

2023 edition

Postgraduate Diploma

Fab Academy Barcelona

APPLICATIONS AND IMPLICATIONS
OF DIGITAL FABRICATION

Introduction

**PROTOTYPE (ALMOST) ANYTHING:
AN IMMERSIVE, INTENSIVE, FAST-
PACED POSTGRADUATE TRAINING
IN DIGITAL FABRICATION.**

Learn the different tools, skills and machines needed for hardware development and their applications and implications. Collaborate locally with a vibrant community of teachers and students and connect with peers from all over the world in our Global Campus.

CONTENT

04 At a glance

Keywords

08 What is Fab Academy?

The Global Classroom

The Program

The Learning Goals

The Technical Competences

The Schedule

The Journey

Faculty & Instructors

20 Who can join?

22 Professional Opportunities

24 Students Projects

What our Alumni say

28 Why Fab Lab Barcelona?

Barcelona City

32 Contact Us

At a glance

The Postgraduate Diploma in Fab Academy BCN is granted by the School of Professional and Executive Development at the Polytechnic University of Catalonia (UPC) – European Higher Education Area (EHEA).

Objectives

To provide technical knowledge with a learn-by-doing empowering method.

To develop a range of “soft” skills with a multidisciplinary approach.

To better adapt to the changing global environments .

To tackle disruptive technologies, materials and processes applied to fast prototyping and hardware design

To encourage critical thinking and entrepreneurial spirit.

To foster new hybrid careers.



Course Length

6+ months
Mid January to end
June/beginning July
2023
(Final dates to be
confirmed)

Campus

Fab Lab Barcelona
at IAAC, Institute for
Advanced Architecture
of Catalonia

Edition

15th Edition

Credits

45 ECTS

Tuition Fee

7500€

Language

English

Keywords

RAPID
PROTOTYPING

HARDWARE
ACCELERATION

DIY/DWO

MAKER
MOVEMENT

DIGITAL
FABRICATION

OPEN
SOURCE

PROJECT
MANAGEMENT

FAB
LITERACY

DISTRIBUTED
EDUCATION

What is Fab Academy?

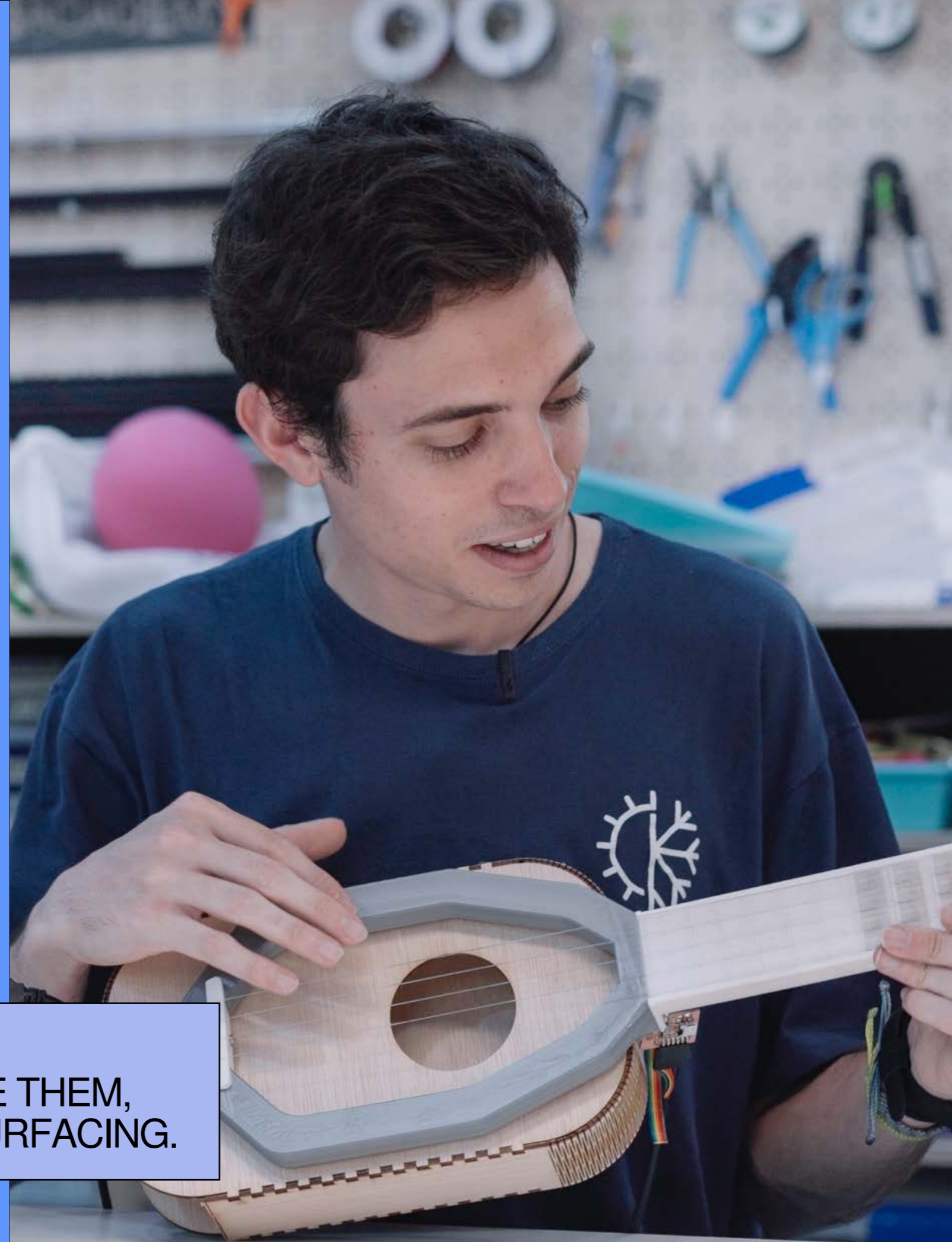
The Fab Academy is a fast-paced, hands-on learning experience where students learn rapid-prototyping by planning and executing a new project each week, resulting in a personal portfolio of technical accomplishments. It is an intensive five-month program that teaches how to use digital fabrication tools and machines. Students focus on personal fabrication, prototyping ideas into products, making stuff locally to become active participants in sustainable cities and communities globally. This is the chance to see how bits become atoms, how ideas can impact the real world, and how new challenges are tackled.

The distributed educational experience of the Fab Lab Network and the Fab Lab Barcelona's learning methodologies applied in this course ensure that students will not only get the technical skills

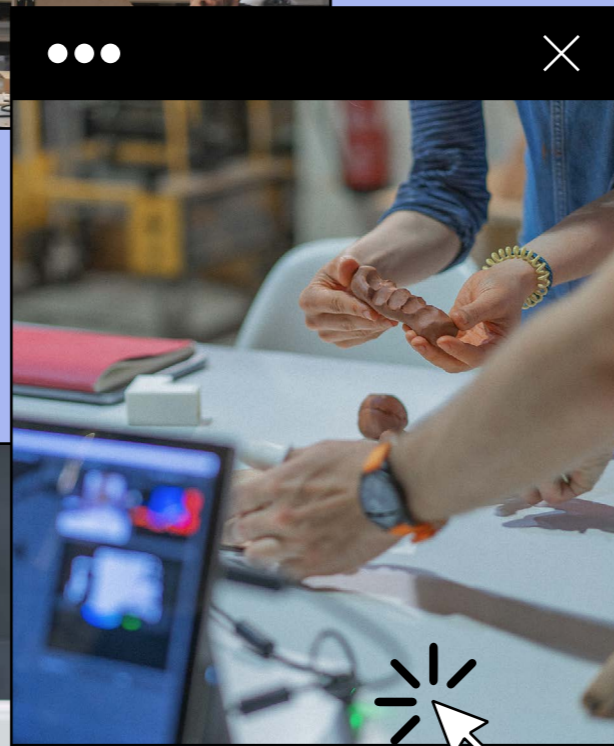
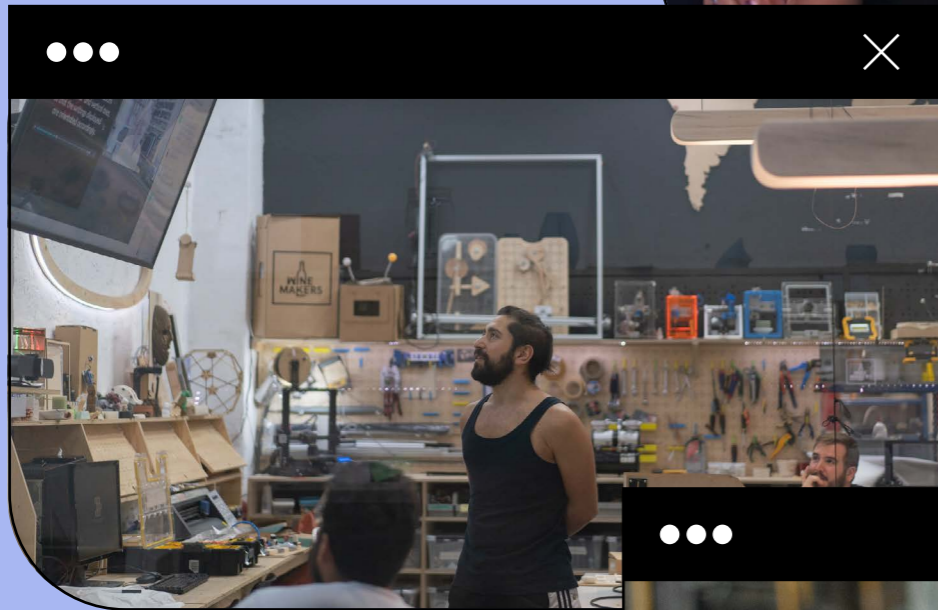
needed to design and prototype a broad range of possible projects but also a set of soft skills like problem-solving, collaboration, integration and sustainability, much needed in today's specialized work market, and a key aspect in becoming productive citizens, making local change for global impact.

The Global Fab Academy program is directed by Neil Gershenfeld of Massachusetts Institute of Technology (MIT)'s Center For Bits and Atoms and is based on MIT's rapid prototyping course: How to Make (Almost) Anything.

FUTURE BRINGS NEW CHALLENGES. TO FACE THEM, NEW CAREERS ARE SURFACING.



STUDENTS WORK ON
TWO LEVELS – GLOBAL
AND LOCAL.



THE CLASSROOM

A local and global Digital Fabrication playground: Fab Academy consists of both classes online and offline, a method which we call “distributed education”. Students work on two levels – global and local.

The **global** level, otherwise known as the Global Campus, connects 250+ students enrolled in Fab Academy every year in more than 50 cities worldwide. The students join weekly Global Lectures with Professor Neil Gershenfeld. After every Global Lecture, in which Prof. Gershenfeld explains the content and lays out the assignment for the week, there is a round of reviews that opens the possibility for students to interact with the rest of the global community.

In the **local** node, students attend in-person classes with their peers at the Lab, taught by our in-house experts on each different weekly topic, develop and fabricate their prototypes, and interact with their peers.

THE PROGRAM

Skills Seminars

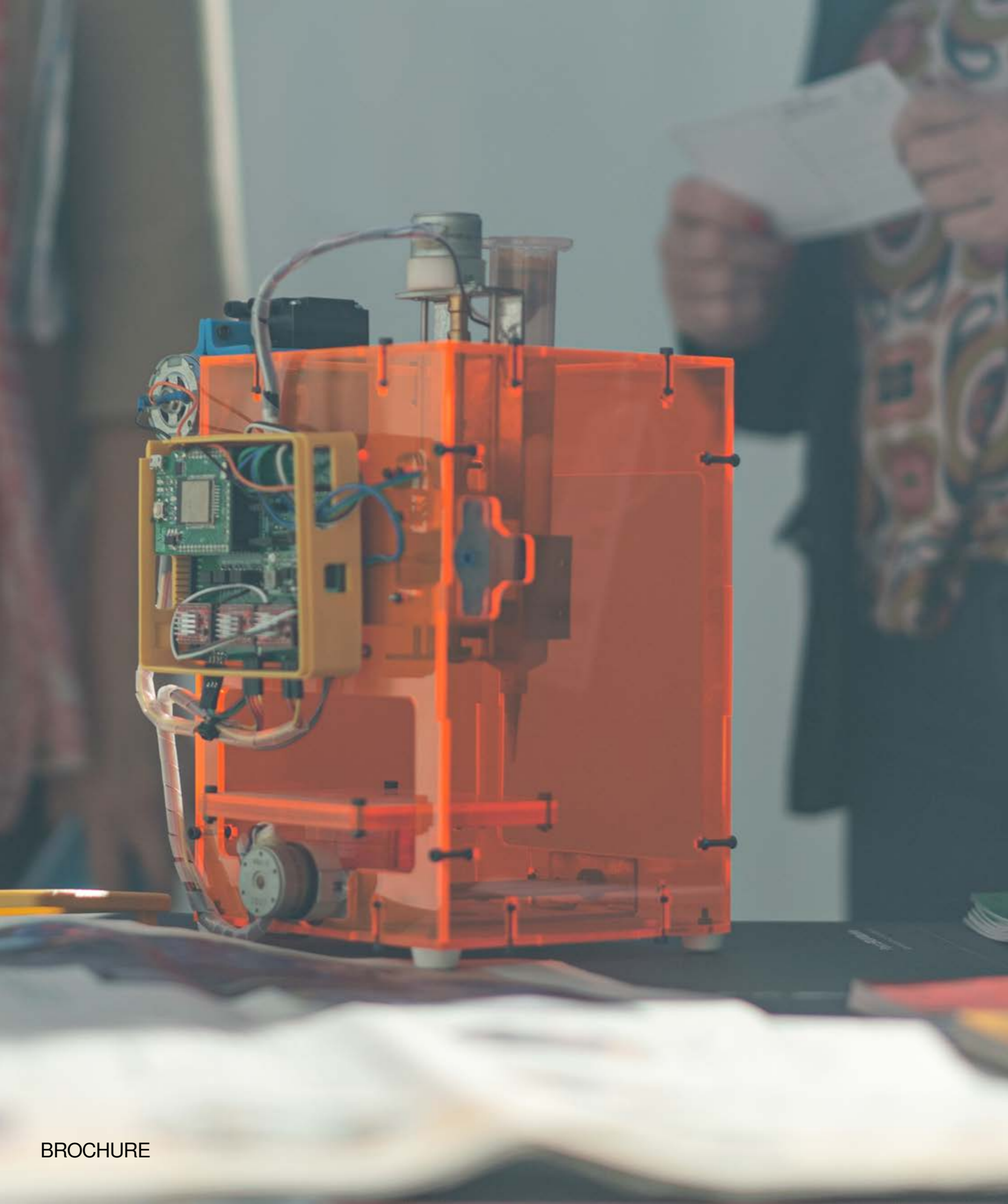
The Postgraduate “Fab Academy BCN: Applications and Implications of Digital Fabrication” comprises 20 week-long intensive seminars that introduce students to the main and transversal aspects of Digital Manufacturing and rapid prototyping, and its implications on project development and design implications.

Personal Project Development

The last phase of the program capitalizes on all the learning acquired to develop a mature personal project. Participants focus on individual in-depth applied project research, employing critical thinking, hard and soft skills for the development of innovative solutions that explore and implement more viable, sustainable and fair alternative systems of today.

Fab Academy Diploma

The official title is awarded by the Fab Academy community with the support of the Fab Lab Network and Fab Foundation. In addition, Fab Lab Barcelona offers students the possibility to access 45 ECTS European Credits granted by the School of Professional and Executive Development at the Polytechnic University of Catalonia – European Higher Education Area (EHEA).





THE LEARNING GOALS

To provide students with theoretical and technical knowledge about disruptive technologies, materials and processes that are transforming the industry and the job market.

To encourage a critical spirit, innovation and sustainability as central principles of any type of intervention.

To provide a multidisciplinary approach and develop a range of “soft” skills that will allow students to better adapt to changing work and academic environments.

To encourage the generation of emerging opportunities and transform them into new hybrid professions.

THE TECHNICAL COMPETENCES

Digital Essentials (Tools)

Principles and Practices, project management

Computer Aided Design

Computer-controlled cutting (Design&CAM)

Electronic Production (Design&CAM)

Fabrication & Production (Processes)

3D Scanning and printing (Design&CAM)

Electronic design

Computer controlled machining (Design&CAM)

Embedded Programming

Interactions & Communications (Protocols)

Molding and Casting

Output devices

Mechanical Design, machine design

Input devices

Networking and communications

Infrastructure & Scales (strategies)

Interface & application programming

Wild card week

Applications and implications

Invention, intellectual property and income

Project development (Final Thesis)

THE SCHEDULE

The classes run from Monday to Friday, from Mid-January until End-June or Beginning-July 2023 (specific dates to be confirmed).

Each week, during the **Skills Seminars**, students will be expected to complete a different topic fully documented. The knowledge learned will contribute towards the development of the final Personal Project.

In addition to the **Global Lectures**, which take place every Wednesday, there are two days each week where you will receive specific support for your project and have access to Fab Lab Barcelona's workshop and digital fabrication equipment.

The **Fab Academy Graduation** takes place during the annual Fab Lab Conference, usually in early-August. The conference consists of online and offline activities such as events, resources, workshops, fairs, and bootcamps that promote and advocate for emerging creative talent and their business productivity and sustainability.

THE JOURNEY

January

Instructor and students boot camps
Project presentations
Principles and practices
Project management
Version control

February

Computer-aided design
Computer-controlled cutting
Parametric, algorithmic, generative design, debugging
Electronics production
3D scanning and printing

March

Electronics design
Computer-controlled machining
Embedded programming
Molding and casting
Machine building

April

Mechanical design, machine design
Fab ecosystem
Midterm review
Input devices
Networking and communications

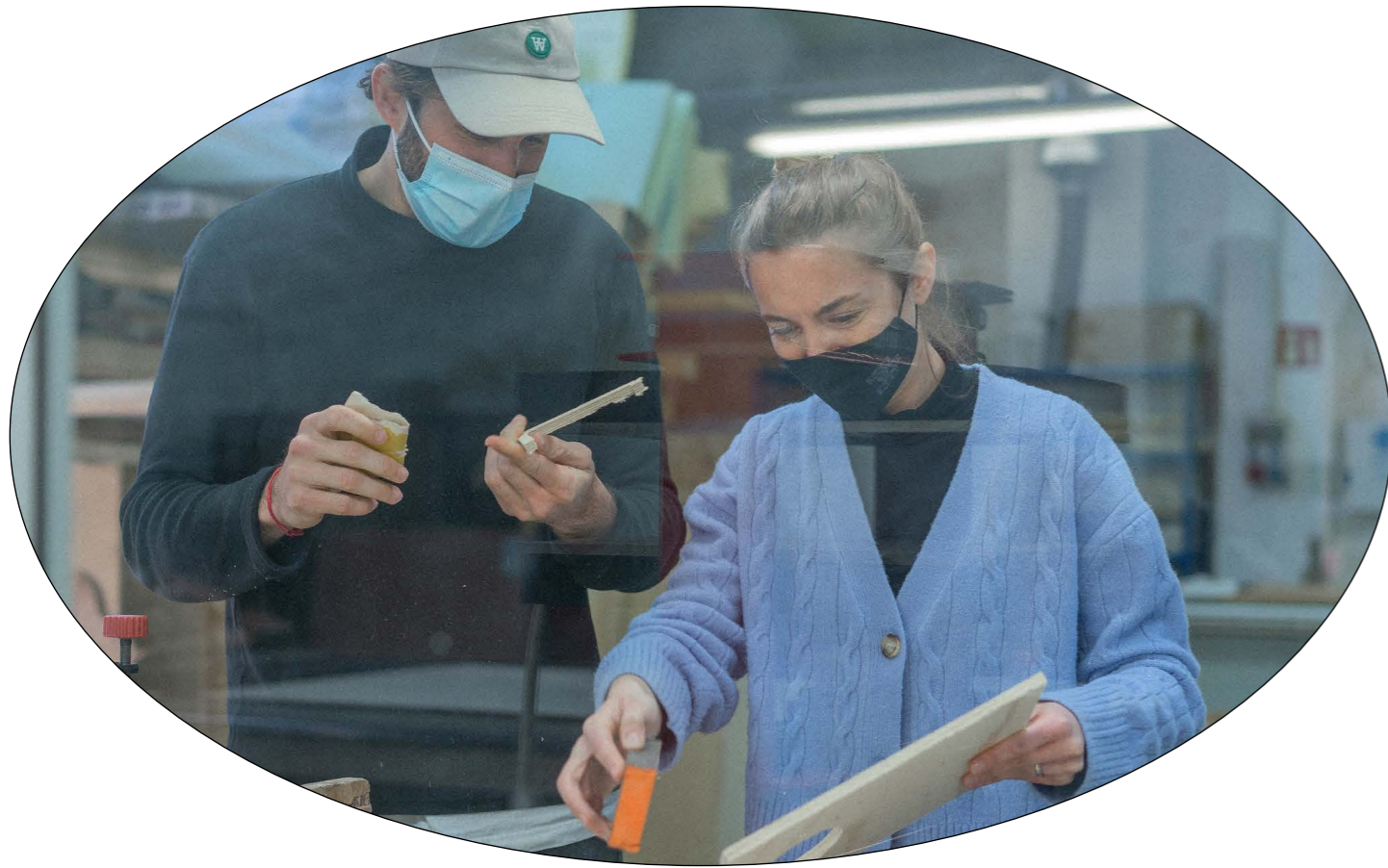
June/July

Final project development
Personal project presentations

August

FAB18 Conference & Graduation
(TBC)

This is a draft version based on last year's calendar. It may be subject to changes.



FACULTY

Neil Gershenfeld - Faculty

Center for Bits and Atoms at MIT Director

FAB LAB BARCELONA INSTRUCTOR & STAFF

Josep Martí - Fab Academy Barcelona Lead Instructor

Digital Fabrication Expert

Santi Fuentemilla - Fab Academy Barcelona Local Expert

Digital Fabrication and Head of Future Learning

Victor Barberán - Fab Academy Barcelona Local Expert

Computer science, Tools, Platforms

Eduardo Chamorro - Fab Academy Barcelona Local Expert

Digital Fabrication and Additive Manufacturing Expert

Victor Barberán - Fab Academy Barcelona Local Expert

Computer science, Tools, Platforms

Oscar Gonzalez - Fab Academy Barcelona Local Expert

Computer science, Tools, Platforms

Julia Leirado - Fab Academy Barcelona Local Expert

Digital Fabrication and Educational Methodologies Expert

Who can join?

There is no specific academic requirement to enroll in Fab Academy:

Engineers, Architects, Designers of all kinds that want to deep-dive into the possibilities of prototyping their ideas becoming prototypes.

People from all backgrounds (arts, social sciences, scientific, and more) that want to reflect on the impact of making through the act of making.

Professionals from different academic and professional experiences that want to refresh their knowledge or simply take a turn towards making.

This means, everyone is welcome!

In order to get the ECTS, students must present a Bachelor or higher degree. However, students that don't aspire to get the ECTS credits don't need to submit a Bachelor Diploma.



Professional Opportunities

Fab Academy provides a set of skills and tools that will help you to translate ideas into prototypes, and prototypes into products. **Fab Academy Alumni** have used their learned skills to build leading roles in the global **Fab Lab network** and the creative community, establishing their own design studios and becoming entrepreneurs in the innovation and social design fields.

This skill set will open the possibility to join innovation teams looking for profiles capable of fast prototyping ideas, or thinking of creative solutions for products and services. You will have the capacity not only to prototype but to have a critical approach on the design and fabrication processes, and the impulse to continuously and autonomously learn new ways to approach them.



After Fab Academy, you will not only get jobs!
You will also be able to invent:

- new roles
- new practices
- new products

Either if you are looking for the right skills to bring into life your personal project or to join the job market, Fab Academy is for you!

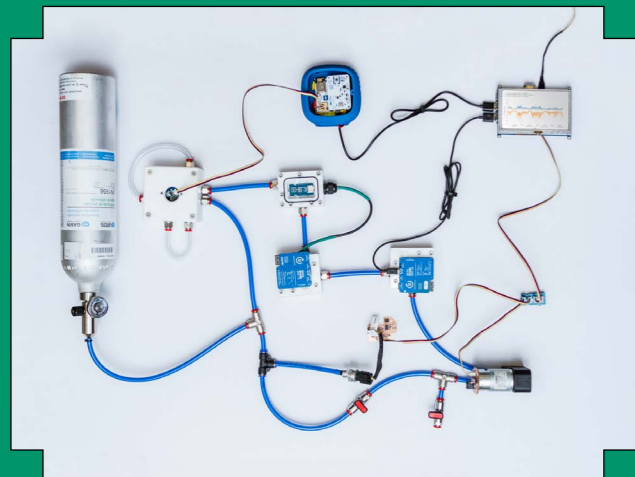
Some of our Students Projects



01



04



02



05



03

01 Open Bike GPS

By Gustavo Abreu

An open source, distraction free, turn-by-turn navigation system for bikes. Made completely with Fab Lab components, and easy to use.

Fab Academy
Barcelona 2019

02 Pollution sensor calibration unit

By Oscar Gonzalez

An Opensource, Fabbable, and modular equipment aiming to improve sensor calibration for lowcost pollution sensors.

Fab Academy
Barcelona 2018

03 Open PFMT: Squeeze me!

By Ximena Amador

The project consists on the creation of 3 electronic devices to function as a pelvic floor muscle trainer (PFMT), produced by sourcing recycled materials within proximity to the FabLab. Low ecological impact during production and minimal disposal & waste of possible resources, and fully OpenSource.

Fab Academy
Barcelona 2022

04 Miss Baker

By Denise Rey

An interactive device to encourage children to exercise while playing. The device is placed on the shoes of the user, and inspires the user to count steps in a playful way with an interactive application. This Project is based on the idea of "active gaming" for healthy kids.

Fab Academy
Barcelona 2021

05 I'm Not Shaving

By Dorota Orloff

An interactive installation. Story line: There is a huge hand in idle state projected on the wall, in the place of armpit there is a fury-like capacitance sensor playing role of hair. Once you rub the hair the hand starts to move the fingers, like after tickling.

Fab Academy
Barcelona 2018

WHAT OUR ALUMNI SAY



“

[Fab Academy] helped me to fuse different technologies and get an understanding of prototyping. The practical teaching allows to immediately apply the learned in a professional environment. It gave me the necessary trust to apply for jobs that seemed too far away before the Academy. I gained the confidence to try things, not only in a technical sense but also in terms of job search.

”



Martin G. took Fab Academy in 2015. He is now working at a leading EU company developing and setting up a 3D Concrete printing system.

“

[Fab Academy] made me realize that I'm not that far from what I'd like to be doing. After the final project it was clear how much fun I have making these types of interactive objects (...) I understood that developing new skills can be a much faster and more dynamic process than I thought. For me it was above all a boost of self-confidence.

”



Denise R. took Fab Academy in 2021. She is now working as a Product Designer with a clear focus on the innovation side.



Why Fab Lab Barcelona?

Fab Lab Barcelona is part of IAAC, the Institute for Advanced Architecture of Catalonia, an academic and research community of extraordinary students and staff from more than 70 different countries. With over more than ten years of experience in teaching the course, Fab Lab Barcelona has become a global benchmark for the Fab Academy experience being a SuperNode of the network.

With specialists in Future of Education and Learning Methodologies leads across all Fab Lab Barcelona, the program is fully supported by multidisciplinary experts in digital fabrication, robotics, machine learning, coding and materials.

Students at Fab Lab Barcelona study in an interdisciplinary professional lab environment subject to multiple interactions between professionals and colleagues, expanding their worldview and professional networks. In addition, the course is delivered in collaboration with students from the IAAC Master of Design for Emergent Futures (MDEF) which provides an opportunity to expand professional and personal experiences.

BARCELONA CITY



The city of Barcelona has historically been recognized as an international benchmark for design, architecture and urbanism. Nowadays, it stands as the world capital of the mobile and technology. Named as the European Capital of Innovation in 2014, Barcelona is creating a multi-disciplinary ecosystem of institutes, companies and entrepreneurs that favors cross-industry collaboration in the development of innovative solutions for the challenges of the 21st century's habitability.

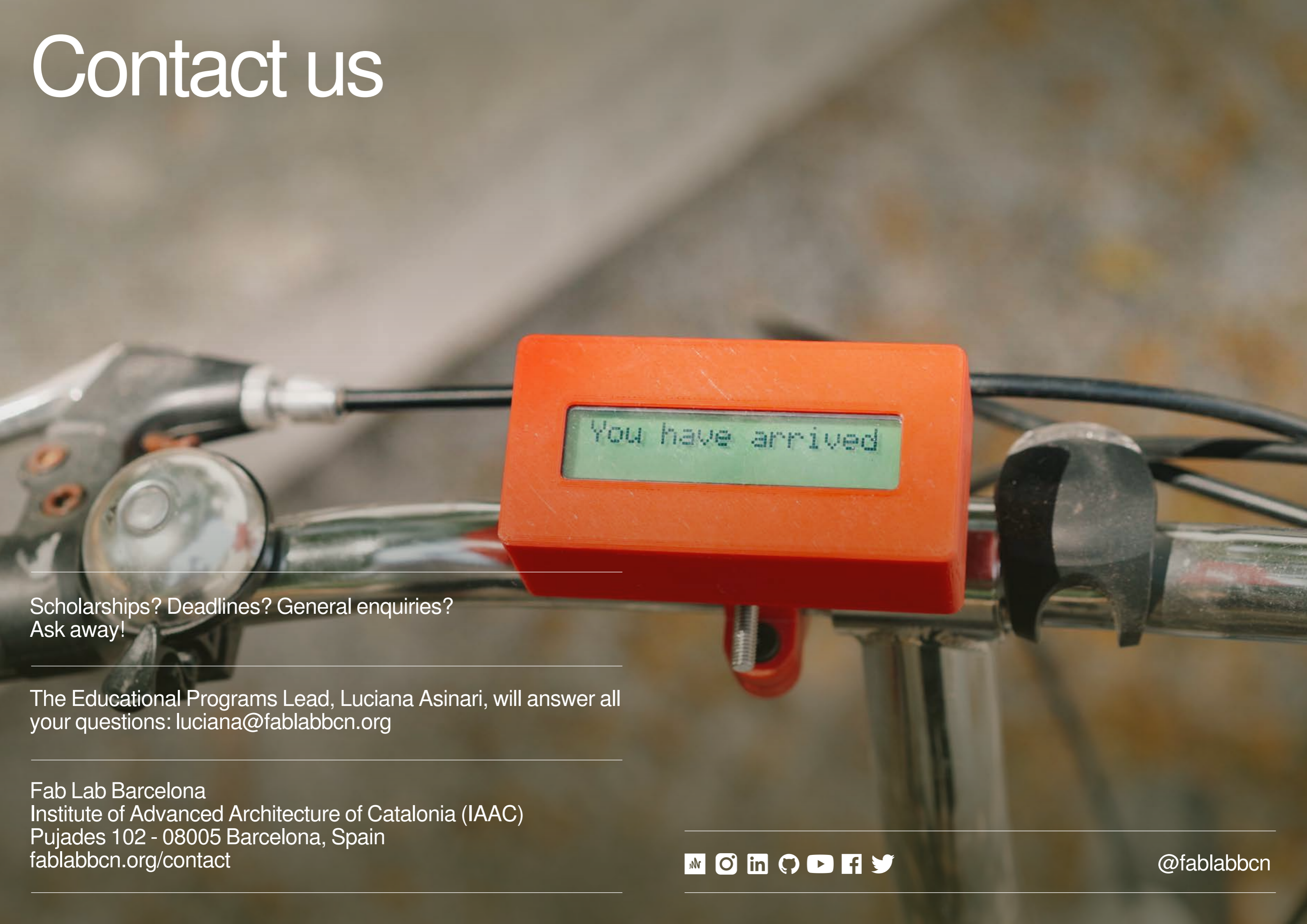
Fab Lab Barcelona is based in the Poblenou 22@ Barcelona district, an international reference of innovation

with cutting-edge companies, universities, research, training and transfer of technology centers that constitute the system of city innovation integrated with different agents of promotion that facilitate interaction and communication among them.

Barcelona is an urban laboratory of research and innovation in digital technologies of communication and interaction. This urban hub supports entrepreneurs and start-ups in the area, creates innovation clusters, looks for talent and serves as a model for developing solutions that could be exported to the world.



Contact us



Scholarships? Deadlines? General enquiries?
Ask away!

The Educational Programs Lead, Luciana Asinari, will answer all
your questions: luciana@fablabbcn.org

Fab Lab Barcelona
Institute of Advanced Architecture of Catalonia (IAAC)
Pujades 102 - 08005 Barcelona, Spain
fablabbcn.org/contact



@fablabbcn
