Eldy Lazaro
Portfolio 2020

Eldy is a Peruvian designer and Master of Fine Arts in Design candidate 2020 at University of California Davis. She has a Bachelor in Architecture and Urban Planning from San Pedro University (Peru), and she is a Fabricademy alumni 2017-2018.

Eldy's innovative work and research are at the intersection of Biodesign, Human-Computer Interaction, and Wearable Technology. Eldy's interdisciplinary study has led her to discover methods in sustainable prototyping with digital fabrication, interactive objects, and wearable technology.

Contact
e-mail: eldylazaro@gmail.com
phone: +1 530 979 3344
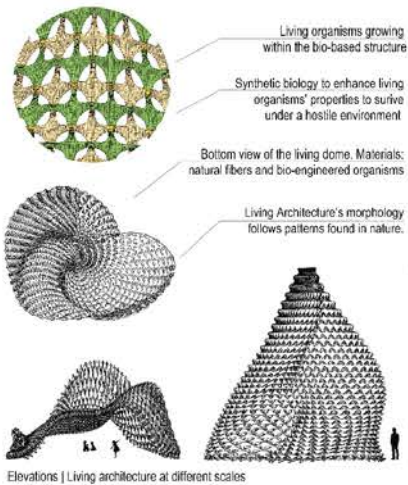**website:** www.eldylazaro.com

Content

Living Architecture for the Hostile Environment

Humans and other natural ecosystems are suffering the consequences of global climate change. Some natural climate cycles partially influence rainfall reduction and desert expansion. Plants, animals and other organisms that live in deserts have evolved to survive harsh conditions, scarce water and barren landscapes; however, not all of them are able to adapt to extreme conditions quickly and those are the ones that become extinct.

Drought will become worse over the time and the lack of water makes desert landscapes vulnerable. Climate change is reducing snowpacks and melting glaciers that provide freshwater to desert communities. Increasing evaporation and dust storms are pushing deserts out into communities at their edges. This desertification is exacerbated by human exploitation of ecosystems that border deserts, causing land degradation, soil erosion and sterility, and a loss of biodiversity.

The Living Architecture for the Hostile Environment becomes a shelter for species that struggle transitioning to extreme conditions. The living architecture's structure is made out of bio-based materials to allow it's degradation over time while the species adapt to a hostile environment. These growing interventions will integrate with nature and create microclimates that support life biodiversity.
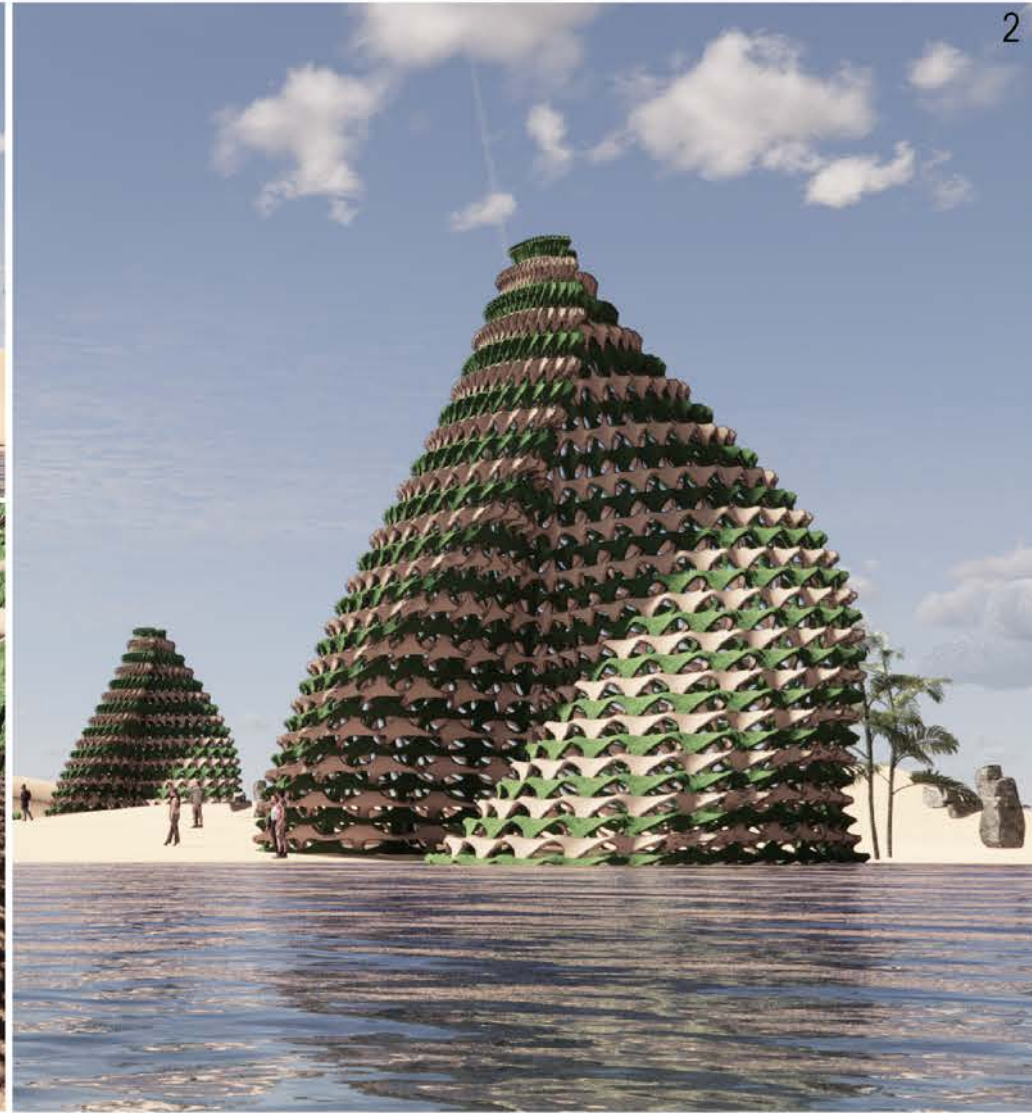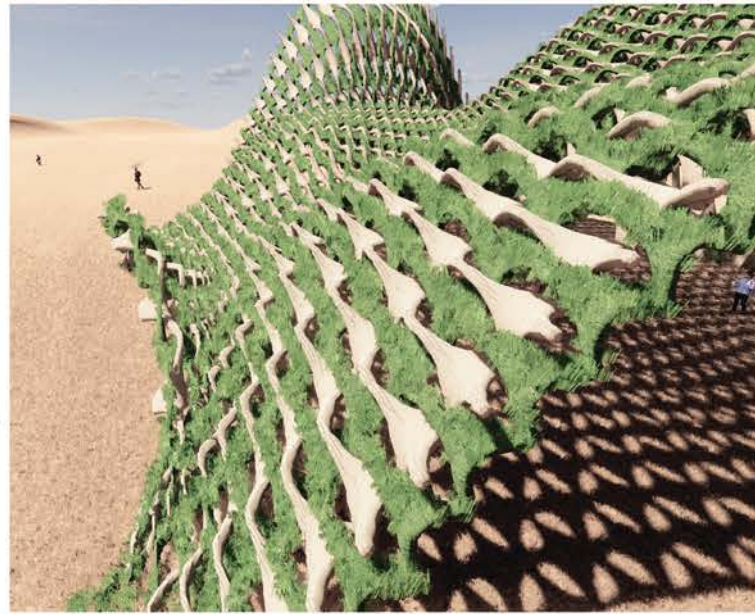
Living organisms growing within the bio-based structure

Synthetic biology to enhance living organisms' properties to survive under a hostile environment

Bottom view of the living dome. Materials: natural fibers and bio-engineered organisms

Living Architecture's morphology follows patterns found in nature

26ft.

6ft.

Elevations | Living architecture at different scales

[Tool-kits] +	[Visualization] +	[Environment]
Rhinoceros	Rhinoceros	Hostile
Grasshopper	Endscape	Global warming
Weaverbird	Adobe Illustrator	Drought
Box Morph	Adobe InDesign	Scarcity

MFA in Design

Eldy's thesis project investigates the environmental impacts of digital fabrication (i.e. 3D printers, laser cutters). Her main research contributions are as follows:

Growable Interfaces: exploring bio-based materials as a substrate for physical computing by creating 5 interactive objects, and 3 wearable technologies.

Bio-Fabrication: designers as manufacturers of their own prototyping material for digital fabrication by developing a process for growing mycelium-composite sheets for laser cutting, and 3D molding with mycelium.

Sustainable Prototyping with Bio-based Materials: introduced sustainable prototyping for digital fabrication with bio-based materials based on surveys to 60 advanced users, 10 interviews with design experts, and two workshops with 22 design students.

Digital Fabrication Life Cycle: adapting the Life Cycle Analysis (LCA) method to support designers' decision making for sustainable prototyping with digital fabrication. This cycle reveals the environmental impact of each phase in the cycle (materials and manufacturing, transportation, fabrication, and end of life).

ECO-IMPACT Calculator: developed a tool that quantitatively measures designers' environmental impact within each phase of the Digital Fabrication Life Cycle.

Eldy's thesis project was presented in the following academic conferences and artistic venues: ISWC'19 (London), UbiComp'19 (London), EduCHI'20-virtual (Hawaii), SelfSustainableCHI'20-virtual (Hawaii), DIS'20-to appear (Eindhoven), Rome Fashion Week-Altaroma 2020 (Rome), 3D Fashion Week 2020 (Lima), MakerFaire'19 (San Mateo), MIT Wearable Biotech and Growable Interfaces'20 (Boston).

Eldy Lazaro

UC DAVIS **DESIGN** MFA EXHIBITION 2020
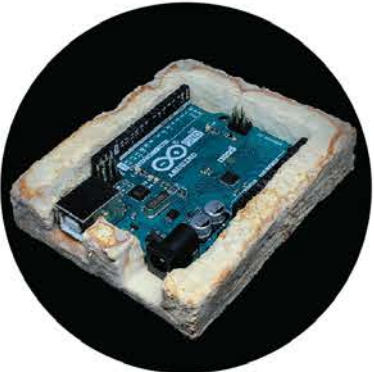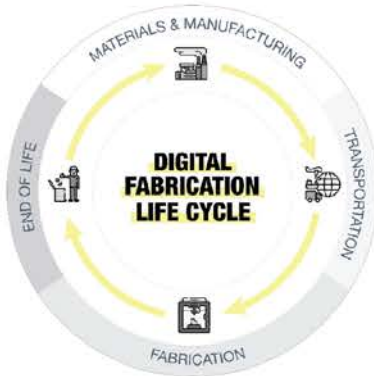
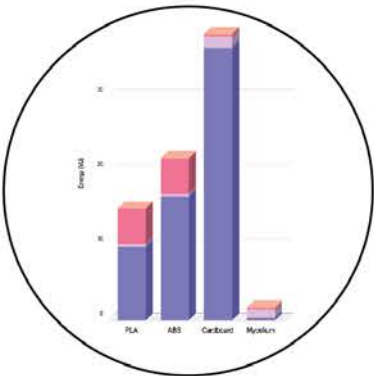Photography: **Margot Uchicua**
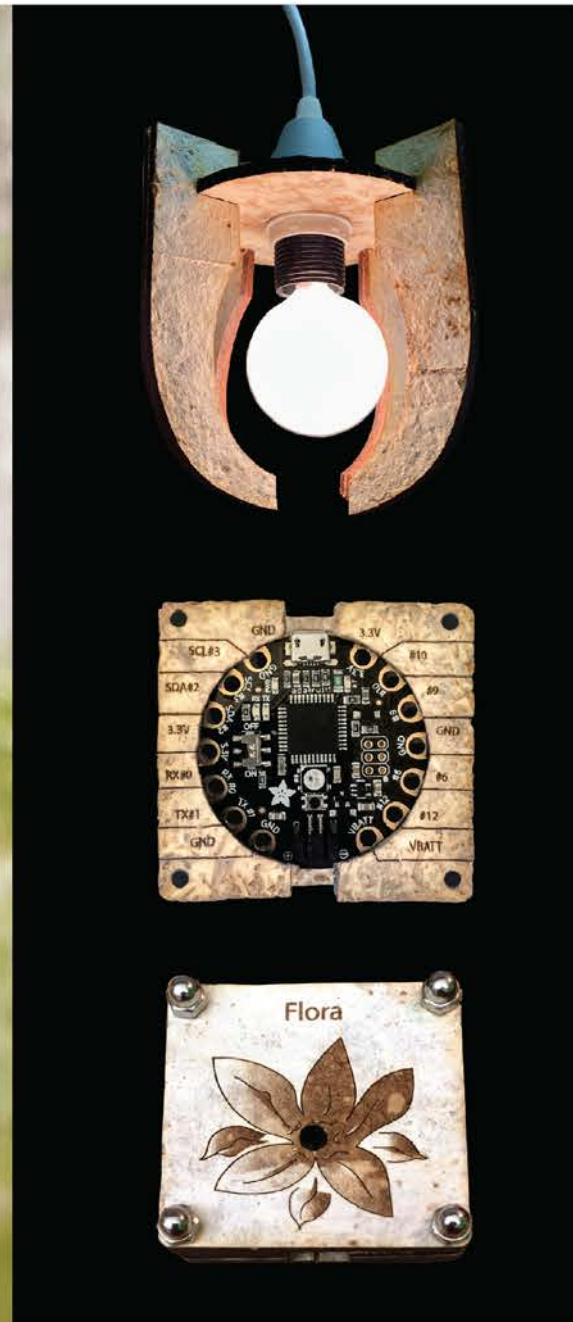
MFA in Design

GROWABLE INTERFACES
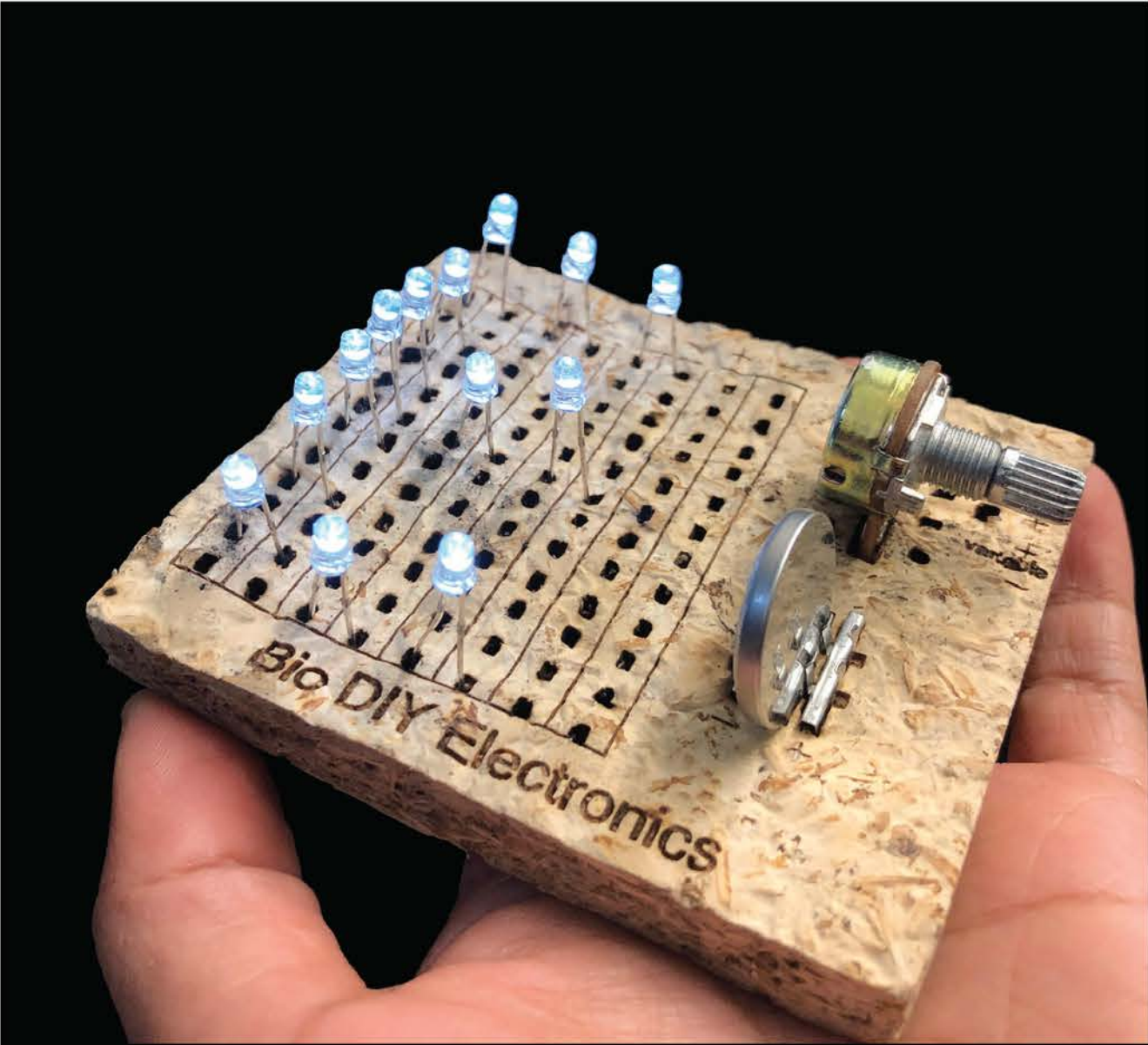

BIO-FABRICATION

SUSTAINABLE PROTOTYPING
with bio-based materials

DIGITAL FABRICATION LIFE CYCLE

ECO-IMPACT CALCULATOR

Sustainable Prototyping with bio-based materials: Mycelium breadboard (laser cut with embedded electronics) grown at the UC Davis Eco Design Lab and Interactive Organisms Lab.
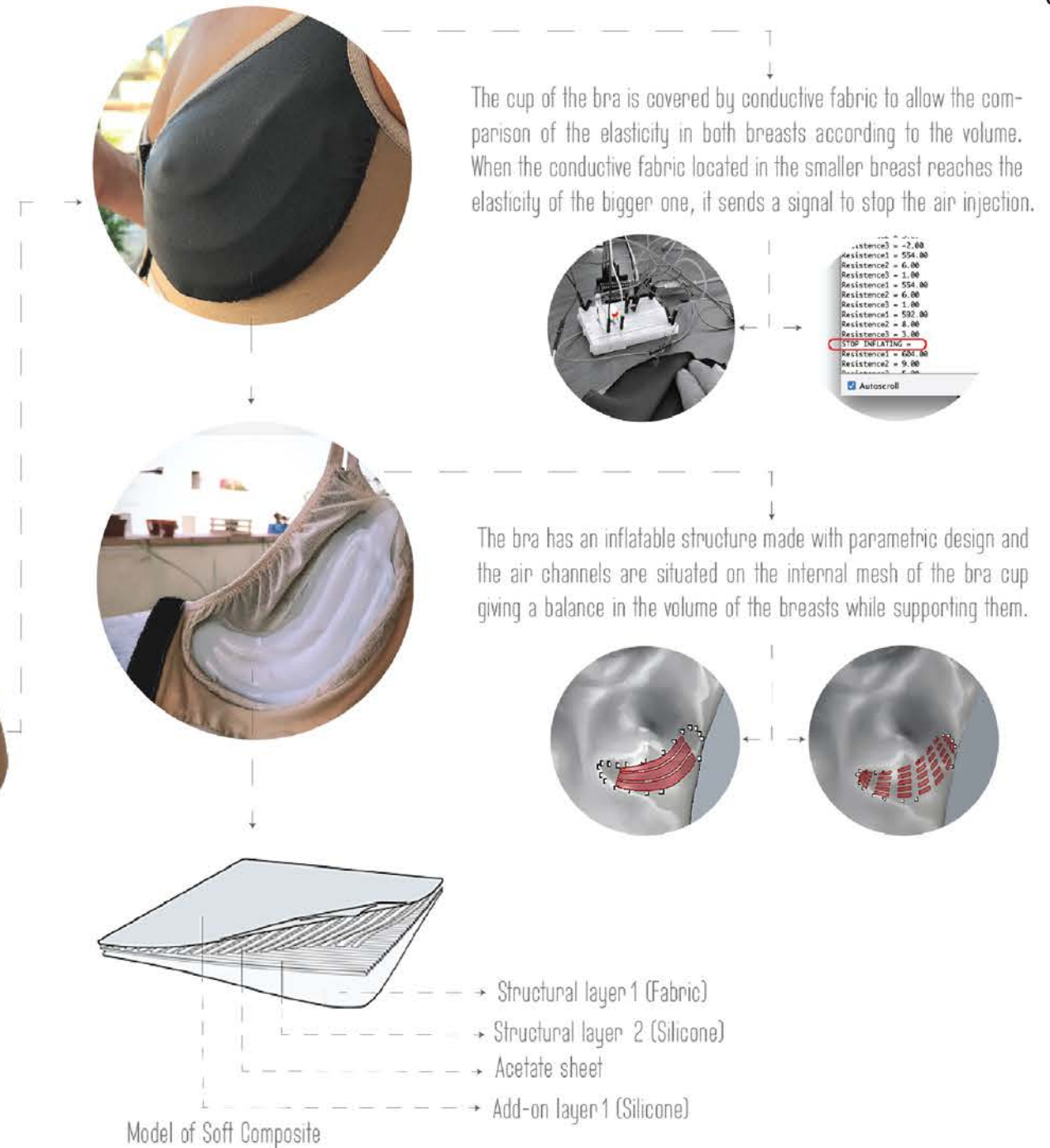
AUTOADJUSTABLE | BRA

The problem

The current market offers standard measures of bras, which do not adapt to the real measurements of each woman.

The proposal

The autoadjustable bra was inspired by women who have visible breast asymmetry.

It incorporates new technologies and parametric design to customize the air channels of the internal mesh of the bra cup to balance the volume of the breasts while supporting them, eliminating the metal underwire bra use that causes health problems long term.

The cup of the bra is covered by conductive fabric to allow the comparison of the elasticity in both breasts according to the volume. When the conductive fabric located in the smaller breast reaches the elasticity of the bigger one, it sends a signal to stop the air injection.

The bra has an inflatable structure made with parametric design and the air channels are situated on the internal mesh of the bra cup giving a balance in the volume of the breasts while supporting them.

Model of Soft Composite

→ Structural layer 1 (Fabric)
→ Structural layer 2 (Silicone)
→ Acetate sheet
→ Add-on layer 1 (Silicone)

AUTOADJUSTABLE | BRA

Digital bodies

New digital tools that complement hand tools in order to design, represent, make, and modify the human figure that can be used as a canvas for creation.
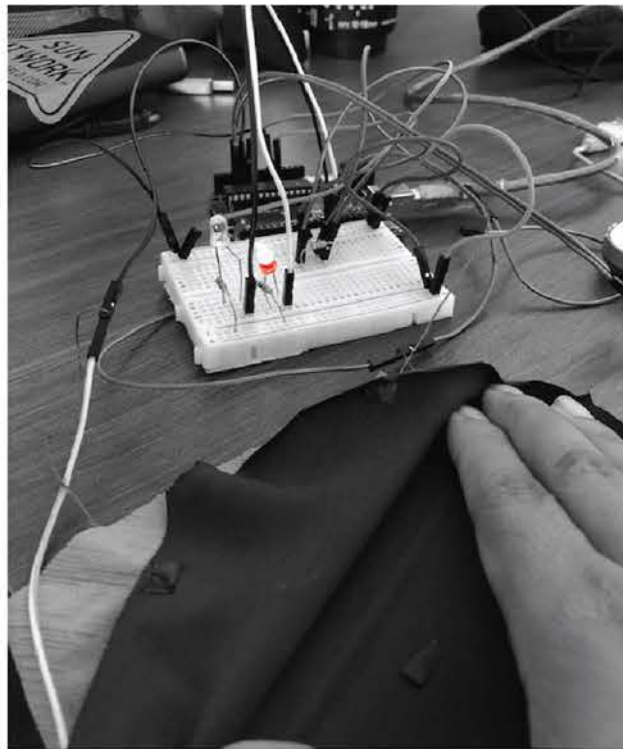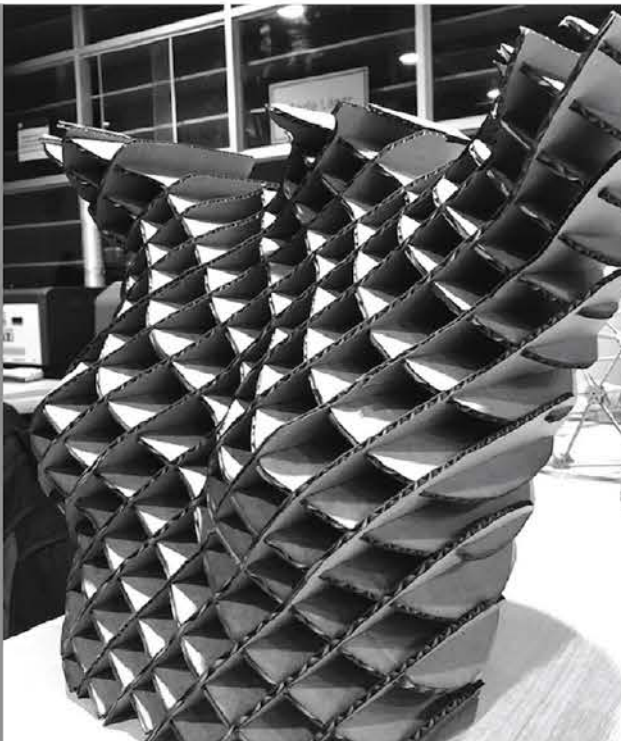
Computational Couture

Explore computational design methods towards a new reinterpretation of cloths, garments and accessories for fashion design, inspired by a new digital design methodology.
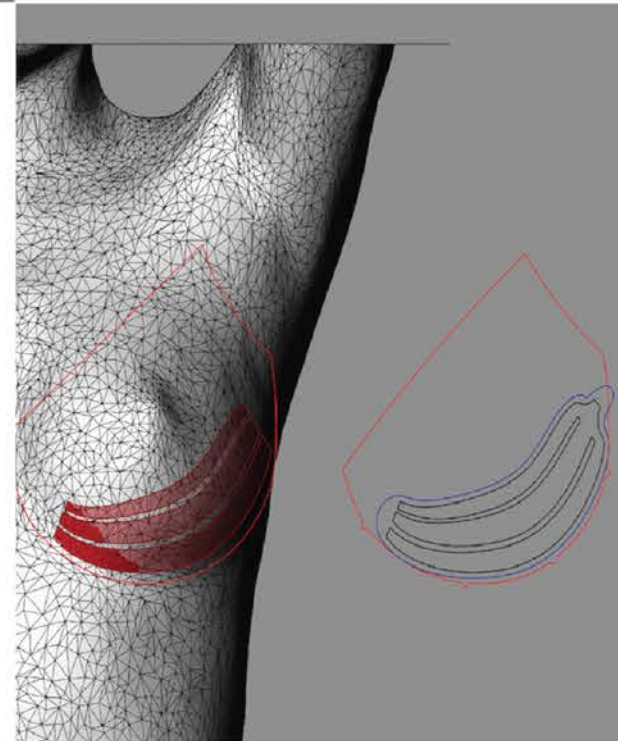
Technologies Used

E-Textiles & Wearables

An overview of the field of electronic textiles, example works in the field as well as materials and technical developments that have made these projects possible. Go into details on different techniques for making soft/flexible fabric circuits.

Soft robotics

Study of a specific field in robotics: the soft robotics. Unlike rigid robots we are mostly used to, soft bodied robots have similarities and performance characteristics similar to living. organisms or the human body.

Eldy Lazaro
Fabricademy, Lima 2017-18

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CREATIVE SPACE

Ocean Woman

LA MUJER OCEANO

Turtle Woman

LA MUJER TORTUGA
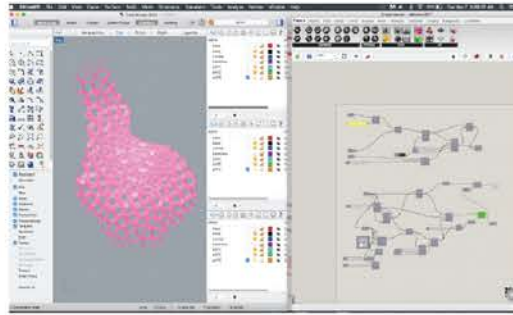
Design and make the shoulder piece for the garment.
This piece was inspired by the shape created by the reflection of the light in the bottom of the sea.
Programs used: Rhinoceros and grasshopper.
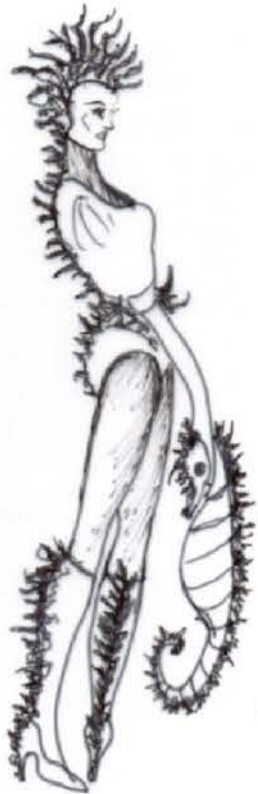**Technologies used**: 3D printing.

Role

Design and make the garment using veneer and leather.
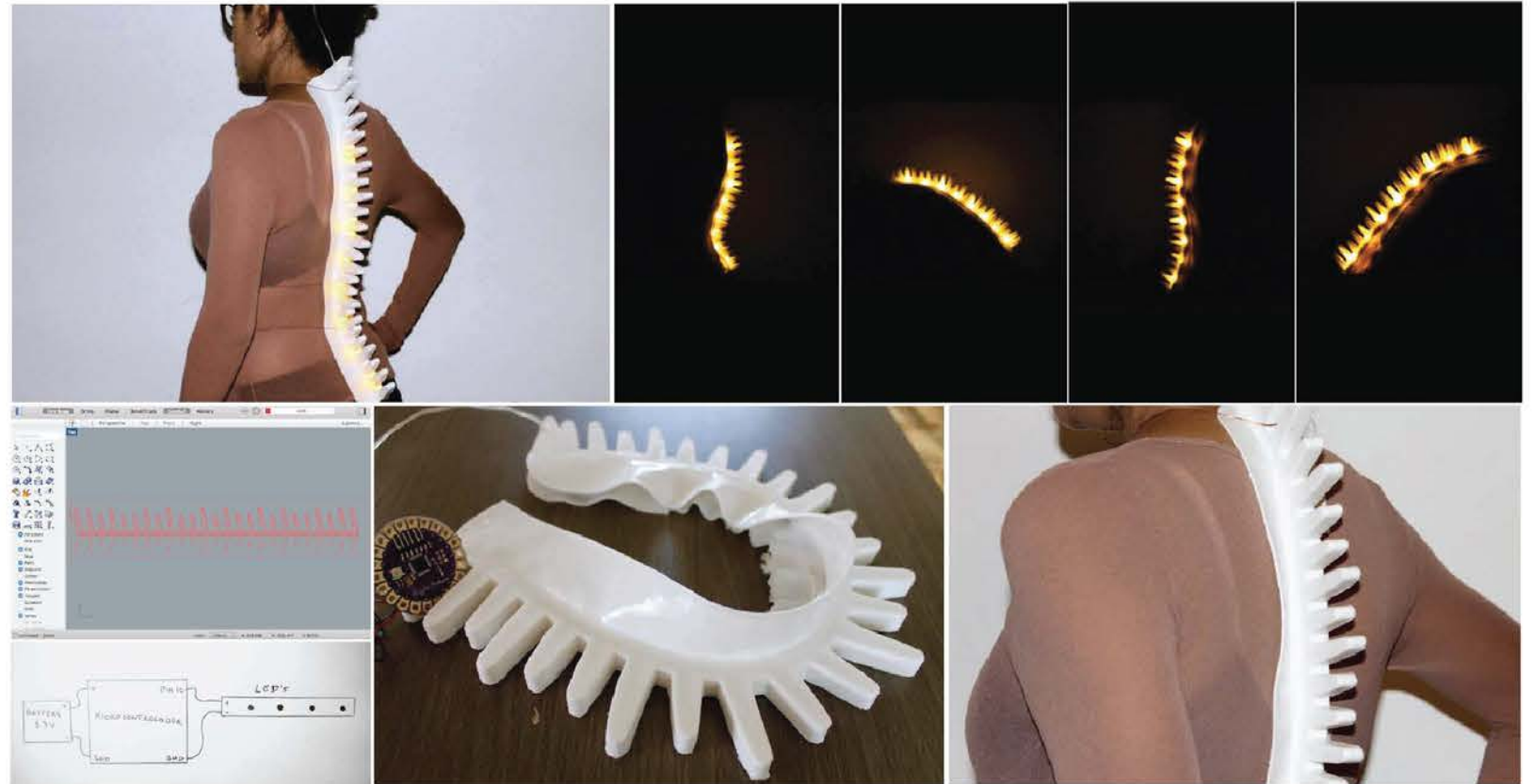**Programs used**: Rhinoceros and grasshopper.
Technologies used: Laser cutting.

December, 2017

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CREATIVE SPACE

FASHION COLLECTION

Seahorse Woman

CABALLITO DE MAR.

Role

Design and work with sofrobotics to create a flexible piece made with silicone and making it interactive by using a lilypad as a microcontroller and a sensor to make the lights blink following the music bass.

Programs used: Rhinoceros and arduino.

Technologies used: Softrobotics, electronics and laser cutting.

December, 2017

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CREATIVE SPACE

FASHION COLLECTION

Coral Woman

Octopus Woman

PULPO - IRENE BAÑO.
BOTONES - CHAPITAS-HOMBRE

Role
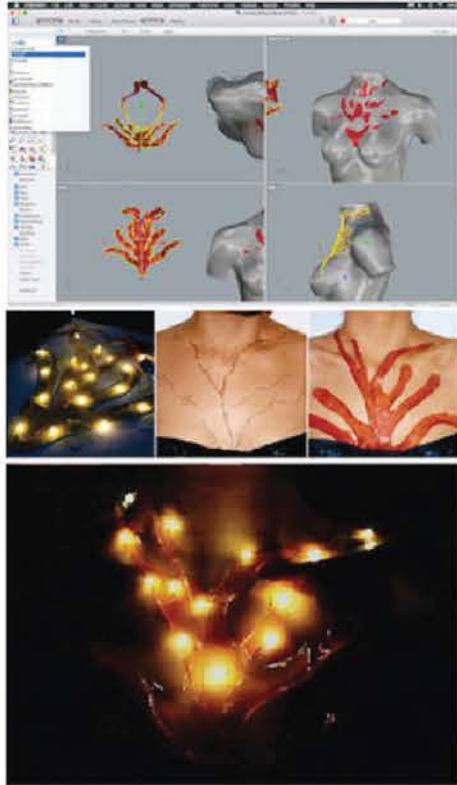
Design and make the necklace for this piece.
The diversity in colors that corals have, inspired me to create an interactive piece.
I made a skin electronics using bioplastics with electronics components on it.
Programs used: Rhinoceros, arduino for programming the electronics.
Technologies used: Laser cutting

Design and make the artistic piece over the shoulders, simulating the tentacles and suckers of the octopus.
Programs used: Rhinoceros
Technologies used: Laser cutting, thermo forming

November, 2017

FASHION COLLECTION

Starfish Woman
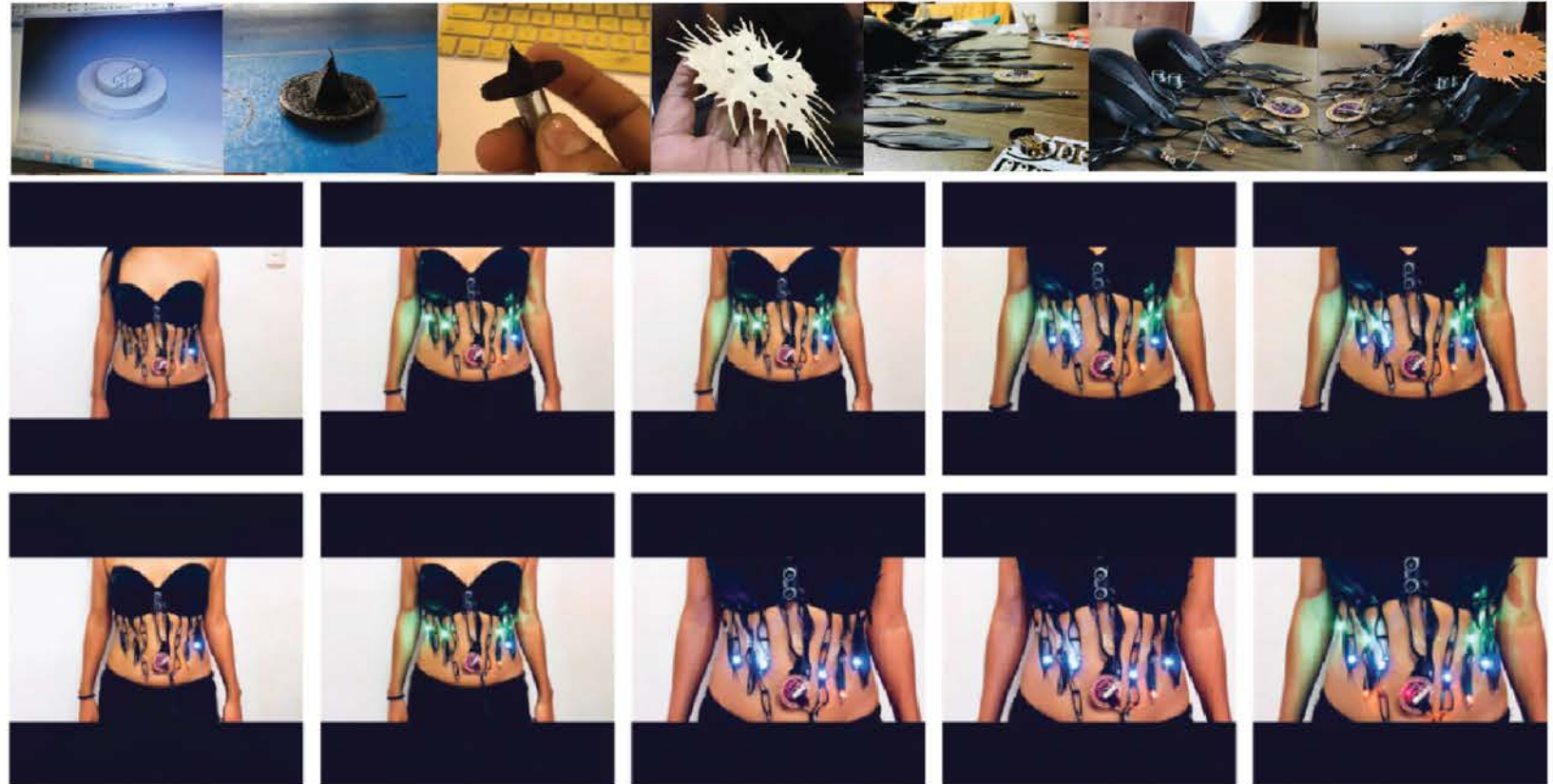
Role

E-textiles by using a lilypad as a microcontroller and a ultrasonic sensor to interact with distances while wearing the garment. The bra has a rotative piece in the middle on the bra cup that starts spinning when a person gets closer.

Programs used: Rhinoceros and Arduino.

Technologies used: E-textiles, 3D printing and laser cutting.

December, 2017

em
poWer
CREATIVE SPACE

FASHION COLLECTION

Octopus Woman

PULPO - TRENE BRAID
BUTONES - CHAPITAS-ALAMBRE

Role

E-textiles by using some electronics components to create an interactive garment. Use an ATtiny45 as a micro controller for programming the sensors used.
Programs used: Arduino, Eagle and Fab modules.
Technologies used: PCB milling, electronics and laser cutting.

December, 2017

INTERIOR DESIGN

Interior Design
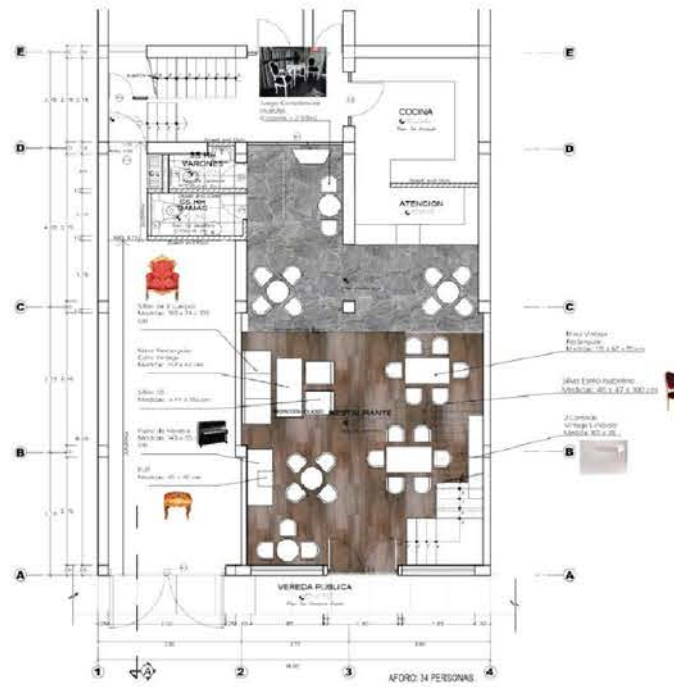
First Floor Plan
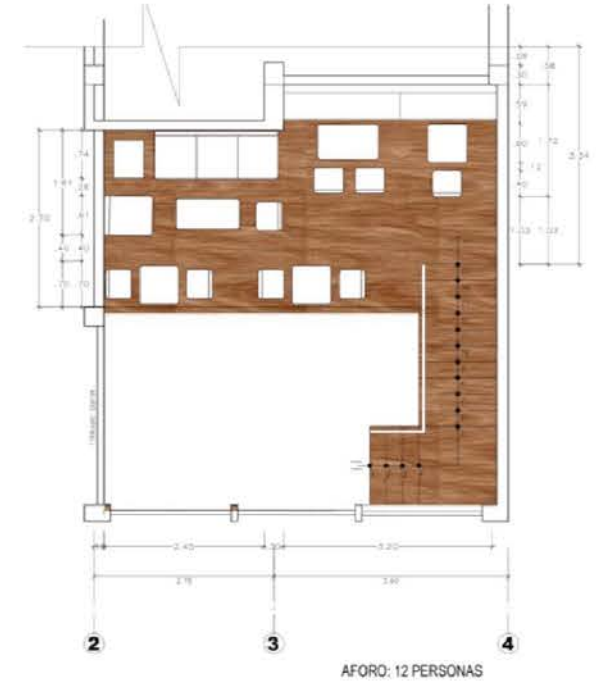
Mezzanine Plan

Views

Pantone colors

Role

Design and decorate a Restautant-Cafe based on a vintage and fancy style for a client in Lima, Peru.
Programs used: Rhinoceros and 3Dmax.
Technologies used: 3D modeling and rendering.

January, 2018

WORKSHOP

Tumi Lamp

Interactive lamp that allows children to learn basic electronics while using a sound sensor and programming it with arduino. Children interact with the lamp through claps or whistles that turn it on or turn it off. The design of the lamp was inspired by a ceremonial tool of Inca sacrifice (Tumi) because this workshop was part of a cultural workshop in China.

Role

Design, develop and give the complete workshop for kids to learn about basic electronics using a sound sensor, programming it, and assemblying the Tumi lamp which was laser cut during the FAB 12, event that took place in Shenzhen, China.

Workshop development
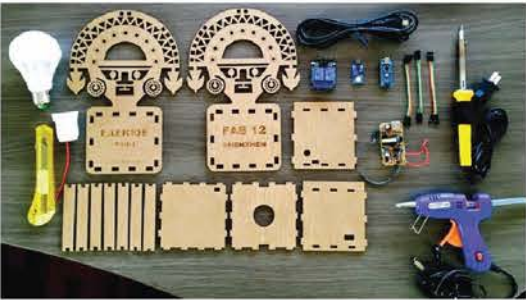
KIT - Tumi Lamp
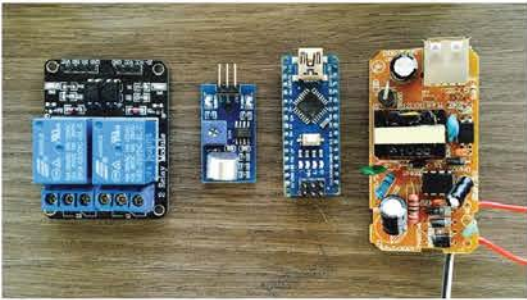
Electronic components (arduino programming)

Tumi Lamp

August, 2016

LUZ Y CULTURA

Por Eldy Lázaro Vásquez
Fab Lab Lima

¡Acércate a la tecnología y conoce la cultura inca haciendo tu propia lámpara! En este taller, aprenderás el uso de componentes electrónicos básicos al fabricar un lámpara en forma de la Piedra de los doce ángulos. También aprenderás de realidad aumentada, mientras descubres la historia detrás de los símbolos de la cultura andina.

Domingo 6 de agosto
10:00hrs a 14:00hrs
Fab Lab Móvil Aconcagua 1

Augmented reality with processing

WORKSHOP

Light & Culture

Involve children in technology by making a lamp. The objective of the workshop is for children to learn to use basic electronic components, to have an approach to augmented reality and to make children discover the history behind the symbols of the Andean culture. The design of the lamp was inspired by the twelve-angled stone located in Cusco, Peru.

Role

Design, develop and give the complete workshop for kids to learn about basic electronics, programming, augmented reality and digital fabrication during assemblying this laser cut lamp, during the FAB 13 (Santiago, Chile).

Electronics (arduino)   Workshop development

INNATUR_2, SPAIN

Project development

Open ideas competition seeking for innovative, cutting-edge, contemporary, proposals, committed to a strategy of implementing architecture in a natural environment.

Approaches should point to find synergies between nature and the building itself.

Role

Design and development of my proposal not only as an idea for this contest but also finding a real application in a natural area located in my hometown Chimbote, Peru. This was also my thesis project to obtain my bachellors degree in architecture.

Programs used: Autocad and 3Dmax+Vray.

Technologies used: 3D modeling and rendering.

December, 2013

CONCEPT:

Following the andean tradition and based on people's beliefs in Apus, which mean god in quechua language. The building is named ILLAPA (The God of Weather) and it wants to regenerate The Andes that has been devastated in different areas because of the global warm. Therefore, the building becomes a regenerative machine of cold habitats and it walks along The Andes identifying the most affected areas, those that will be intervened, regenerated and recuperated as the same way that Illapa does naturally.

0652

0652

GREEN HOUSE AND CONTROL CENTER

HOUSE'S SEEDS BANK

HOTEL'S CENTRAL HALL & ACOMODATIONS

ROAD PLAN AND CONNNECTIONS

0 50 100 150 200

VIEW OF INYECTORS

Delumidifying
Greenhouse
Seed's Bank
Hotels
Secundary access

Laboratory
High Density Housing
Media Density Housing
Hotels-Central Hall Commerce
Engine Room
Inyector and Principal Access

FUCTIONS

CONTEST

EVOLO 2017, USA
Skyscraper Competition

Recogition of visionary ideas for building high-projects that through the novel novel use of technology, materials, programs, aesthetics, and spatial organizations, challenge the way we understand vertical architecture and its relationship with the natural and built environments.

Role

I was part of the research team about which technologies are the best to apply in this skyscraper. Develop the idea till the building become sustainable and finally making the architectural program.

Programs used: Rhinoceros and 3Dmax+Vray.
Technologies used: 3D modeling and rendering.
The team: Daniel Iturrizaga, Carlos Zapata, Indira Almonacid, Harry Orsos, Daniel Bermudez, Cristian Palomino, Gabriela Mejia, Michael Hutado, Victor Ramirez, Dario Ccaccya, Ernesto Ramirez, Johel Rodriguez and Eldy Lazaro.

February, 2017