

中国“数制”工坊 “智造学术 X”  
2018 冬令营

FABO X  
ACADEMY  
WINTER  
BOOTCAMP



FABO X WINTER BOOTCAMP

# HOW TO RUN A SUCCESSFUL FAB LAB! THE FAB LAB PHILOSOPHY AND CORE VALUES.

SAVERIO SILLI | 西萨维

Fablab Guru - Fablab O Course Director



FABLAB



DII

同济大学设计创意学院  
COLLEGE OF DESIGN AND INNOVATION TONGJI UNIVERSITY



PLAYGROUND  
中国“复制”乐园

# KEY CONCEPTS

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## A Fablab is like a small city:

- it uses and manage resources
- it has a population of users
- it creates products and services
- its shape and identity is unique
- it is part of a province (network)
- it communicates with other cities (labs)
- it has a government (manager)

# KEY CONCEPTS

- INVENTORY
- USERS
- ACTIVITIES
- LOCAL IDENTITY
- GLOBAL IDENTITY
- NETWORKING
- MANAGING

# INVENTORY

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The inventory of a Fablab is the most important thing, and the key to run a successful Fablab is to understand its components, what they are, why we use them, how to manage, keep and organize the materials, the machines and the processes.

# INVENTORY

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If I want to share globally some content that was created locally in my lab, I have to be sure that the machines and materials I use in my lab are available in any other lab as well.

**this is the main reason why the fablab network spread so fast all over the world**

# INVENTORY

## MACHINES

The machines we use in a Fablab were selected for specific reasons. The brand and vendor may vary, but the type of machine and what you can do with it is what matters most.

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## PROCESSES

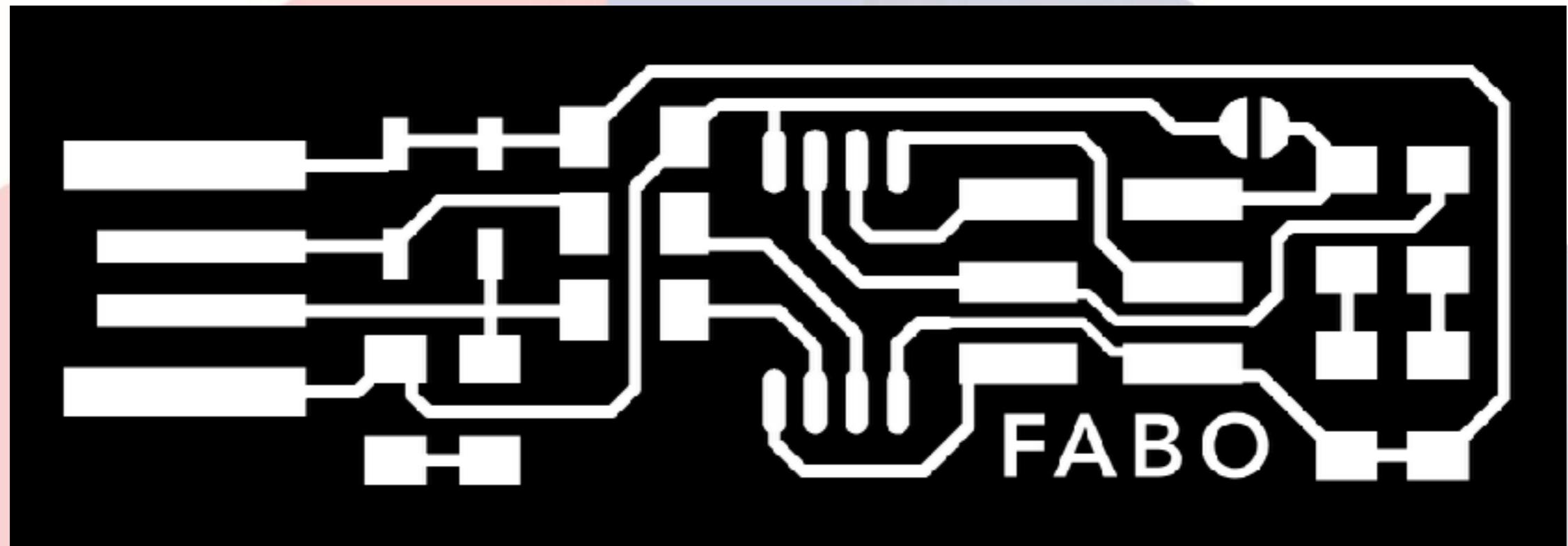
With a similar set of machines and materials it is easy to design and share something that uses the same best practices and techniques all around the network.

# INVENTORY

# **EXAMPLE: PCB Etching vs PCB Milling**

# PCB Etching vs PCB Milling

Both techniques start from the same standard source file, a black and white .png image.



# PCB Etching vs PCB Milling

Etching requires the use of nasty chemicals that are bad for the environment and for the health.



# PCB Etching vs PCB Milling

Milling is safe and environmental friendly: every fablab has a small precision milling machine...



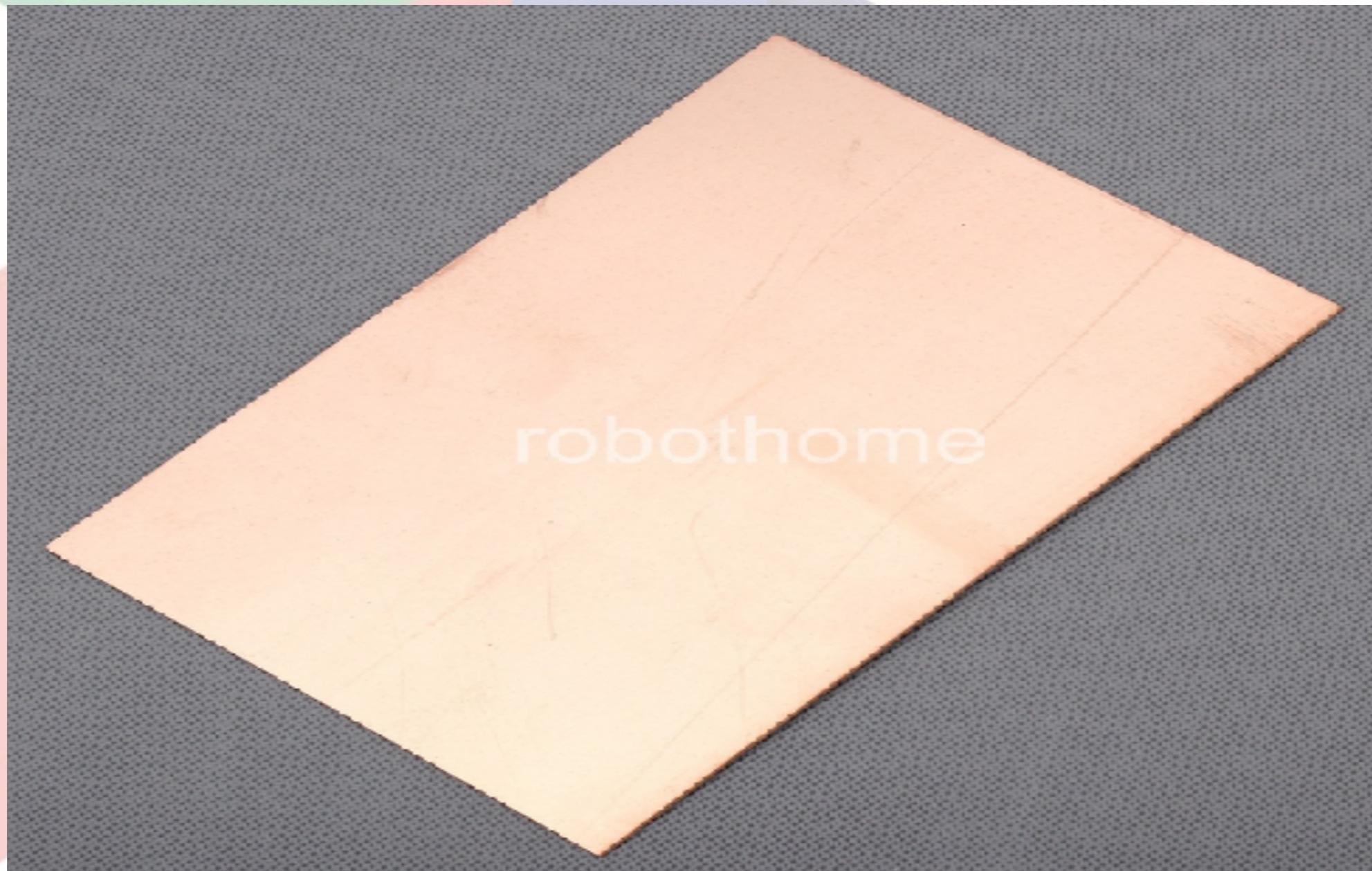
# PCB Etching vs PCB Milling

...and precision endmill (1/32", 1/64")...



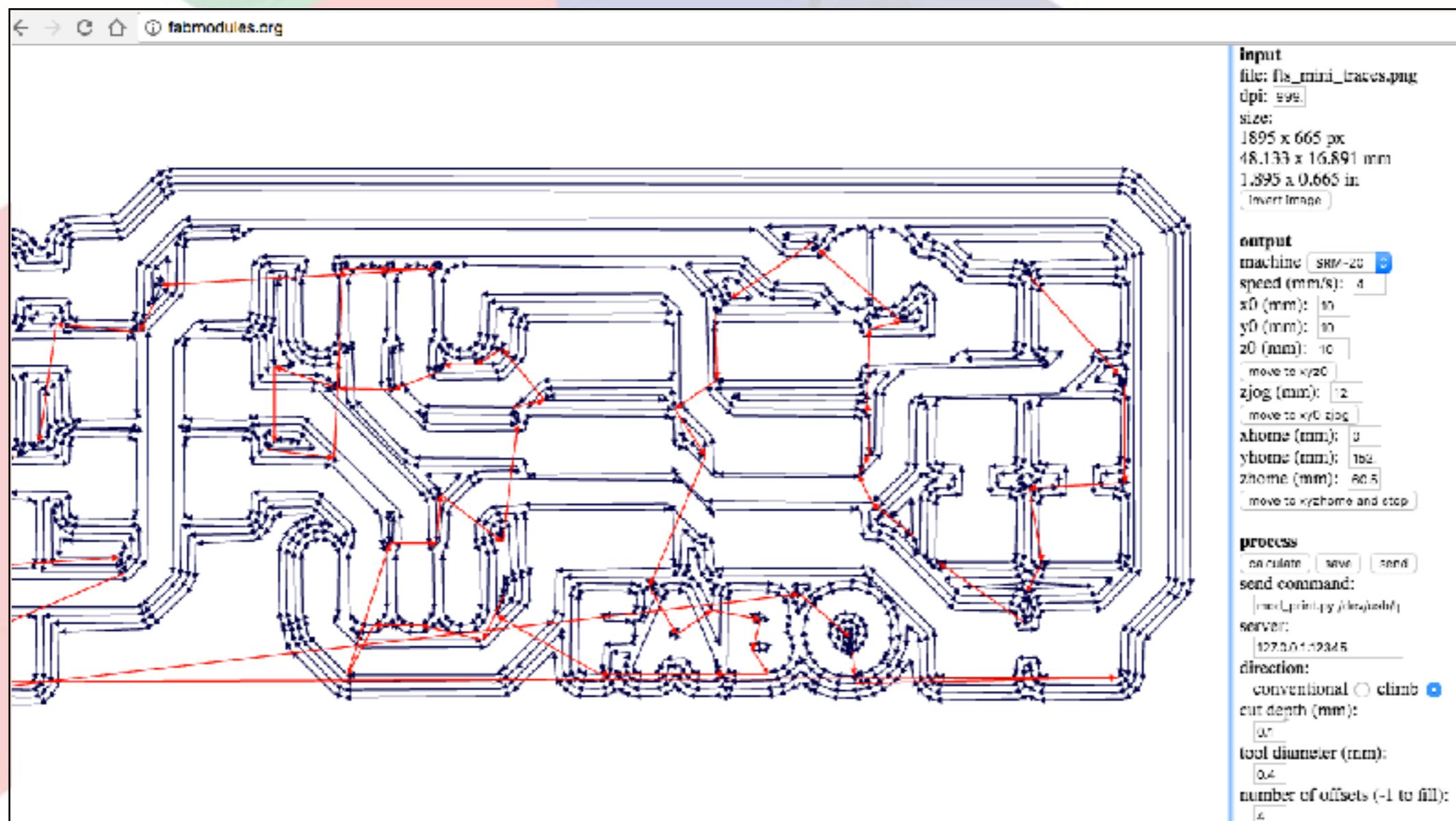
# PCB Etching vs PCB Milling

...and single-sided FR1 copper plated board...



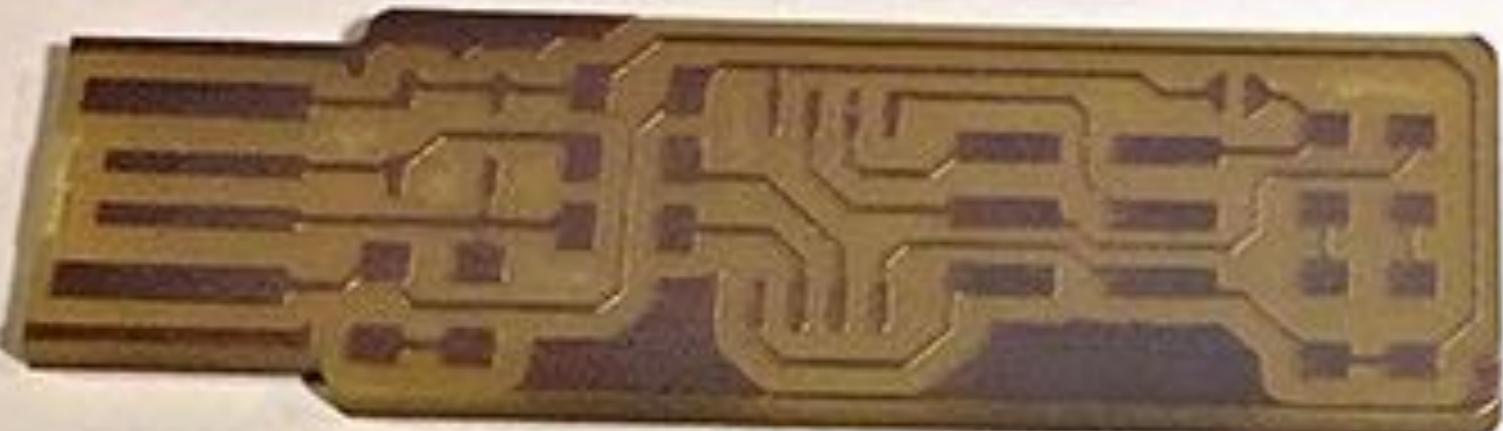
# PCB Etching vs PCB Milling

...and a dedicated software to generate the toolpaths  
(fabmodules)...



# PCB Etching vs PCB Milling

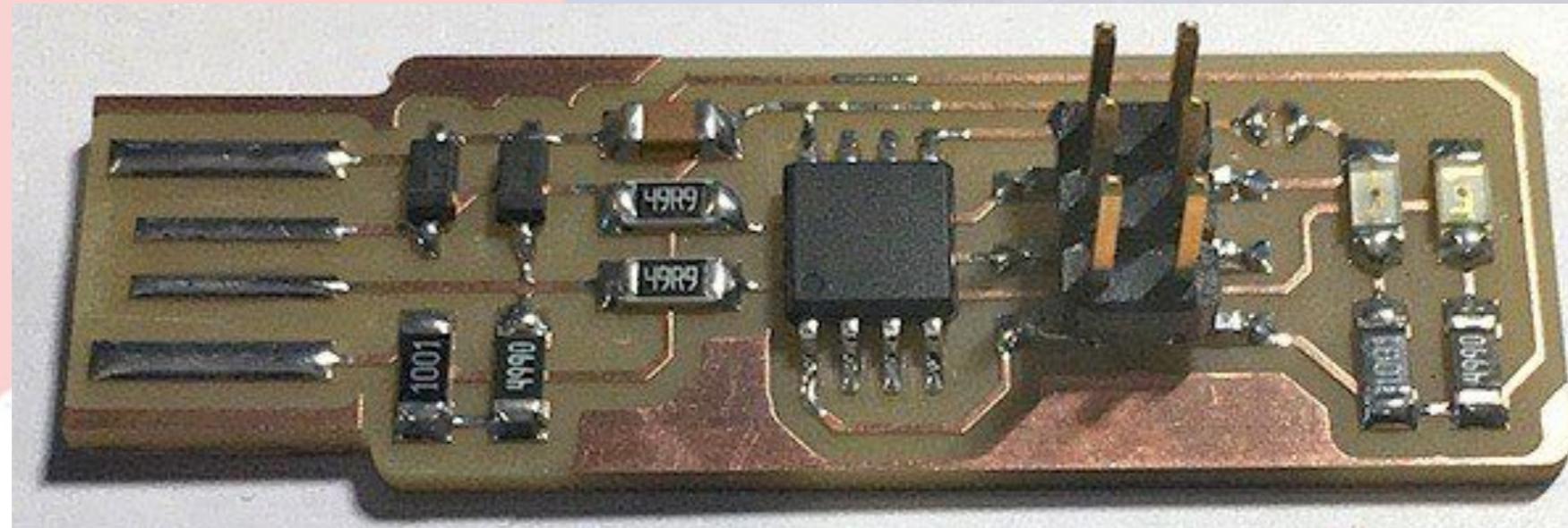
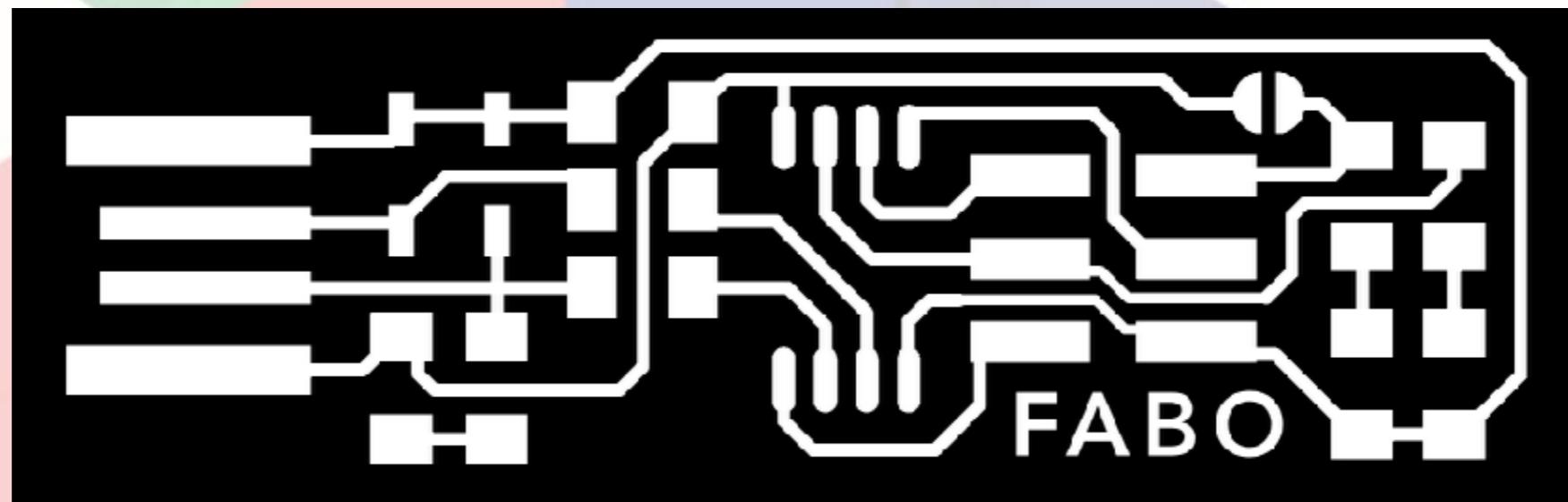
A complete, fablab-designed process that integrates machines, tools, materials and softwares...



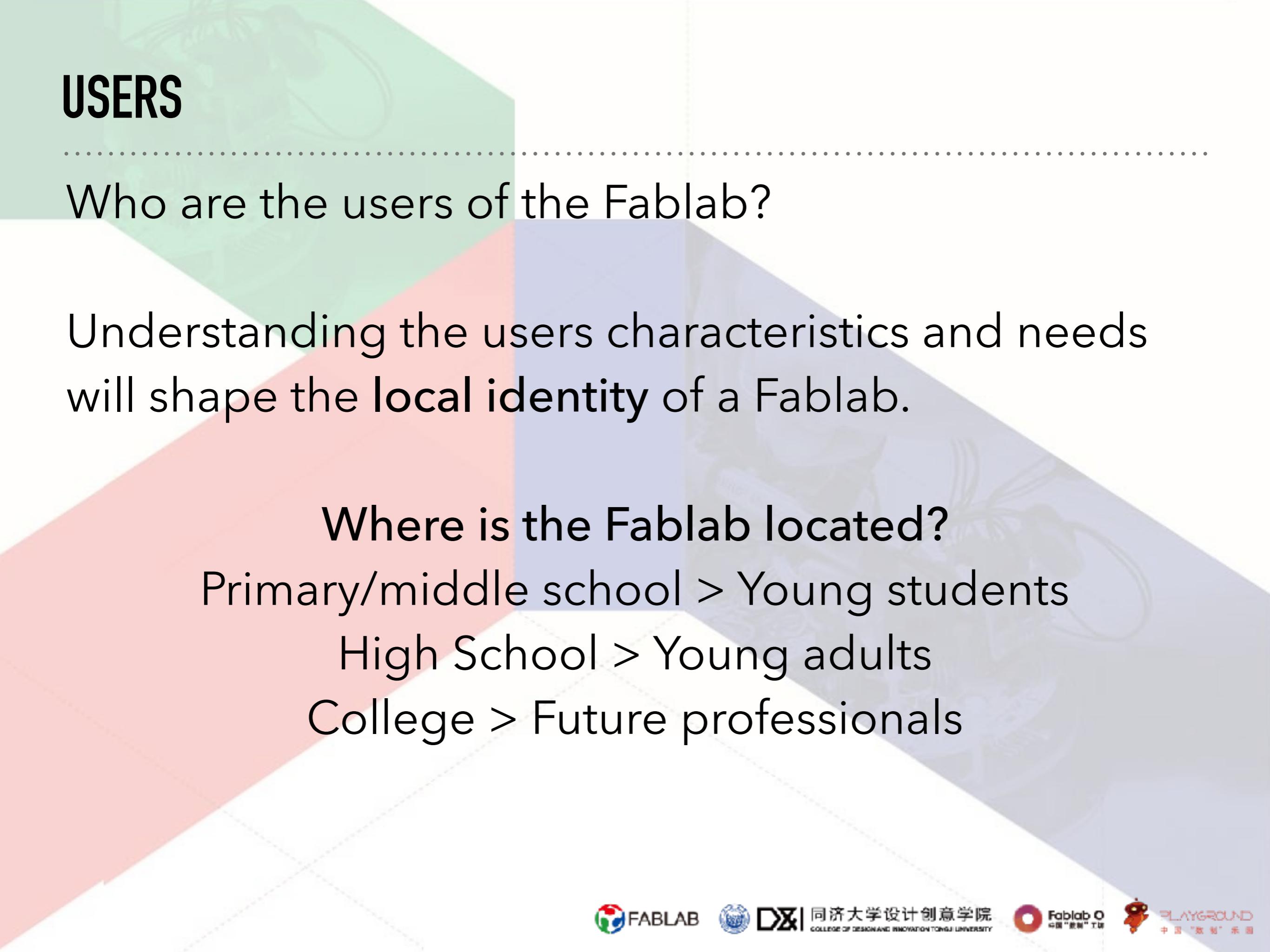
...no matter where you are:

# PCB Etching vs PCB Milling

Something that was designed in Fablab Amsterdam,  
can be replicated (and modified) in Fablab Shanghai.



# USERS



Who are the users of the Fablab?

Understanding the users characteristics and needs will shape the local identity of a Fablab.

Where is the Fablab located?

Primary/middle school > Young students

High School > Young adults

College > Future professionals

# ACTIVITIES

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What happens in a Fablab?

Once the target users have been defined, the activities we choose to focus on come as a consequence.

When a Fablab is part of a school, education is the main focus.

# ACTIVITIES

## Fablab in school:

- Teachers use the lab to create educational content.
- Lab can be used as a classroom with direct access to technology.
- Special classes or workshops are organized in the lab.
- Students from clubs can use the lab to make things related to other subjects.

## Fablab in universities can also:

- Organize Hackathons and making competitions (over a weekend or two/three days).
- Students can use the lab freely (after basic training), to complement their own study and make research.

# LOCAL IDENTITY

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The local identity of a Fablab is the result of the kind of users that populate it and the activities that are held there.

Another source for the local identity is the activities happening in territory upon which the Fablab operates: in the best wine districts of Italy, there are labs working with food, in Milan they are active in the fashion and industrial design field, in Rome, they focus on cultural heritage preservation.

# GLOBAL IDENTITY

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A Fablab also operates at a Regional level (China) and Global level (World). To stand out in the regional or global network a Fablab must have a strong local identity, but this is not enough:

Thanks to the network, Fablabs can access contents created somewhere else, but they must contribute back with the content they create locally and share them into the network.

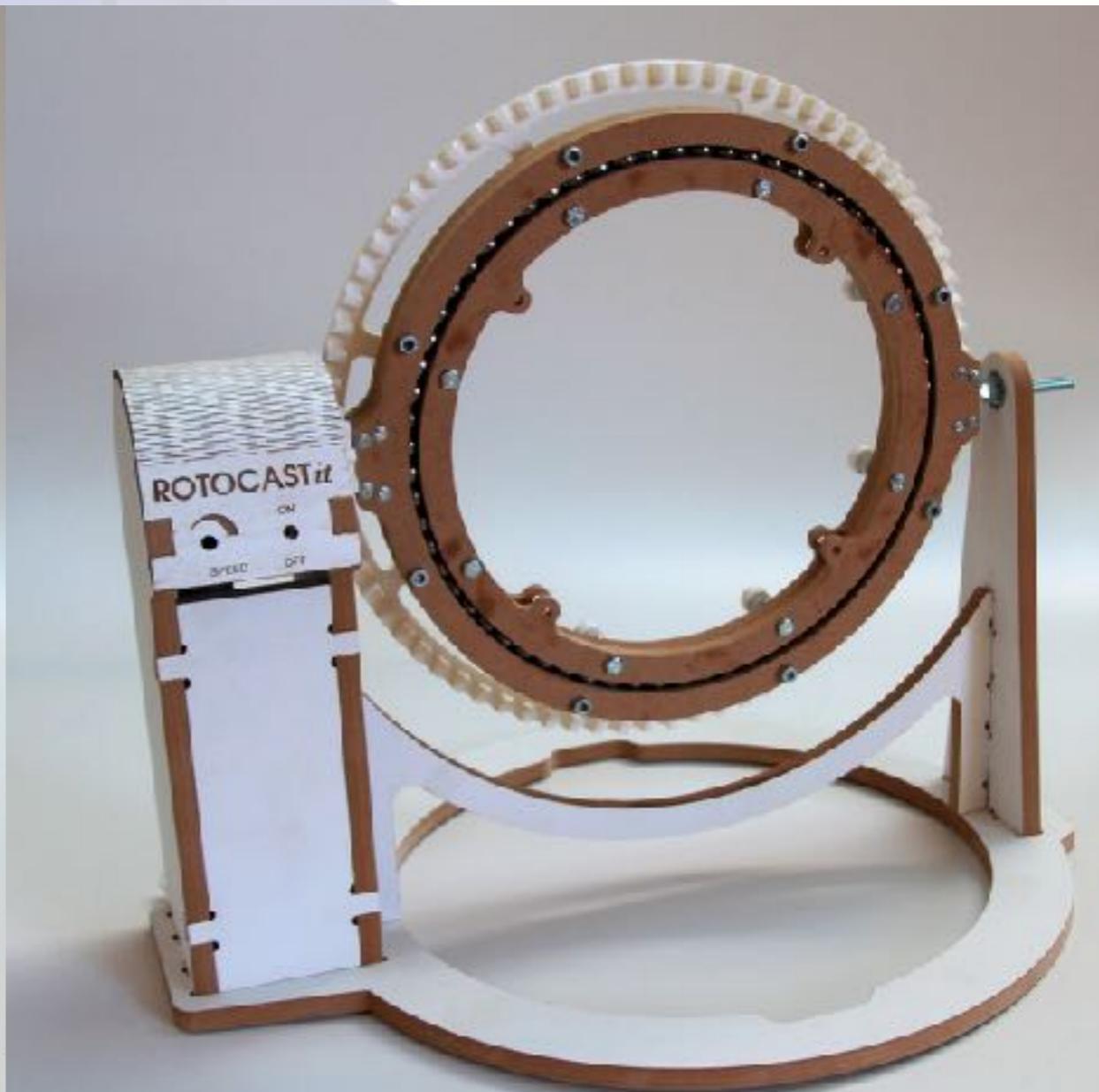
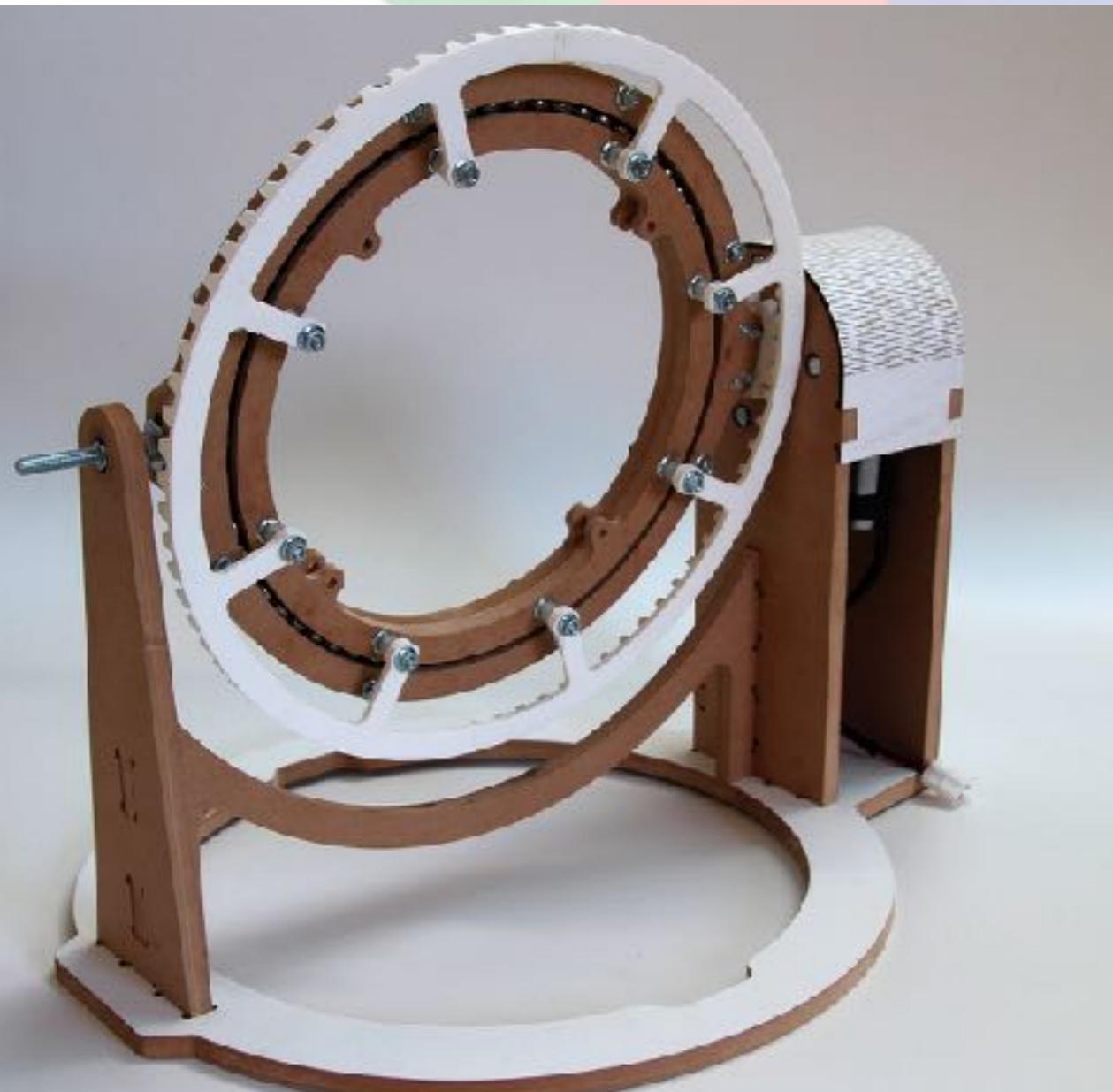
This system is the second reason why the number of Fablabs grew so fast: taking contents, using them, modifying them, sharing them back again, and it is also what made Opensource Software and Hardware so widely used today.

# NETWORKING

**EXAMPLE:**  
**Contributing to the network  
and getting something in return**

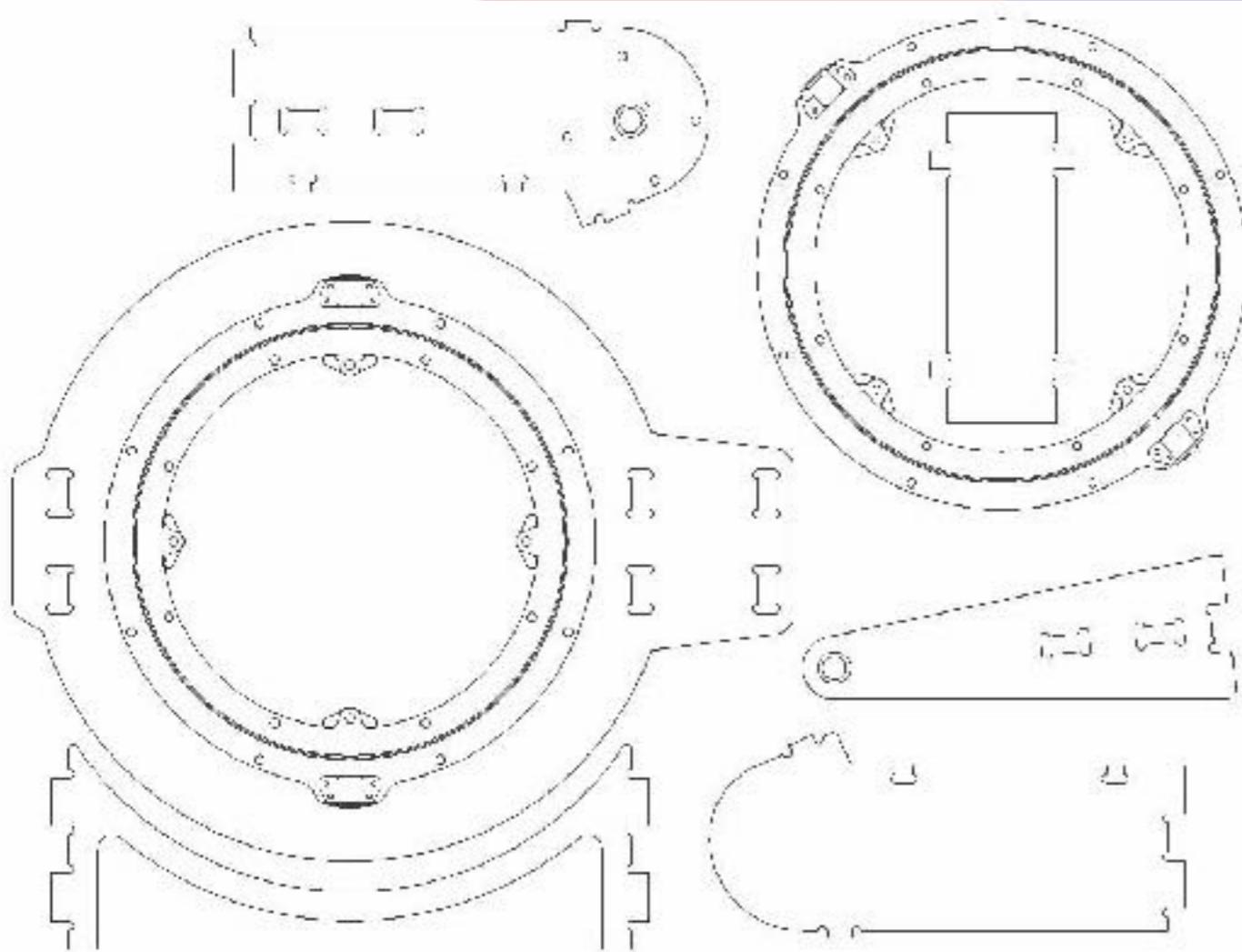
## **Contributing to the network and getting something in return**

I created this machine in Fablab Opendot in Milan. It is designed to be fabricated with materials and machines commonly found in any lab.



# Contributing to the network and getting something in return

The project documentation was published on a website including all the source file and released with a Creative Common License so that anyone could replicate it.



ROTOCASTIt by [Saverio Silli](#) is  
licensed under a  
[Creative Commons Attribution-  
ShareAlike 4.0 International License](#)

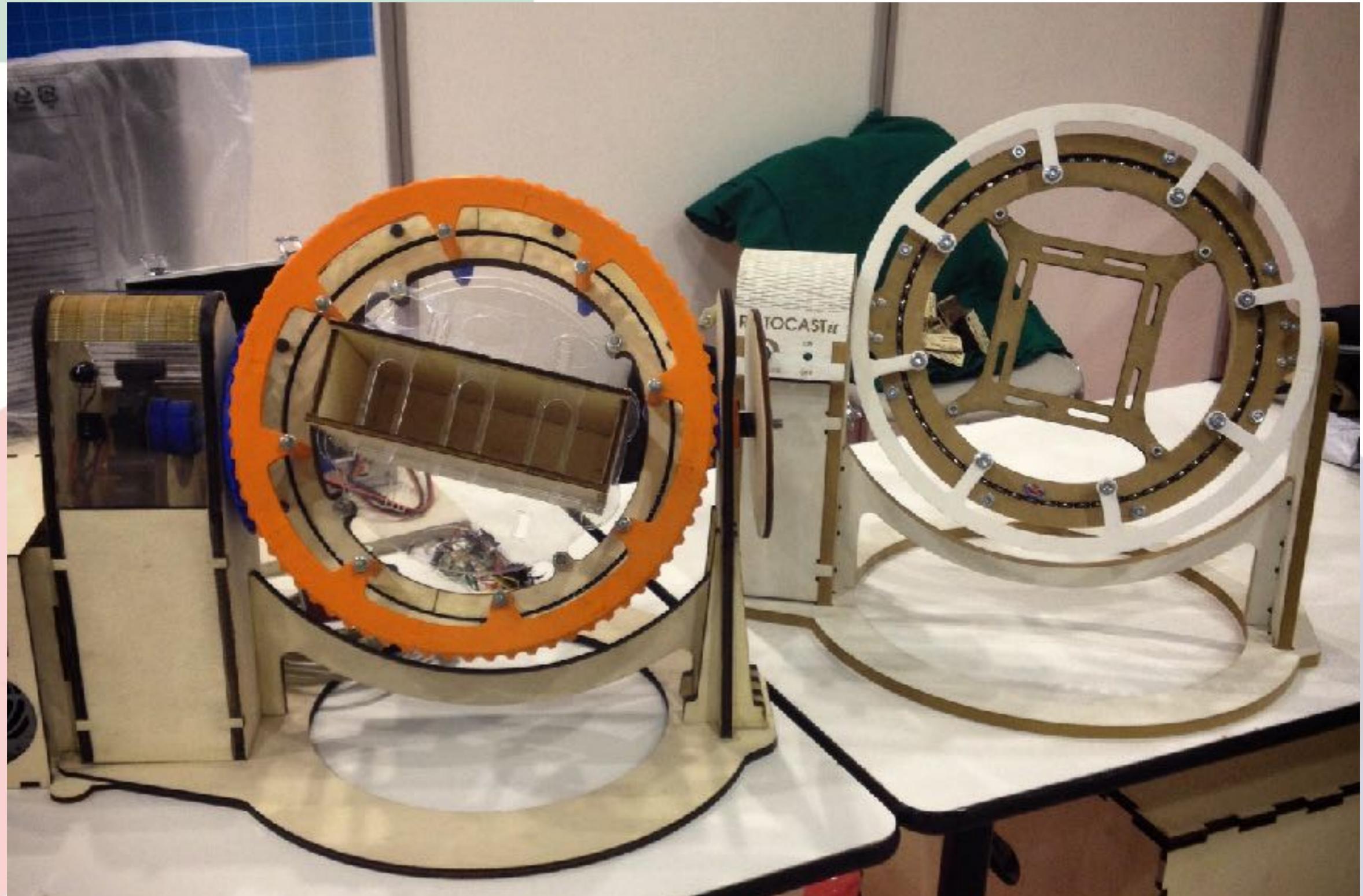
## **Contributing to the network and getting something in return**



After a year, a Fablab located in a High School in Italy decided to make the same project. They modified the original design to make a better version and they shared the file again.

Now I could update  
the original machine  
with their upgrades.

# Contributing to the network and getting something in return



# MANAGING A FABLAB

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Managing the lab can be a lot easier if the lab was well designed since its creation. Fablab O has established a standard for labs creation providing the right machines and materials, the needed tools and equipment and a series of documents containing the inventory, technical details and educational contents to use the lab at its best.

Local management take care of keeping the lab clean at all the time, training the students to put back the tools and materials they used after each session and developing the technical skills to understand machine troubles and how to solve them.

# MANAGING A FABLAB

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The Fablab Charter is a list of simple rules that every Fablab decide to follow. Some of the rules are especially important for daily use:

## WHAT ARE YOUR RESPONSIBILITIES?

- *safety: not hurting people or machines*
- *operations: assisting with cleaning, maintaining, and improving the lab*
- *knowledge: contributing to documentation and instruction*





MDF/34 mm

























# MANAGING THE REGIONAL NETWORK

# How do Fablabs cooperate together on the network?

We are in the process of building an online structure to connect every site in the regional network of China, using the experience we made with the global Fab Academy system that uses Gitlab, a powerful tool that assemble the most advanced tools for productivity:

- Issue tracker
  - Discussion forum
  - File storage and management
  - Web hosting
  - Version control

# MANAGING THE REGIONAL NETWORK: GITLAB

The screenshot shows the GitLab web interface. At the top, there is a navigation bar with the GitLab logo, a search bar, and various icons for creating, searching, and managing projects. Below the navigation bar, the page title "Projects" is displayed. Underneath, there are tabs for "Your projects", "Starred projects", and "Explore projects". There are also filters for "Filter by name..." and "Last updated" (with a dropdown arrow), and a green button for "New project". Below these filters, there are two buttons: "All" and "Personal", with "All" being underlined. The main content area lists five projects:

Owner	Project Name	Type	Last Updated	Star Rating	Lock Status
S	Academany / Fab Academy / 2018 / staff	Developer	updated a week ago	★ 3	🔒
C	Academany / Fab Academy / 2018 / class	Developer	updated 2 weeks ago	✓	★ 0
S	Academany / Fab Academy / 2018 / Labs / O Shanghai / site	Master	updated 2 days ago	✓	★ 0
F	saveriosilli / fabricademy-saveriosilli	Master	updated 2 days ago	✓	★ 0
L	Academany / Fab Academy / 2018 / Labs / Seoul / local	Master	updated a week ago	★ 0	🔒

# MANAGING THE REGIONAL NETWORK: GITLAB

The screenshot shows a GitLab interface with the following details:

- Header:** GitLab logo, Projects, Groups, More, +, Search, Filter, Issues, User profile.
- Breadcrumbs:** Academy > ... > 2018 > staff > Issues
- Filters:** Open 12, Closed 33, All 45, RSS feed, Edit issues, New Issue button.
- Search Bar:** Search or filter results... with a dropdown icon.
- Issues List:**
  - Dropped Students** (#45) - opened 38 minutes ago by nisarsiqui, updated 34 minutes ago.
  - one student unable to add files in its gitlab repo** (#44) - opened 44 minutes ago by denist, updated 9 minutes ago.
  - recitations** (#38) - opened 4 days ago by neilg, updated 3 days ago.
  - class prep** (#33) - opened a week ago by neilg, updated a day ago.
  - Instructor list** - no details shown.

# MANAGING THE REGIONAL NETWORK: GITLAB

 GitLab Projects Groups More      

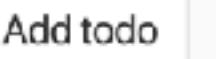
S

 santifu @santifu commented 3 days ago  
Hi, do we have a special bluejeans link that we can share with the students?

 santifu @santifu commented 3 days ago  
Hi [@fibasile](#),  
Small comment from your presentation. Download mac git link from slide 16 it's not working  
Thanks!

 neilg @neilg commented 3 days ago  
The Bluejeans conference needs to stay limited to labs. But you can share it locally (I'll review and I have set up a separate site for following the screen-share that will be served at <http://s> currently running)

 yuichitamiya @yuichitamiya commented 3 days ago  
I connected MCU (4@mcu.fabacademy.org -> PIN 4286#) and logged in, but nothing from recitation. Why?

Todo  

Assignee Edit  
No assignee - assign yourself

Milestone Edit  
None

Time tracking   
No estimate or time spent

Due date Edit  
No due date

Labels Edit  
None

Confidentiality Edit  
 Not confidential

# MANAGING THE REGIONAL NETWORK: GITLAB

The following document contains a collection of notable Fab Academy students documentations.  
As agreed with the instructor, the general criteria followed to select this documentation are:

1. Originality of the final project idea
2. field of application of the final project
3. understandability and clearness of the presented contents

Any help in the refinements of the selection criteria is appreciated. We can use this issue as a starting point

Student	Lab	Recommended by	Link	Comments
Stefano Paradiso	Torino	Romain Di Vozzo	[site]( <a href="http://archive.fabacademy.org/archives/2016/fablabor">http://archive.fabacademy.org/archives/2016/fablabor</a> )	
Jakob Nilsson	Verket	Fiore Basile	[site]( <a href="http://archive.fabacademy.org/archives/2017/fablabverket/stu">http://archive.fabacademy.org/archives/2017/fablabverket/stu</a> )	
J.Travis Russet	Shangai	Saverio Silli	[site]( <a href="http://archive.fabacademy.org/archives/2017/fablabshanga">http://archive.fabacademy.org/archives/2017/fablabshanga</a> )	
Dalal Alkhald	Kuwait	Nuria Robles	[site]( <a href="http://archive.fabacademy.org/archives/2017/fablabkuwait/stu">http://archive.fabacademy.org/archives/2017/fablabkuwait/stu</a> )	
Silvia Palazzi	Siena	Matteo Sirizzotti	[site]( <a href="http://archive.fabacademy.org/2017/fablabtoscana/stude">http://archive.fabacademy.org/2017/fablabtoscana/stude</a> )	
Katie Levine + Or Shoval	Israel	Ohadino Meyuhas	[site]( <a href="http://fabacademy.org/archives/2015/as/student">http://fabacademy.org/archives/2015/as/student</a> )	
Paulina Reijnsmeijer	Aachen	Marcel Lahaye	[site]( <a href="http://archive.fabacademy.org/archives/2017/fablabaacher">http://archive.fabacademy.org/archives/2017/fablabaacher</a> )	

The following table contains the featured project selected by Neil for 2017 cycle

# MANAGING THE REGIONAL NETWORK: VIDEOCONFERENCE

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On the same track, we are developing a regional videoconference system using a simple software called Bluejeans that will allow every lab to be a remote classroom and participate in the FABO X Academy program.

The class will be streamed from Fablab O Headquarter and each local site with a local instructor will be connected into a large videoconference.

The most important feature is that this will not be just a top-down livestreaming, but a two-direction video connection, where local sites can ask questions and local students can talk to the rest of the audience.

# Ready to join Academany?



FaceTime H... ▾ ON

Microfono in... ▾ ON

Uscita integr... ▾ TEST

**JOIN MEETING**

PHONE & MORE CONNECTION OPTIONS

# MANAGING THE REGIONAL NETWORK: VIDEOCONFERENCE

You are the first person in Academany



Add participants by sharing this link through email or chat.

 <https://bluejeans.com/448190928/6294>

COPY

EMAIL



Leave



Chat



Participants



Share Screen



Settings



Switch to Phone



Audio ON



Video ON

# MANAGING THE REGIONAL NETWORK: VIDEOCONFERENCE



academy.cba.mit.edu/classe X    Academany / Fab Academy X    Fab Academy 2018 X

https://gitlab.fabcloud.org/academany/fabacademy/2018/lab

Fab Academy 2018 fabcloud

GitLab Projects Groups Activity Milestones Snippets Details

Academany > Bottrop students > lukas.hellwig > Details

Lukas.hellwig

Overview Details Activity Cycle Analytics

Star 1 Fork 0 SSH git@gitlab.fabcloud.org:academany/fabacademy/2018/lab.git

Files (2.3 MB) Commits (9) Branch (1) Tags (0)

Add Commit

master Lukas Hellwig committed 6 days ago

Update week1

Name Last commit

pictures add pictures

Collaboration tools and resources for managing the regional network:

- Video conference platform (multiple participants, including Neil Gershenfeld).
- GitLab repository for the Fab Academy 2018 project, specifically for Bottrop students.
- Academany website for the Fab Academy 2018.
- SSH access to the GitLab repository.
- Commit history showing activity from Lukas Hellwig.
- Branch selection dropdown.
- File statistics (2.3 MB).
- Commit details: "Update week1" by Lukas Hellwig 6 days ago.
- Repository navigation links: Overview, Details, Activity, Cycle Analytics, Repository, Issues, Merge Requests, CI / CD, Wiki, Snippets.
- User profile sidebar: Star (1), Fork (0), SSH (git@gitlab.fabcloud.org:academany/fabacademy/2018/lab.git).

# FABO X WINTER BOOTCAMP



THANK YOU!  
谢谢

**SAVERIO SILLI | 西萨维**

Fablab Guru - Fablab O Course Director