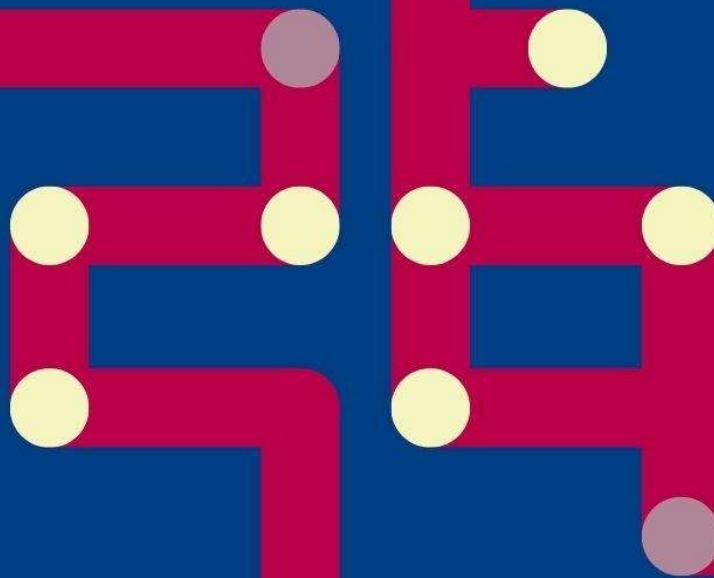


FAB ACADEMY

STUDENTS BOOTCAMP



LEARN
HOW TO **MAKE**
(ALMOST) **ANYTHING**



Luciana Asinari

Fab Academy Global Coordinator and Dean
Fab Lab Barcelona

Pablo Nuñez

Lead Global Instructor
Fab Lab León



Student Bootcamp

A Friendly Guide for Your **Fab Academy** Journey

MONDAY

GENERAL
TIPS

TUESDAY

CONTENT AND
FINAL PROJECT

**YOU ARE ABOUT TO ENTER AN INCREDIBLE
NETWORK**



SPEAK "FRIEND" AND ENTER



FAB ACADEMY IN NUMBERS



16 EDITIONS
1714 GRADUATES SINCE 2008
65 NODES THIS YEAR

FAB ACADEMY IN EMOTIONS



*I've seen things you people
wouldn't believe.*

FAB25



FAB25 CZECHIA

JULY 4-11, 2025 BRNO & PRAGUE



FAB X EVENTS

Past events

FAB 24 MÉXICO



The 2024 International Fab Lab Conference in Puebla, México under the theme Fabricating Equity.

BALI FAB FEST



The 2022 International Fab Lab Conference in Bali (Indonesia) and Fab City Summit under the theme #Designing Emergent Realities.

FABXLIVE



The 2020 Online International Fab Lab Conference

FAB 23 BHUTAN



The 2023 International Fab Lab Conference in Thimphu, Bhutan under the theme #Designing Resilient Futures.

FAB16



The 2021 Online International Fab Lab Conference in Montréal (Canada) and the Fab City Summit online under the theme #Fabricating the Commons.

FAB15



The 2019 International Fab Lab Conference in El Gouna, Egypt. Theme: Collectively Independent

FAB14

FAB14+

FAB13

FAB13



Foundations for Fab Futures

SAVE THE DATE

JULY 27-31, 2026



FAB ACADEMY IN EMOTIONS



BE PREPARE TO MEET
AMAZING PEOPLE

A NETWORK OF RESTLESS MINDS
READY TO HELP YOU IN
YOUR JOURNEY

¿Where are you from?

Join at menti.com | use code 4595 5862

Mentimeter

Where are you from? Move the pin and click "submit"

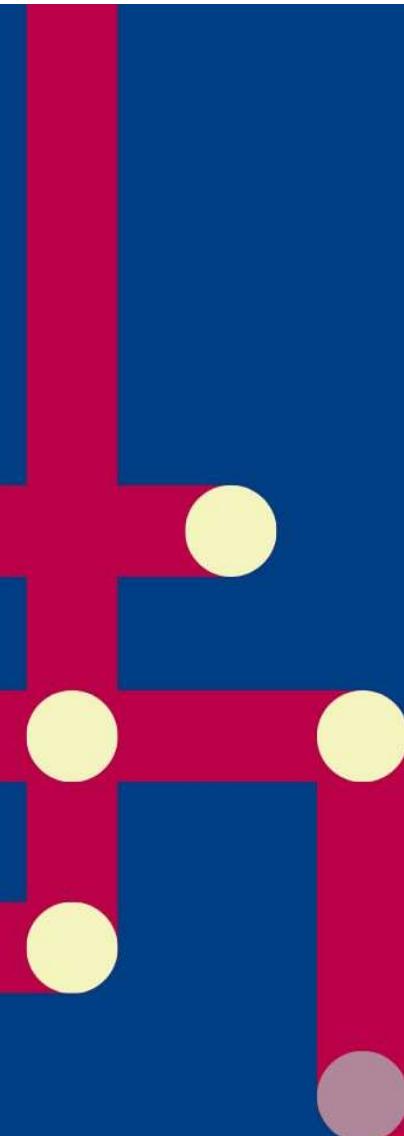


<https://www.menti.com/alje7us8uk3n>



Adrián Torres

Lead Global Instructor
Fab Lab León



Student Bootcamp

A Friendly Guide for Your Fab Academy Journey





GENERAL TIPS

IMPORTANT LINKS

- [Fab Academy 2026](#)
- [Schedule](#)
- [Inventory](#)
- [Assessment - Nueval](#)
- [Tutorials](#)
- [Fab Academy Student Agreement](#)
- [Projects](#)
- [Programmers](#)
- [Image compression](#)
- [Video compression](#)
- [Videos of Reviews, classes, recitations](#)



<https://fabacademy.org/2026/>



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Schedule

Info of the class (links, tutorials...)

[The Fab Academy](#)
2022 Schedule

- Jan 10- [instructor boot camp](#)
- Jan 17- [student boot camp, project presentations](#)
- Jan 26: [principles and practices \(video\)](#), [project management \(video\)](#)
- Jan 31 *recitation: version control (video)*
- Feb 02: [computer-aided design \(video\)](#)
- Feb 09: [computer-controlled cutting \(video\)](#)
- Feb 14 *recitation: parametric+ design*
- Feb 16: [electronics production \(video\)](#)
- Feb 23: [3D scanning and printing \(video\)](#)
- Feb 28 *recitation: debugging*
- Mar 02: [electronics design \(video\)](#)
- Mar 09: [computer-controlled machining \(video\)](#)
- Mar 14 *recitation: programming*
- Mar 16: [embedded programming \(video\)](#)
- Mar 23: [molding and casting \(video\)](#)
- Mar 28 *recitation: machine building*
- Mar 30: [output devices \(video\)](#)
- Apr 06: [mechanical design, machine design \(video\)](#)
- Apr 13: break
- Apr 18 *recitation: fab ecosystem*
- Apr 20: [input devices \(video\)](#)
- Apr 27: [networking and communications \(video\)](#)
- May 02 *recitation: education*
- May 04: [interface and application programming \(video\)](#)
- May 11: [wildcard week \(video\)](#)
- May 16 *recitation: DEI+*
- May 18: [applications and implications \(video\)](#)
- May 25: [invention, intellectual property, and income \(video\)](#)
- May 30 *recitation: start-ups*
- Jun 01: [project development \(video\)](#)
- Jun 08- [project presentations \(08,10,13,15\)](#)
- July 25- FAB17

Video of the class

→ Recitations: 1 every 2 weeks

[Search your global time](#)

Global lectures happen on Wednesdays at 9:00 on the US East Coast (ranging from 6:00 on the West Coast to 23:00 in Japan). Recitations happen on Mondays at the same hour, and global lab sections and regional reviews are scheduled throughout the week.



Class

2D design

raster

[scan](#)
[GIMP](#) [BIMP](#) [pixels](#)
[Photoshop](#)
[Pixlr](#)
[MyPaint](#)
[Krita](#)
[ImageMagick](#) [GraphicsMagick](#) [Converseen](#) [encoding](#)
[Geeqie](#) [gThumb](#)

vector

[Potrace](#) [mods](#)
[Inkscape](#) [shapes](#) [Booleans](#) [clones](#)
[Iodraw](#)
[Illustrator](#)
[Sketchpad](#)
[CorelDRAW](#)
[Scribus](#)
[QCAD](#)
[FreeCAD](#) [constraints](#)
[Layout](#)

3D design

types

design past, present, future
project complexity, collaboration
volume (VRep), boundary (BRep), function (FRep) representations
GUIs, scripting, hardware description languages
imperative, declarative, generative, optimization, Multidisciplinary Design Optimization

programs

[SketchUp](#) [Tinkercad](#)
[Shapesmith](#) [Flood](#)
[Blender](#) [Sverchok](#)
[sculpting](#) [rendering](#) [animation](#)
[ZBrush](#)
[Rhino](#) [Grasshopper](#) [Kangaroo](#)

Computer-Aided Design



Inventory

Fab Lab/Class Inventory (incomplete draft)
[full inventory](#)

Computer-Aided Design, Project Management

quantity	item	description	list unit price	extended price
Amazon				
		videoconference		
3	C920x	Logitech HD Pro Webcam, Full HD 1080p/30fps	\$56.99	\$170.97
1	Speak 510	Jabra Wireless Bluetooth Speaker for Softphone and Mobile Phone	\$149.00	\$149.00
				total
				\$319.97

total: \$319.97

Assignments

assignment

model (raster, vector, 2D, 3D, render, animate, simulate, ...) a possible final project, compress your images and videos, and post a description with your design files on your class page

assignment

group assignment:

- test the design rules for your 3D printer(s)

individual assignment:

- design and 3D print an object (small, few cm³, limited by printer time) that could not be made subtractively
- 3D scan an object (and optionally print it)

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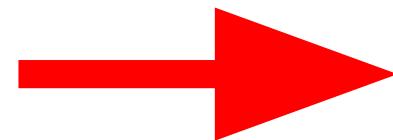


Labs



The Fab Academy
2022

- [Aalto Fablab \(Espoo, Finland\)](#)
- [AgriLab \(Beauvais, France\)](#)
- [Al Jazri Lab \(Sharjah, UAE\)](#)
- [Fab Lab Amsterdam - Waag \(Amsterdam, Netherlands\)](#)
- [Fab Lab Bangalore \(Bangalore, India\)](#)
- [Fab Lab Barcelona \(Barcelona, Spain\)](#)
- [Fab Lab Benfica \(Lisboa, Portugal\)](#)
- [Berytech Fab Lab \(Beirut, Lebanon\)](#)
- [BOLD Lab Seoul \(Seoul, Korea\)](#)
- [Fab Lab Bhutan \(Thimpu, Bhutan\)](#)



Wesites of the different Fab Labs:
Student website, Group Assignments,
Machine...



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Students



The Fab Academy
2022

[Aalto \(Espoo, Finland\)](#)  Website of the Fab Lab

- [Alexander Andrew McVicker](#)
- [Matti Niinimäki](#)

[AgriLab \(Beauvais, France\)](#)

- [Aurore Kubica](#)
- [Christophe Chamot](#)
- [jules topart](#)



 Website of the students

[Amsterdam - Waag \(Amsterdam, Netherlands\)](#)

- [Bas Pijls](#)
- [Benjamin Doerig](#)
- [Bente van Bourgondien](#)
- [Joany Beer](#)
- [Jonathan Blok](#)
- [Paola Zanchetta Muñoz](#)
- [Saco Heijboer](#)
- [Sander Blom](#)



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Documents

Assessment

Tutorials

Agreements: labs instructors students

Fab Academy Student Agreement

The Fab Academy is responsible for:

- Teaching principles and practices of digital fabrication
- Arranging lectures, recitations, meetings, and events for the class
- Evaluating and providing feedback on student work
- Offering clear standards for completing assignments
- Certifying and archiving student progress
- Supervising class preparation
- Reviewing prospective students, instructors, and labs
- Providing central staff and infrastructure for students, instructors, and labs
- Fund-raising for costs not covered by student tuition
- Managing and reporting on the program's finances, results, and impacts
- Publicizing the program
- Promoting a respectful environment free of harassment and discrimination

I am a Fab Academy student, responsible for:

- Attending class lectures and participating in reviews
- Developing and documenting projects assigned to introduce and demonstrate skills
- Allowing the Fab Academy to share my work (with attribution) in the class for purposes compatible with its mission
- Honestly reporting on my work, and appropriately attributing the work of others
- Working safely
- Leaving workspaces in the same (or better) condition than I found them
- Participating in the upkeep of my lab
- Ensuring that my tuition to cover local and central class costs is covered
- Following locally applicable health and safety guidance
- Promoting a respectful environment free of harassment and discrimination

Signed by committing this file in my repository,
(your name goes here)

Tutorials created by
Fab Academy
instructors/students

- The assignments (what you'll do)
- What we want you to learn each week (why you're doing it)
- The base-line evidence/proof/things you need to show about what you've learnt each week (what you did and how you did it).

CRITERIA FOR NUEVAL

You should read it, and upload a copy signed to your repo.



Assessment

Type to search

Introduction

General Essentials

Commercial Board Policy

Principles and Practices, project man...

Computer-Aided Design

Computer-Controlled Cutting

Embedded Programming

3D Scanning and Printing

Electronics Design

Computer-Controlled Machining

Electronics Production

Output Devices

Mechanical Design, Machine Design

Midterm Review

Input Devices

Molding and Casting

Networking and Communications

Interface and Application Programming

Fab Academy 2025 Assignments and Assessment

Created by Anna Kaziunas France & Bas Withagen (2015)

Maintained by Jani Ylioja, Steven Chew, Vaneza Caycho and Pablo Nuñez

What is this document

During Fab Academy, you will learn how to envision, prototype and document your ideas through many hours of hands-on experience with digital fabrication tools. **This document outlines:**

- The assignments (what you'll do)
- What we want you to learn each week (why you're doing it)
- The base-line evidence/proof/things you need to show about what you've learnt each week (what you did and how you did it).

How to be evaluated

Advise your local instructor when you have completed assignments so they include your work in their weekly round of assessment. Your local instructor will advise of dates and times of assessments.

Not sure what code to use for your favorite smiley? Consult the [Emoji Cheatsheet](#).

Feedback & questions

CRITERIA FOR
YOUR
EVALUATION:
NUEVAL

You have a
section for each
assignment



<https://fabacademy.org/2026/>



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Projects

pub

P **pub**  Group ID: 1484 Request Access 

public, publication

Subgroups and projects Shared projects Archived projects

Subgroup	Description	Count
 programmers 		0 8 3
 Tools 	Various software tools to make ones Fab life easier.	0 1 1
 Inventory 	The Fab inventory	0 1 1
 projects 	Subgroup for shared public projects	2 3 4
 libraries 	Group for shared libraries	1 1 1
 hello world 	Group for hello-world projects and documentation	0 2 1
 Tutorials 	Tutorial repository to be updated continuously.	★ 0 1 week ago
 project index 	Maintainer	

You will find the new
programmers, libraries, hello
world, Resources...

<https://fabacademy.org/2026/>



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Prior Years



[The Fab Academy](#)
2022

Prior Years

[2021](#)

[2020](#)

[2019](#)

[2018](#)

[2017](#)

[2016](#)

[2015](#)

[2014](#)

[2013](#)

[2012](#)

You can find other students from other years, projects... all the documentation from past years.



<https://fabacademy.org/2024/>



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Search:

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Search tool for any project, tool, machine, student... It's super powerful.



<https://pub.fabcloud.io/project/expert-network-map/>

Expert Network Map

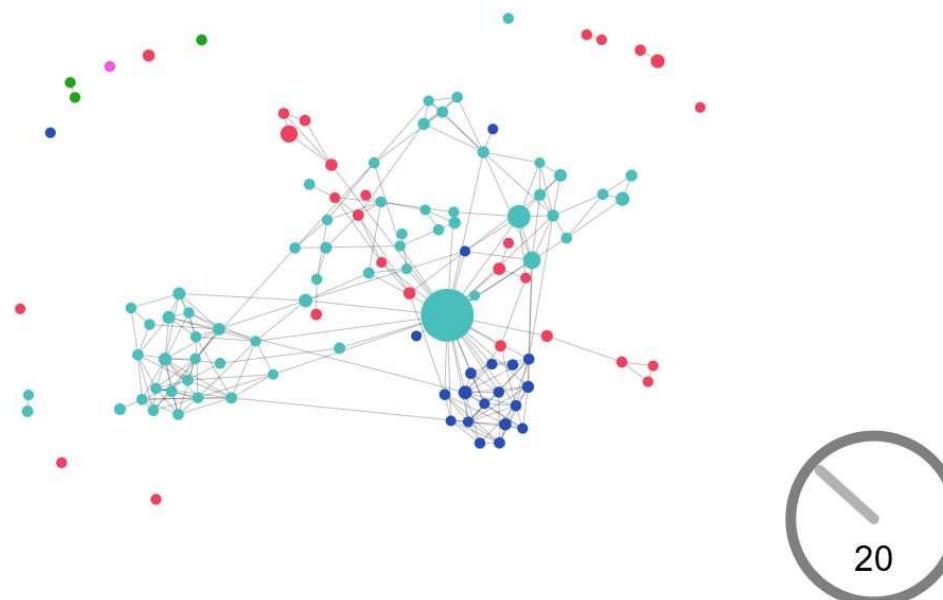
Seven generations of Fab Academy students intertwined

Seek Out *Topic Experts*

The Expert Network Map allows users to visually identify *Topic Experts* in the Fab community. *Topic Experts* are Fab Academy students who are frequently referenced by peers. Fab Academy students often link each other's websites in their documentation, and mapping these connections creates a network intertwined across labs, years, and countries. The more times a student is referenced correlates with expertise level in specific subject areas. For current Fab Academy students, it can be extremely helpful to quickly identify *Topic Experts* to access their documentation for reference. Interacting with the Map can determine *Topic Experts* by year and specific labs. Once *Topic Experts* are found, clicking on their circle redirects the user to their Fab Academy Documentation Website.

The Expert Network Map allows users to navigate the massive web of interconnected students and highlights *Topics Experts* dating back to 2018. Each Fab Academy student is represented by a circle. Drag around different students to play with the data and gain insight into the interconnectedness of the Fab community.

The larger a student's circle, the more times they have been referenced. Hover over a circle to see the student's name, year, lab, and region, and click on it to open their documentation website. Click the tabs on the left to filter by topic area; click different years on the bottom left circle to highlight students from that year; use the dropdown on the top right to highlight students from certain Fab Labs; and use the dial on the bottom right to set a minimum number of references that a student must have, changing the *Expertise Threshold*.



Student Adam Stone created a map where all students who mention other students' documentation are related.

Vimeo: Videos

vimeo Why Vimeo? **Features** **Resources** **Watch** **Pricing** **Log in** **Join** **New video**

Academany

Boston, MA, USA

This channel shows the videos of the Fab Academy as recorded at Fablab Amsterdam and the course...[Read more](#)

Create a free Vimeo Basic account to view Academany's contact details

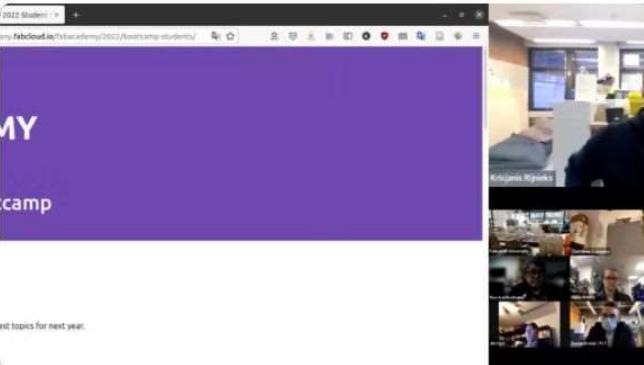
Join

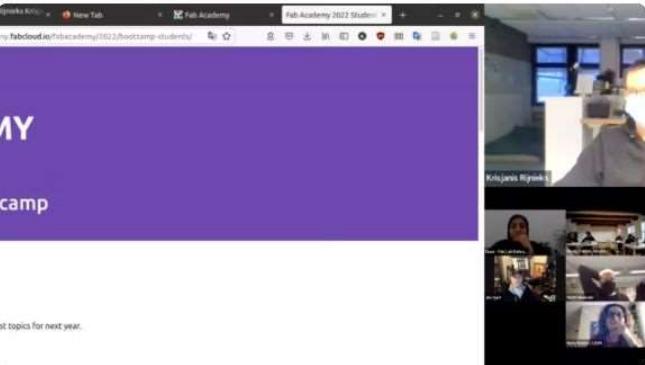
Activity

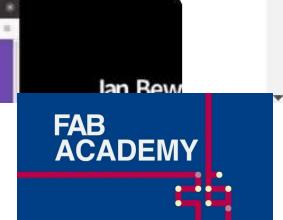
Showcases 1

637 videos

2022- Students Bootcamp

 **FA2022_StudentBootcamp_Day5.mp4**

 **FA2022_StudentBootcamp_Day4.mp4**

 **Ian Bew**

FAB ACADEMY

Image compression

GIMP

[compress](#)
[resize](#)
[batch](#)

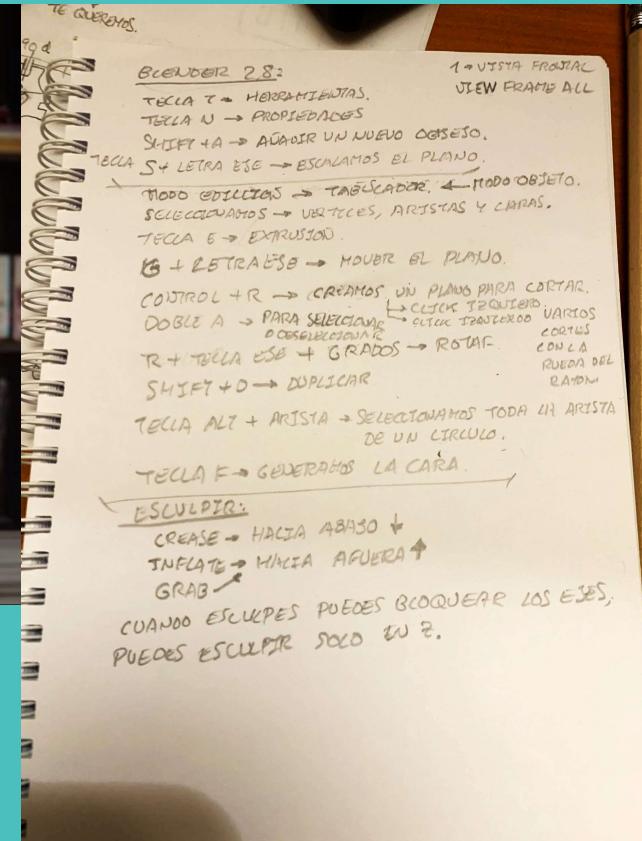
ImageMagick

```
list formats:  
    convert -list format  
    JPG: compressed  
    PNG: uncompressed  
convert PNG to JPG:  
    convert input.png output.jpg  
convert all PNGs to JPGs:  
    mogrify -format jpg *.png  
convert SVG to PNG at 1000 DPI:  
    convert -density 1000 -units PixelsPerInch input.svg output.png  
compress JPG to quality 50% width 1000:  
    convert input.jpg -quality 50% -resize 1000 output.jpg  
compress all JPGs to quality 50% width 1000:  
    mogrify -quality 50% -resize 1000 *.jpg
```

Video compression

```
HTML5 MP4 ffmpeg encoding
variable bit rate 1080p MP3:
ffmpeg -i input_video -vcodec libx264 -crf 25 -preset medium -vf scale=-2:1080 -acodec libmp3lame -q:a 4 -ar 48000 -ac 2 output_video.mp4
fixed bit rate 1080p MP2:
ffmpeg -i input_video -vcodec libx264 -b:v 1000k -vf scale=-2:1080 -acodec mp2 -b:a 256k -ar 48000 -ac 2 output_video.mp4
no audio:
ffmpeg -i input_video -vcodec libx264 -b:v 1000k -vf scale=-2:1080 -an output_video.mp4
crop size (width:height:xoffset:yoffset):
ffmpeg -i input_video -vf crop=1500:800:200:100 -vcodec libx264 -b:v 1000k -an output_video.mp4
trim time (-ss start time, -t duration):
ffmpeg -i input_video -vcodec libx264 -b:v 1000k -an -ss 00:00:10 -t 00:00:10 output_video.mp4
mix audio and video:
ffmpeg -i input_video -vcodec libx264 -b:v 1000k -vf crop=1120:876:0:100 -i input_audio -acodec mp2 -b:a 256k -ar 48000 -ac 2 -ss 00:00:20 -t 00:00:20 output_video.mp4
crop, pan, composite:
ffmpeg -i input_video_1 -i input_video_2 -filter_complex '[1:v]crop=175:95:930:860[cropout];[cropout]scale=350:190[scaleout];[0:v][scaleout]overlay=10:10[outv]' -map '[outv]' -vcodec libx264 -b:v 1000k -map 0:a
numbered images to video:
ffmpeg -r 30 -i %04d.jpg -vcodec libx264 -b:v 1000k -vf scale=-2:1080 -an output_video.mp4
```

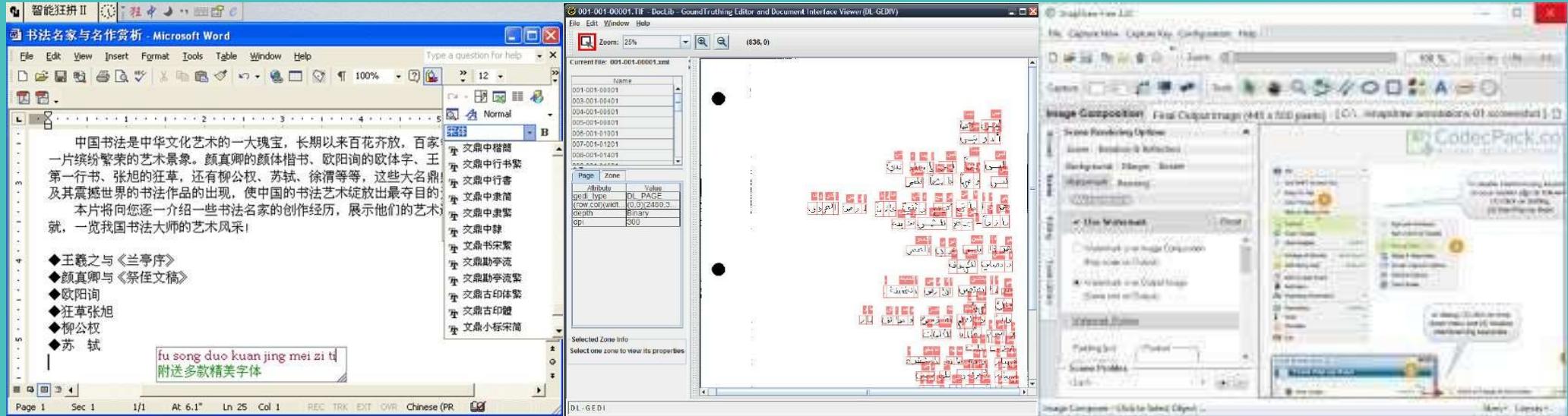
Keep and Write Notes In A Small **Notebook**



Youtube: Surviving Fab Academy

- **Fast. Convenient. Better for memory recall**
- Supplement to digital documentation
- Document as you go
- Quick sketches

English for Documentation...Please



General Recommendation: Switch Software to English for documentation.
 If not possible, clarify images with detailed English explanations describing the procedural steps you made.

English is the communication standard for Fab Academy...and required for Global Evaluation.

The Assessment Book



¿Whats is this document for?

The Assessment Book

- The assignments (what you'll do)
- What we want you to learn each week (why you're doing it)
- The base-line evidence/proof/things you need to show about what you've learnt each week (what you did and how you did it).

<https://fabacademy.org/2026/nueval/>



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ACADEMY

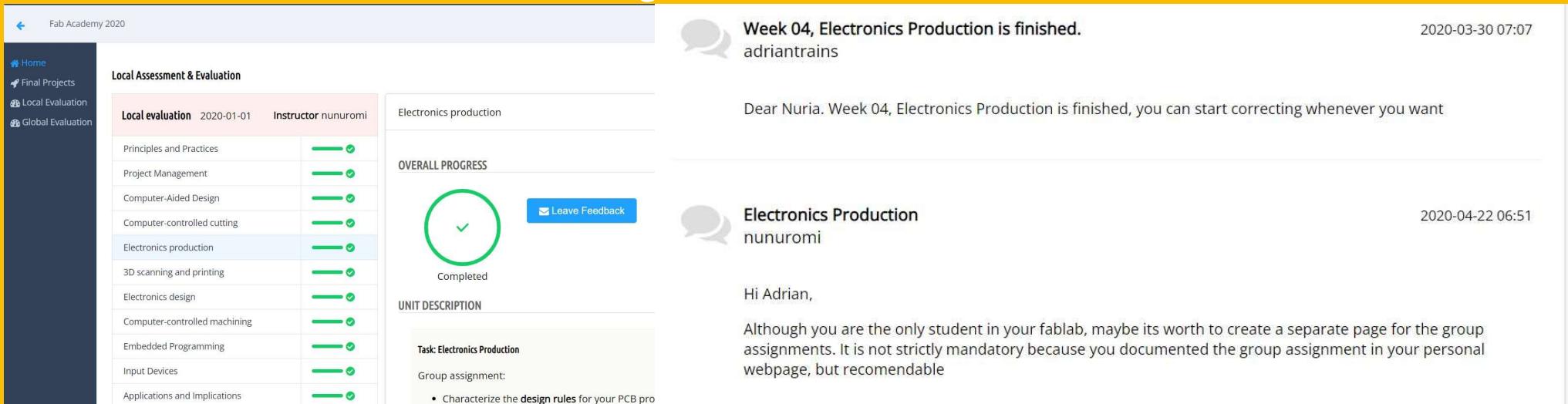


NUEVAL
nueval.fabacademy.org

Communicate...to Make Progress

It's a tool for all the people involved in the Fab Academy learning environment: Student, Local instructor and Global Evaluator.
The only way to keep tracking of the learning path.

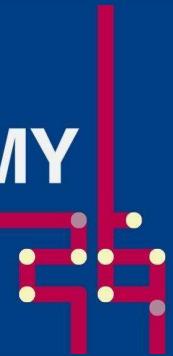
- Give feedback to both your **local** evaluator as well as your **global** evaluator.
- Work with evaluators toward graduation success!



The screenshot shows a web-based application for tracking local evaluations. On the left, a sidebar lists 'Home', 'Final Projects', 'Local Evaluation', and 'Global Evaluation'. The main area is titled 'Local Assessment & Evaluation' and shows a table of completed tasks under 'Local evaluation' (2020-01-01) and 'Instructor' (nunuromi). The tasks include 'Principles and Practices', 'Project Management', 'Computer-Aided Design', 'Computer-controlled cutting', 'Electronics production', '3D scanning and printing', 'Electronics design', 'Computer-controlled machining', 'Embedded Programming', 'Input Devices', and 'Applications and Implications', all marked as completed with green checkmarks. To the right, a communication log shows two messages. The first message, from 'adriantrains' on 2020-03-30 at 07:07, says: 'Week 04, Electronics Production is finished.' and 'Dear Nuria. Week 04, Electronics Production is finished, you can start correcting whenever you want'. The second message, from 'nunuromi' on 2020-04-22 at 06:51, says: 'Electronics Production' and 'Hi Adrian,' followed by a recommendation: 'Although you are the only student in your fablab, maybe its worth to create a separate page for the group assignments. It is not strictly mandatory because you documented the group assignment in your personal webpage, but recomendable'.

Lets take a look

FAB
ACADEMY



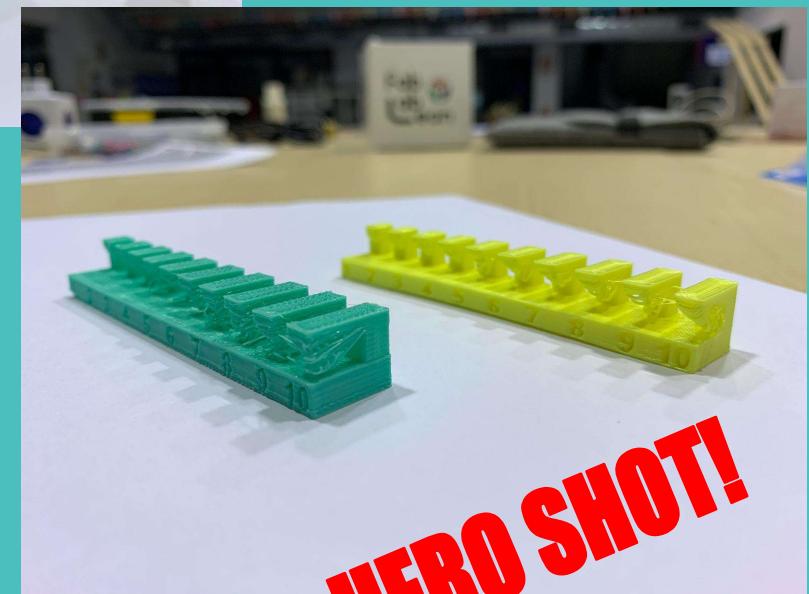
How to make (almost) good **PHOTOS** & **VIDEOS**

Prepare your **camera, smartphone** and your **computer**

- **Smaller Image Size**
 - Open the **Camera** app on your device
 - Tap on the **Settings** icon which should look like gear as always
 - Select **Picture Quality**
 - Choose a reasonable image **File Size** > 1MB
- Compress **Photo** size -> **Image Magick**
- Compress **Video** size -> **FFMPEG**
- **Canva**
 - Templates.
 - Compress image
 - Video editing

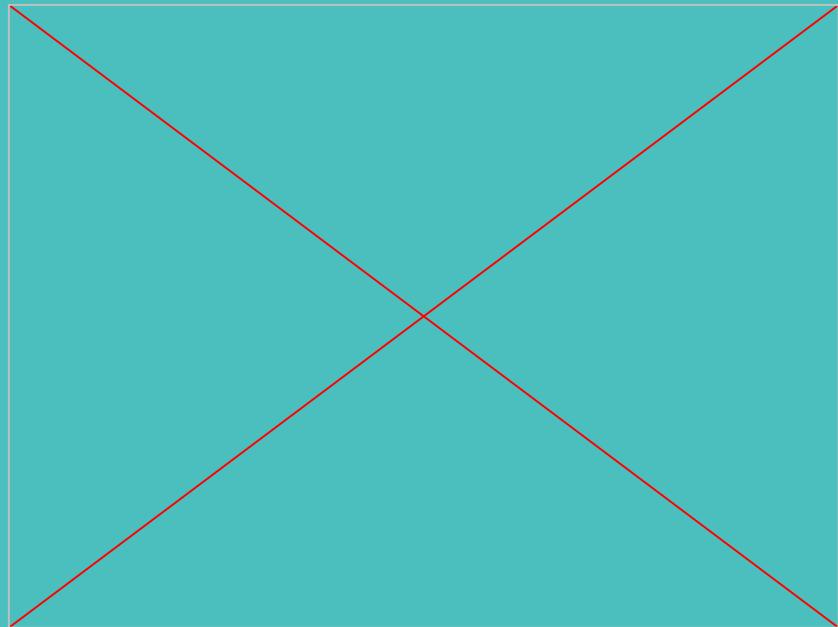


One Good Photo is Worth 1000 Words



- Good light. Good focus. Horizontal.
- YOU making things

Save Videos In the **Repository**



- Horizontal
- Short
- No watermark



Week 10: Input Devices

Assignments

- Week 1: Project Management & Web Development
- Week 2: Computer-Aided Design
- Week 3: Computer Controlled Cutting
- Week 4: Electronics Production
- Week 5: 3D Printing & Scanning
- Week 6: Electronics Design
- Week 7: Computer-Controlled Machining
- Week 8: Embedded Programming
- Week 9: Mechanical Design & Machine Design
- Week 10: Input Devices
- Week 11: Molding and Casting
- Week 12: Output Devices
- Week 13: Networking and Communications
- Week 14: Interface and Application Programming
- Week 15: Wildcard Week
- Week 16: Applications and Implications
- Week 17: Invention, Intellectual Property, and Income

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- Apr 9
- Apr 10
- Apr 11
- Apr 29
- May 8



TIME MANAGEMENT

Rico Kathatham

Lead Global Instructor
Skylab Workshop Fab Lab



FAB
ACADEMY



Pablo Nuñez
Rico Kanthatham
Adrián Torres

GLOBAL
OPEN
TIME

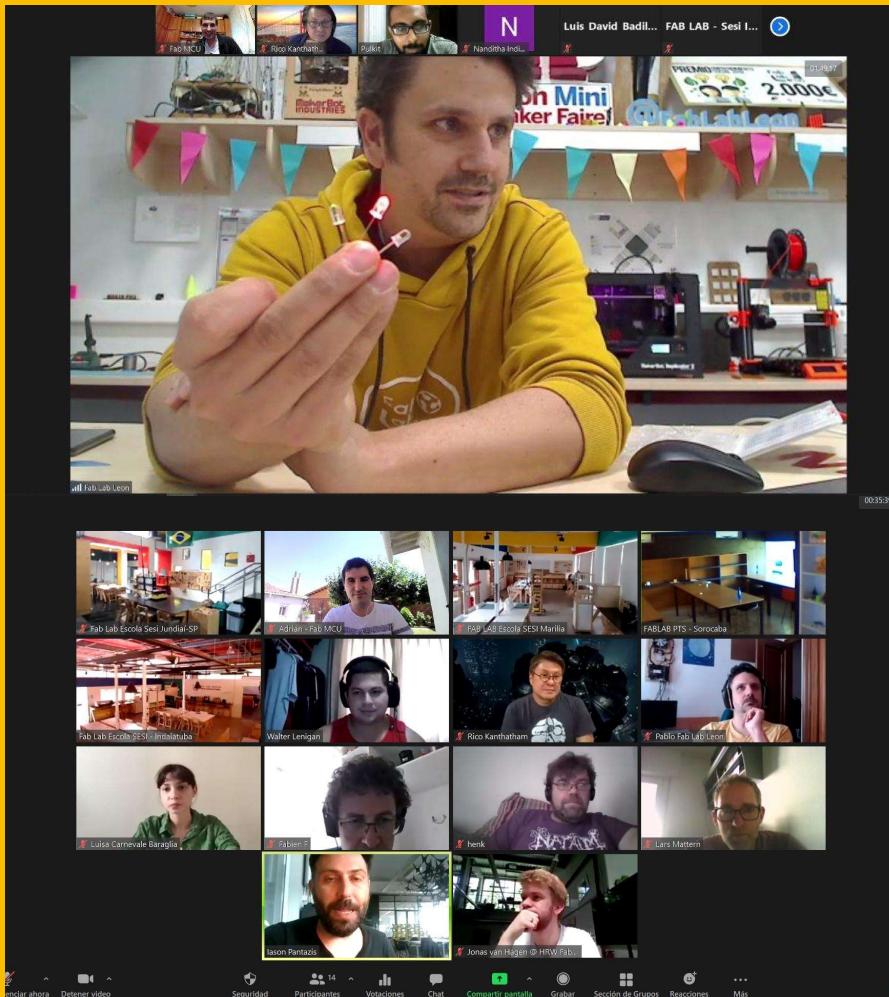
You Are **Not** Alone.



Where **everybody**
knows your
name...

and your face :)

What is Global Open Time?



**10:00AM - 11:00AM EDT
Saturday
Zoom MCU Room**

- Get together with **friends**...in a **fun** place
- **Discuss questions and concerns**...find answers...most of the time :)
- Seek advice to **focus and redirect** assignments or Final Project

Why is Global Open Time?

**Enjoy every moment of your
Fab Academy journey...
We are here for you.**



FAB
ACADEMY



MATTERMOS
chat.academy.org

How to **CHAT** with **(almost)** anyone.

FIND HIS/HER USER NAME
@something
same as gitlab.fabcloud.org user

chat.academany.org

FAB
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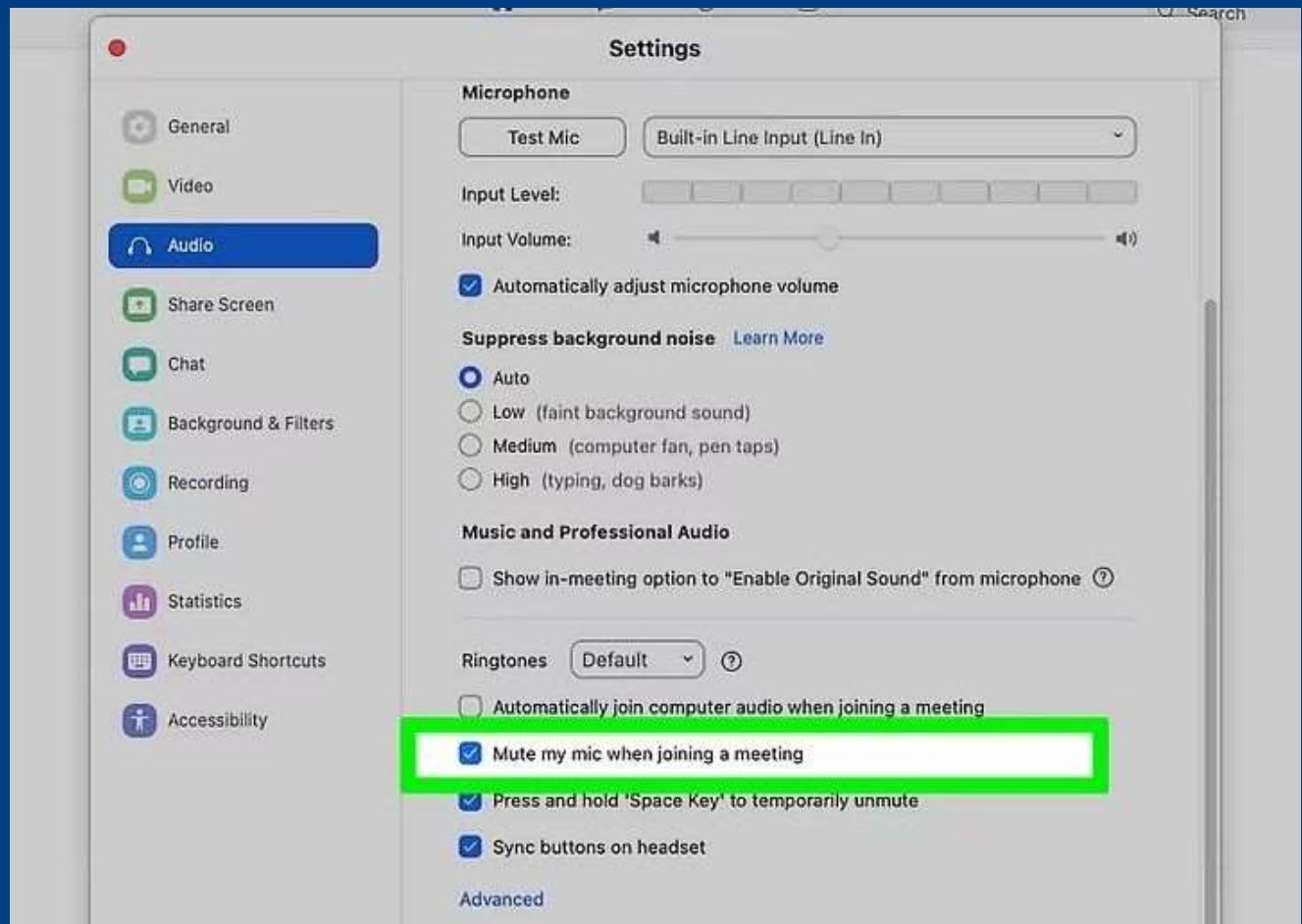
HOW TO SURVIVE ALMOST ANY ZOO

1

Enter **ALWAYS** muted.

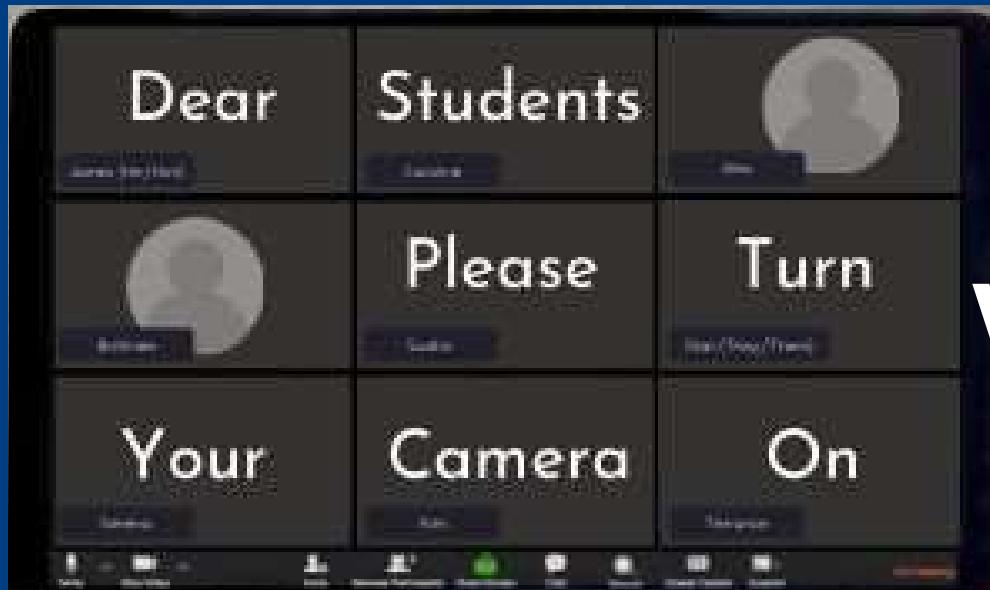


Check all your devices:
computer, laptop,
mobile...



2

TURN ON your camera.



VS



WE ARE A NETWORK OF **PEOPLE**

3

SPEAK slow and clear.



KEEP
CALM
AND
PREPARE FOR
PUBLIC SPEAKING

4

SAVE the chat.

