digital culture for local and autonomous creativity and production, with a focus on communities, ecosystems, science, arts, and digital technologies. The lab links local work and needs with global infrastructure and networks promoting resilient fabrication and implementation of meaningful solutions and interventions through ecosystem-oriented design processes. Located in Puerto Williams, the southernmost city in the world, Fab Lab Austral is a project promoted by the Pontificia Universidad Católica de Chile, the Design School UC, the Center for Bits and Atoms of the Massachusetts Institute of Technology and the Fab Foundation.



>>> MAP OF FAB LABS, RESEARCH GROUPS AND STUDIOS IN HOMO FABER 3.0 EXHIBITION


Fab Labs Tech Mx, 2015
Estudio Trujillo-Pisanty, 2012
Mexico DF
VENEZUELA
COLOMBIA
GUYANA
SURINAME
GUYANA FRANCESA
UNICAP-ICAM TECH, 2021
Recife
Campinas
PLASMA | UNICAMP, 2020
LEFAD | PUC Minas, 2016
1maginari0 | UFMG, 2008
Belo Horizonte
BRASIL
PERÚ
BOLIVIA
LAMO | UFRJ, 2012
Rio de Janeiro
São Paulo
SuperLimão, 2002
Fab Lab Belas Artes, 2010
PARAGUAY
CHILE
URUGUAY
ARGENTINA
IEHU | UBA, 2006
Buenos Aires
RILab | UNL, 2010
Santa Fé
10 LOW HIGH TECHNOLOGIES
5 PEDAGOGICAL ELEMENTS
6 ARTISTIC | HACKING
2 MOBILE FAB LABS

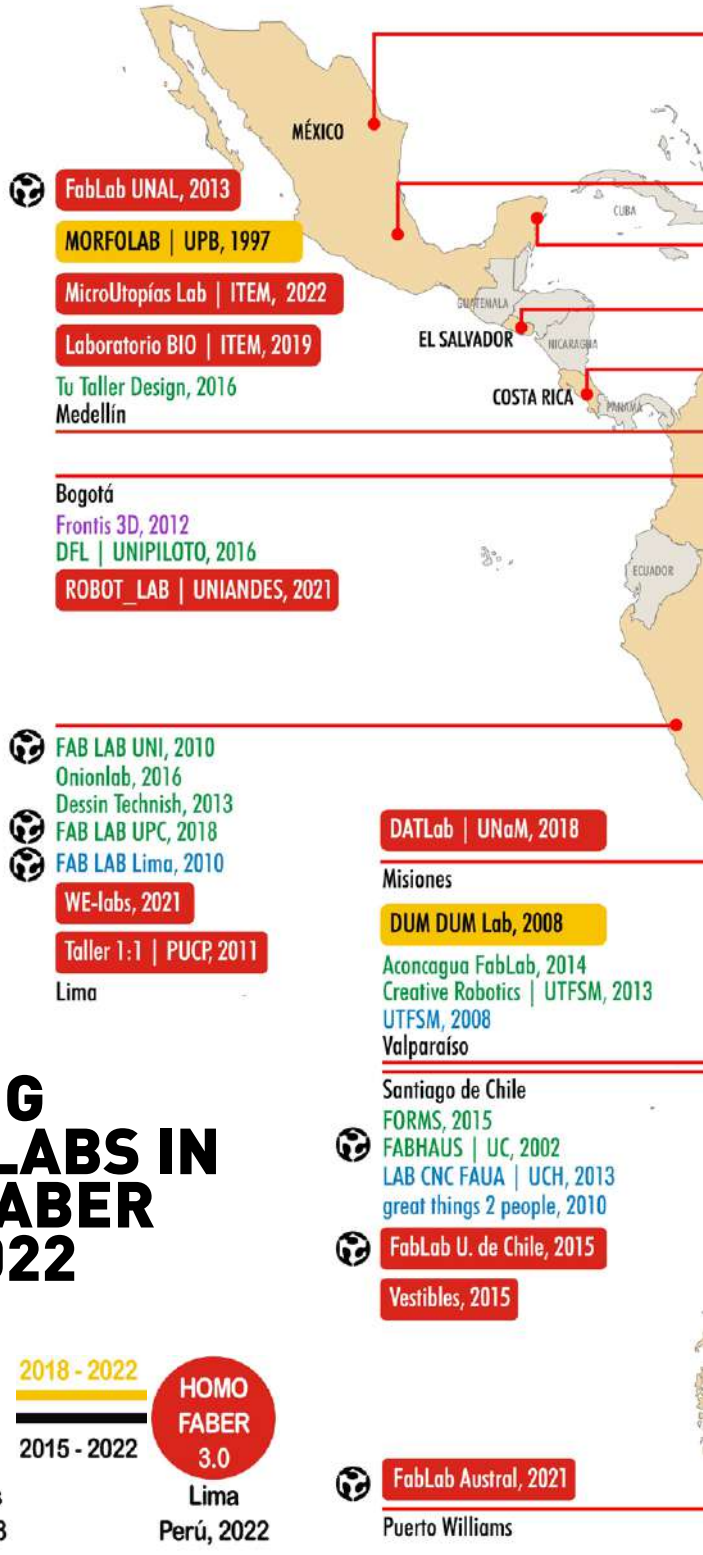

1997
2002
2004
2005
2006
2008
2010
2011
2012
2013
2014
2015
2016
Argentina [6]
IEHU | UBA
CID | UNL
TaMaCo
RILab | UNL
LM + P | UFPB
LAGEAR | UFMG
FabLab Belas Artes
DOMVS | UFJF
LAMO 3D | UFRJ
FAB LAB Livre SP
Brasil [32]
1maginari0
Desenho Parametrico | USP
NÓ.LAB | UFV
Superlimão
SimmLab | UFRGS
GEGRADI | UFPEL
Fab Lab Social
EDRO
GP_ADMD | USP
Aleph Zero
Nomads | USP
OUTROS | USP
SUBdV
LEAUD | UFJF
LED | UFC
Estudio Guto Requena
Protobox
LAPAC | UNICAMP
Rede Brasileira de FD
Pronto3D | UFSC
NIMBU
LEFAD | PUC Minas
FAB LAB SP
Colombia [8]
FabLab UNAL
Tu Taller Design
MORFOLAB | UPB
Frontis 3D
DFL | UNIPILOTO
Costa Rica [1]
FABLAB Veritas
Creative Robotics | UTFSM
FORMS
great things 2 people
Chile [11]
Aconcagua FabLab
DUM DUM Lab
FabLab U. de Chile
Vestibles
FABHAUS | UC
UTFSM
LAB CNC FAU | UCH
El Salvador [1]
FABLAB | UDEM
Fab Labs Tech Mx
México [4]
Estudio Trujillo-Pisanty
FABLAB Maya
FAB LAB Lima
Dessin Technish
Perú [7]
FAB LAB UNI
Onionlab
Taller 1:1 | PUCP
Uruguay [1]
LabFabMVD | UDELAR
Low-High Technologies
Pedagogical Elements
Artist | Hacking
Mobile FabLabs



>>> **TIMELINE. 9 COUNTRIES AND 71 LABORATORIES IN HOMO FABER EXHIBITIONS**

>>> **HOMO FABER 3.0 IMAGES SELECTION BY LABORATORY**



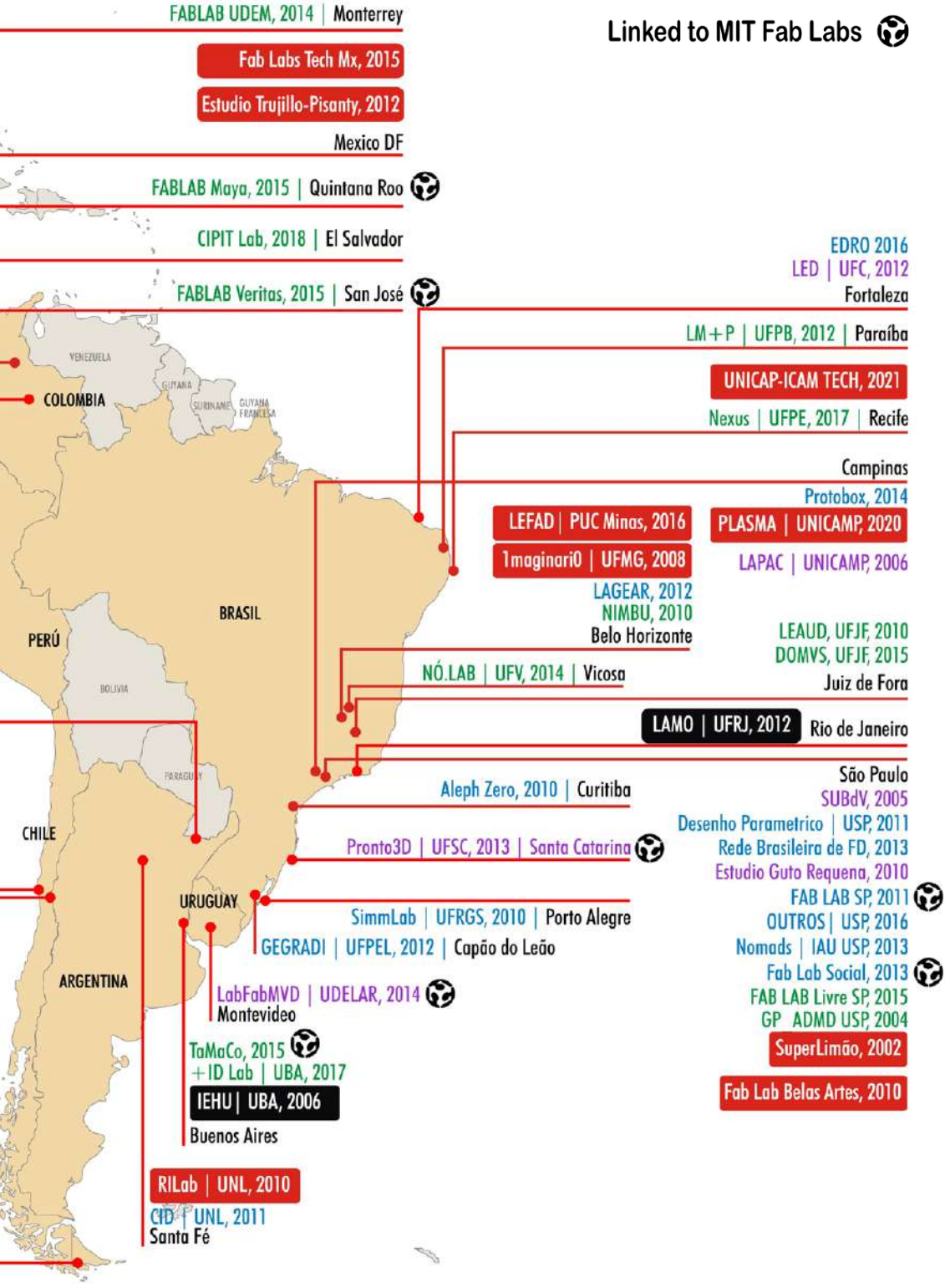


>>> MAPPING 71 FAB LABS IN HOMO FABER 2015-2022

HOMO FABER 1.0 — 2015 - 2018 / 2015 - 2022 — São Paulo, Brazil, 2015

HOMO FABER 2.0 — 2018 - 2022 / 2015 - 2022 — São Carlos, Brazil, 2018

HOMO FABER 3.0 — Lima, Perú, 2022


Linked to MIT Fab Labs
FABLAB UDEM, 2014 | Monterrey
Fab Labs Tech Mx, 2015
Estudio Trujillo-Pisanty, 2012
Mexico DF
FABLAB Maya, 2015 | Quintana Roo
CIPIT Lab, 2018 | El Salvador
FABLAB Veritas, 2015 | San José
EDRO 2016
LED | UFC, 2012
Fortaleza
LM+P | UFPB, 2012 | Paraíba
UNICAP-ICAM TECH, 2021
Nexus | UFPE, 2017 | Recife
Campinas
Protobox, 2014
LEFAD | PUC Minas, 2016
PLASMA | UNICAMP, 2020
1maginari0 | UFMG, 2008
LAPAC | UNICAMP, 2006
LAGEAR, 2012
NIMBU, 2010
Belo Horizonte
LEAUD, UFJF, 2010
DOMVS, UFJF, 2015
Juiz de Fora
NÓ.LAB | UFV, 2014 | Vicosa
LAMO | UFRJ, 2012
Rio de Janeiro
São Paulo
Aleph Zero, 2010 | Curitiba
SUBdV, 2005
Desenho Parametrico | USP, 2011
Pronto3D | UFSC, 2013 | Santa Catarina
Rede Brasileira de FD, 2013
Estudio Guto Requena, 2010
FAB LAB SP, 2011
OUTROS | USP, 2016
SimmLab | UFRGS, 2010 | Porto Alegre
Nomads | IAU USP, 2013
GEGRADI | UFPEL, 2012 | Capão do Leão
Fab Lab Social, 2013
FAB LAB Livre SP, 2015
LabFabMVD | UDELAR, 2014
Montevideo
GP ADMD USP, 2004
SuperLimão, 2002
TaMaCo, 2015
+ID Lab | UBA, 2017
IEHU | UBA, 2006
Buenos Aires
Fab Lab Belas Artes, 2010
RILab | UNL, 2010
CID | UNL, 2011
Santa Fé
VENEZUELA
GUYANA
SURINAME
GUYANA FRANCESA
COLOMBIA
BRASIL
PERÚ
BOLIVIA
PARAGUAY
CHILE
URUGUAY
ARGENTINA

HOMOFABER 3.0:
APPROPRIATIONS OF DIGITAL FABRICATION FROM LATIN AMERICA >>> 2022

TECHNICAL INFORMATION >>>

CHAIR OF SIGRADI 2022. CRITICAL APPROPRIATIONS
Pablo C. Herrera
Universidad Peruana de Ciencias Aplicadas

HOMO FABER 3.0 CURATORS
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Universidade de São Paulo, Brasil

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Maria Luisa Pineda (Exhibition Design)
Noelia Muñante (Exhibition Design)
Katherine Muñante Bazan {Communication)
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720.2840285 HERR

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Homo Faber 3.0. Appropriation of Digital Fabrication from Latin America is inspired by local challenges, vulnerable communities, and semi-peripheral geographies, from the creative strategies that drive pioneers, developers, and end-users in our region with digital fabrication, as an ally of their processes of design, in any of its forms.

Homo Faber 3.0 explores the domestication, interpretation, and application of digital fabrication in the region, which stimulates the logic of technological appropriation of Homo Faber, beyond simple curiosity, automation, and personalization, to distance itself from the modest technological manipulation of Homo Fabricatus. Appropriation as a critical practice makes visible processes that create the foundations of a digital culture that establishes local agendas for other geographies, implementing technical solutions in synergy with situated ecosystems.

Homo Faber 3.0 reveal inspirations and synthesize thoughts from making objects, spaces, and environments.