

Hardware essentials to record (and stream) from Campus

Center for Digital Education (CEDE)
Teaching Support Center (CAPE)
Service Audiovisuel (SAVE)

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More information: <https://go.epfl.ch/flexible-teaching>
On campus assistance: save@epfl.ch / Call: 33400

This document identifies three configurations for teaching on campus while recording / streaming lectures that we have tested and for which we can provide support.

These recommendations complement the great “savoir-faire” which teachers have put in place during the past 18 months.

General Approach

For all configurations covered in this guide:

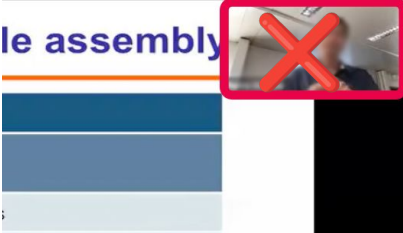
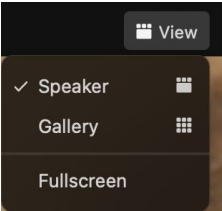
- Use **ZOOM** to record (or stream) the lecture. Thus, if sanitary restrictions apply, you can share the ZOOM meeting ID to remote students.
- Use the **microphone from the lecture hall** (if available). The audio is at the same time sent to the loudspeakers in the lecture hall and recorded or streamed to ZOOM in good quality.
- Use **only 1 source to project** in the room on the main projector and record / stream it to distant students. If using a second projector, remote students should also have access to the content.
- Use a “**non-laser**” **pointer** to allow remote students to see what you are pointing at.
- **Publish your course recordings** on SWITCHtube soon after the lecture.

Not covered in this document

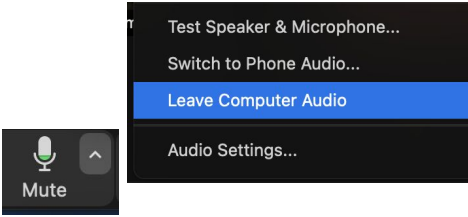
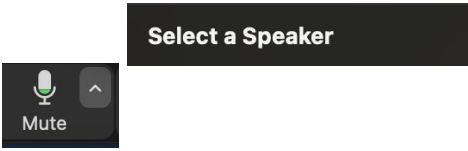
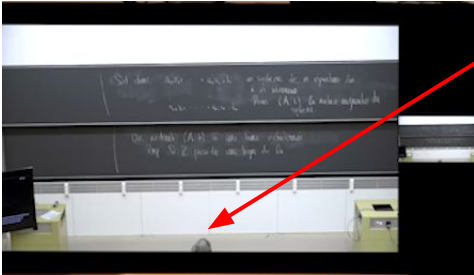
In addition to this guide you might find useful information in the following quick start guides:

- Learn about how to prepare your lecture material for recording and discover the steps involved in pre-recording your lectures.
https://go.epfl.ch/QUICKSTART_VideoRecording
- Learn about how to best setup your session with 1/3 of the students in class and 2/3 of the students remote.
https://go.epfl.ch/QUICKSTART_Livestream_Classroom_Lecture
- Learn about how to setup a SWITCHtube channel and upload your videos.
https://go.epfl.ch/QUICKSTART_SwitchTube
- And the all the supporting guides available on
<https://go.epfl.ch/flexible-teaching>

General ZOOM Settings

<p>Don't record your picture while sharing the screen. PIP ("Picture in Picture") takes away space on the screen and your image might be distracting for students who will watch the recording later.</p>		<p>In the zoom.us menu, go to Preferences => Recording => Unselect "Record video during screen sharing".</p>
<p>Don't record the picture of students who joined the ZOOM meeting. When you don't share your screen, ZOOM is recording the picture of the person who speaks (Speaker View).</p>		<p>Choose "Speaker View" (rather than "Participant Gallery"). Set your ZOOM View setting (upper right corner) to "Speaker" so that only your picture is recorded.</p>
<p>Record the video locally (on your laptop rather than in the cloud).</p>	<p>For more details, about settings for good quality recording, see our Quickstart Guide about ZOOM: https://go.epfl.ch/QUICKSTART_ZOOM_Essentials.</p>	

Setup tips before starting the course

<p>Avoid echo and larsen effects, by asking everyone in the lecture hall to “leave computer audio”.</p>	 A screenshot of the Zoom audio settings menu. On the left is a 'Mute' button with a microphone icon and an upward arrow. The main menu on the right contains the following options: 'Test Speaker & Microphone...', 'Switch to Phone Audio...', 'Leave Computer Audio' (highlighted in blue), and 'Audio Settings...'.	<p>From the audio button in the zoom bar, choose “Leave Computer Audio”.</p>
<p>Hear remote student’s voices from ZOOM in the lecture hall.</p>	 A screenshot of the Zoom audio settings menu, similar to the one above. A black rectangular overlay with the white text 'Select a Speaker' is positioned at the top right of the menu.	<p>Connect the laptop to the projector (HDMI connector) and from the audio button in the zoom bar, choose HDMI as the audio for output.</p>
<p>When setting up the camera, identify the area in the room where you are visible for remote participants.</p>	 A video feed of a lecture hall. In the foreground, there is a white table with a laptop and some papers. In the background, there is a large blackboard with handwritten text. A red arrow points from the right side of the frame towards the bottom center of the lecture hall, indicating the 'Invisible teacher' position.	<p>Invisible teacher</p>

How to use this document.

First, identify the hardware which is available in your [lecture hall](#).

Then identify what [source you record/stream](#)

Finally jump to the appropriate section to see recommendations.

Where do you teach ?

Where do you teach ?	Equipment available		
	Projector	In class camera and microphone	Possible to record automatically
High-tech rooms CM-1, CM-2, SG1, CO1, CE6, BCH 2201, CE4, CO2, CE3, CO3, CE1, Forum Rolex	✓	✓	✓ Contact save@epfl.ch to schedule recording (but no streaming)
Mid-tech rooms CE-2, CE-5, CM-3, CM-4, CM-5, MA A1 11, MED 0 1418, ME B3 31, MXF-1, ELA-1, ELA-2, INF-1, BC-01, CM 1 120, CM 1 121, AAC-231, ELD-020, SG 0 211, SG 0 213, Salle Polyvalente et le Polydôme	✓	✓	
Standard rooms All other teaching rooms on campus.	✓	Bring your own microphone & camera	

Choose your configuration

Note: If your needs are not covered by the options above, do not hesitate to contact save@epfl.ch who can help find a solution.

Where do you teach ?	What would you like to record / live stream ?			Configuration
	Laptop	iPad	Blackboard & Demos / Experiments	
High tech and mid tech rooms <u>High-tech rooms</u> : SG1, CO1, CE6, BCH 2201, CE4, CO2, CE3, CO3, CE1, Forum Rolex <u>Mid-tech rooms</u> : CE-2, CE-5, CM-1, CM-2, CM-3, CM-4, CM-5, MA A1 11, MED 0 1418, ME B3 31, MXF-1, ELA-1, ELA-2, INF-1, BC-01, CM 1 120, CM 1 121, AAC-231, ELD-020, SG 0 211, SG 0 213, Salle Polyvalente et le Polydôme	✓			<u>A</u>
	(✓)	✓		<u>B</u>
			✓	<u>C</u>
Standard rooms Standard rooms do not feature in room cameras and microphones. Bring your own microphone.				A, B, C with your own camera & microphone

Configuration A

“Laptop”

This section describes the setup for **mid-tech and high-tech** rooms. In **standard** rooms, replace the “Auditorium hardware” (lecture hall microphone and camera) with your own devices as explained [here](#).

Teachers use their laptop to connect to the lecture hall’s camera and audio setup.

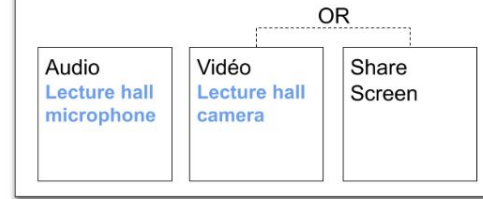
Teachers share their screen via ZOOM, for example: a Powerpoint presentation, a PDF document, or any application which is displayed on the laptop

What would you like to to record / live stream ?			
Laptop	iPad	Blackboard & Demos / Experiments	Configuration
✓			A

Auditorium Hardware



ZOOM recording



In class projection



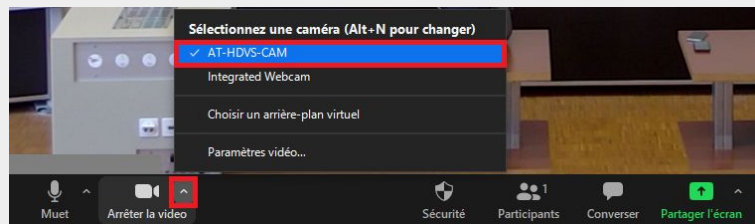
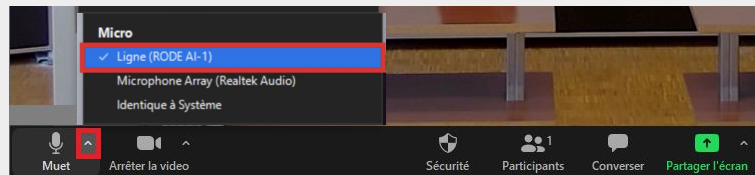
Students see the
Powerpoint on the
projector

Configuration A - Laptop

Setup

1. Connect the blue USB cable at the podium to your computer.
This will make the audio and the PTZ camera in the lecture hall available on your computer for ZOOM.
2. Connect the HDMI cable at the podium to your computer to display your screen on the projector.
3. Start ZOOM. For the audio, select the **Lecture hall microphone**. For the video, select the **Lecture hall camera**.
4. Start recording.

Instructions for setup will also be available on a Flyer at the podium in the lecture hall.



Configuration A - Laptop

Recommendations

- During the introduction and conclusion or during discussion with the class, you may stop screen sharing in ZOOM so that the recording contains a picture of you speaking.
- Repeat questions from the audience out loud before answering so that they are recorded by ZOOM.
- Make sure that what you point at in the classroom during explanations is also recorded by ZOOM.
- Use the laser pointer function in Powerpoint.

Possible pitfalls and how to avoid them

- Recording the presenter mode from Powerpoint rather than the full screen slides. Select the correct screen when sharing with ZOOM. See <https://support.zoom.us/hc/en-us/articles/203395347-Screen-sharing-a-PowerPoint-presentation>.

Switching Modes

You can switch from recording yourself or the content by simply starting or stopping the screen sharing in ZOOM.

	ZOOM setting	What is recorded	What is projected
Teacher	Screen sharing <u>off</u>	Video stream from the lecture hall camera.	Set the beamer to display a blank screen with the remote control.
Content	Screen sharing <u>on</u>	Screen capture of teachers' laptop.	If you use Powerpoint in presentation mode, the full slides.

Configuration B

“iPad”

This section describes the setup for **mid-tech and high-tech** rooms. In **standard** rooms, replace the “Auditorium hardware” (lecture hall microphone and camera) with your own devices as explained [here](#).

Teachers use an iPad in addition to the laptop which is recording the lecture.

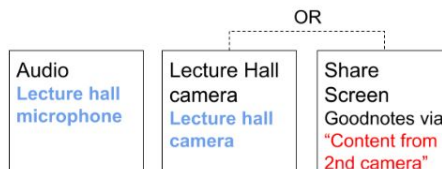
This configuration uses an [Elgato HD60S+](#) adapter which converts which allows to record and project Goodnotes without the tabs and tools that appear on the iPad. This is not supplied in lecture theatres - teachers should bring their own if required. As an alternative, connect the iPad with a cable.

What would you like to record / live stream ?			
Laptop	iPad	Blackboard & Demos / Experiments	Configuration
(✓)	✓		<u>B</u>

Auditorium Hardware



ZOOM recording



In class projection



The "blue cable"

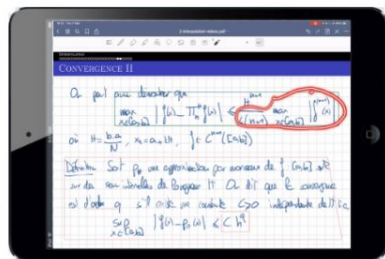
USB

USB

Elgato HD60S+ HDMI to USB converter

HDMI in

HDMI out



CONVERGENCE II

On peut aussi démontrer que

$$\max_{x \in [a,b]} |f(x) - T_n^*(x)| \leq \frac{1}{n+1} \max_{x \in [a,b]} |f^{(n+1)}(x)|$$

où $H = \frac{b-a}{N}$, $x_i = a + iH$, $f \in C^{n+1}([a,b])$

Démonstration Soit p_n une approximation par morceaux de f sur des sous-intervalles de longueur H . On dit que la convergence est d'ordre q s'il existe une constante $C > 0$ indépendante de H telle que

$$\sup_{x \in [a,b]} |f(x) - p_n(x)| \leq C H^q$$

Students see Goodnotes on the projector (without the tools and menus)

B

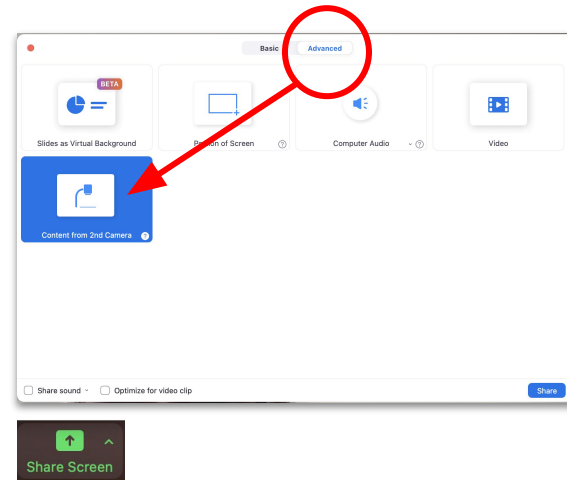
Configuration B - iPad

Setup

1. Connect the **blue USB** cable at the podium to your computer. This will make the audio and the camera in the lecture hall available on your computer for ZOOM.
2. Connect the iPad to the HDMI input of the Elgato HD60S+.
3. Connect the Elgato HD60S+ USB output to your computer. This will stream the iPad to your laptop for recording.
4. Connect the HDMI cable at the podium to the Elgato HD60S+ HDMI out connector. This will stream the iPad to the projector in the lecture Hall.
5. Start ZOOM. For the audio, select the **Lecture hall microphone**. For the video, select the **Lecture hall camera**.
6. Start sharing. Click on “Share Screen” => select the “Advanced” tab => select “**Content from 2nd camera**” and finally choose the iPad as the second camera.
7. Start recording.

Sharing the iPad via Elgato in ZOOM.

When streaming an external source (configurations B and C), the quality of the image is better through “Share Screen” (select Advanced => “**Content from 2nd camera**”) rather than using “Video” from ZOOM.



Configuration B - iPad

Recommendations

- During the introduction and conclusion or during discussion with the class, you may stop screen sharing in ZOOM so that the recording contains a picture of you speaking (Teacher mode).
- Repeat questions from the audience out loud before answering so that they are recorded by ZOOM.
- Use presentation mode in Goodnotes (set to “Mirror Presenter Page”) so that the menu and tools are not projected / recorded.
- Use the laser pointer in Goodnotes to focus attention.

Possible pitfalls and how to avoid them

- Using 2 projectors in class but recording only one source. Using the HDMI output from the Elgato HD60+ for the iPad does not allow you to use the laptop to switch from projecting the iPad to projecting the laptop. You could use the second projector in the lecture hall to project the laptop, and change the screen sharing in ZOOM to record the laptop (Laptop mode in Switching Modes).

Switching Modes

You can switch from recording yourself, the iPad or the screen of the Laptop by selecting different ZOOM settings for screen sharing.

	ZOOM setting	What is recorded	What is projected
Teacher	Screen sharing <u>off</u>	Video stream from the lecture hall camera.	The projector continues to display the iPad.
iPad	Screen sharing <u>on</u> (Content from 2nd camera)	The screen from the iPad. With goodnotes, only content is recorded (without tools and menus)	The projector receives the output of the Elgato adapter and displays Goodnotes (without tools and menus).
Laptop	Screen sharing <u>on</u> (Content from laptop)	The screen from the laptop.	The laptop needs to be connected to a second projector in the lecture hall.

Configuration B - iPad

Hardware not already supplied in the lecture hall

- Laptop and iPad
- [Elgato HD 60 S+](#) (~200 CHF)

Cables

- iPad adapter
 - iPads with a lightning plug:
[Lightning to HDMI adapter](#) (~ 50 CHF)
 - iPad Pro with USB-C plug:
[USB-C to HDMI adapter](#) (~ 70 CHF)
- HDMI cable (to connect the iPad adapter to the Elgato HD60 S+)
- USB-C cable to USB (or USB-C) (to connect the Elgato HD60 S+) to your computer. Make sure to have a cable which **supports** “[Thunderbolt](#)”.

Nice to have

- [Multi charger](#) to power laptop and Elgato.

Configuration C

“Blackboard”

This section describes the setup for **mid-tech and high-tech** rooms. In **standard** rooms, replace the “Auditorium hardware” (lecture hall microphone and camera) with your own devices as explained [here](#).

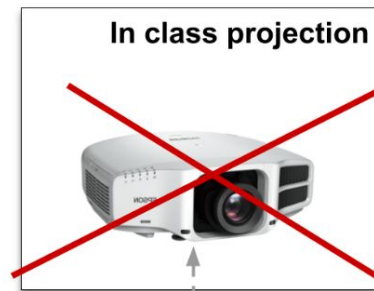
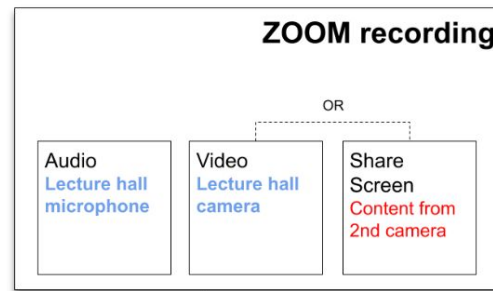
In this configuration, teachers mainly use the blackboards.

In large lecture halls the resolution of the video streams might not be sufficient to ensure good readability of the blackboards. It is therefore necessary to **zoom the camera**.

The blackboards are either filmed:

- with the lecture hall camera. The teacher or a TA select presets for the lecture hall camera on the remote control (full, left, center, right).
- by a dedicated camera placed on a tripod in the 4th row of the auditorium and operated. A TA is in charge of filming the lecture.

What would you like to record / live stream ?			
Laptop	iPad	Blackboard & Demos / Experiments	Configuration
		✓	<u>C</u>



Not available in
MA A1 11, ME B3 31, MXF-1,
ELA-1, ELA-2

The "blue cable"

USB



HDMI

Students look at
the blackboard in
class

C Lecture Hall
camera

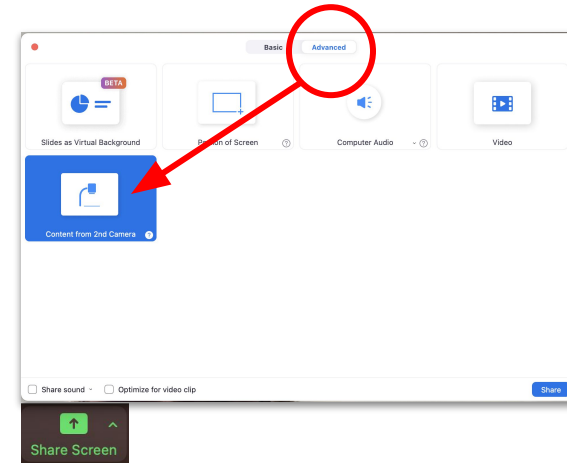
Configuration C - Blackboard Lecture Hall camera

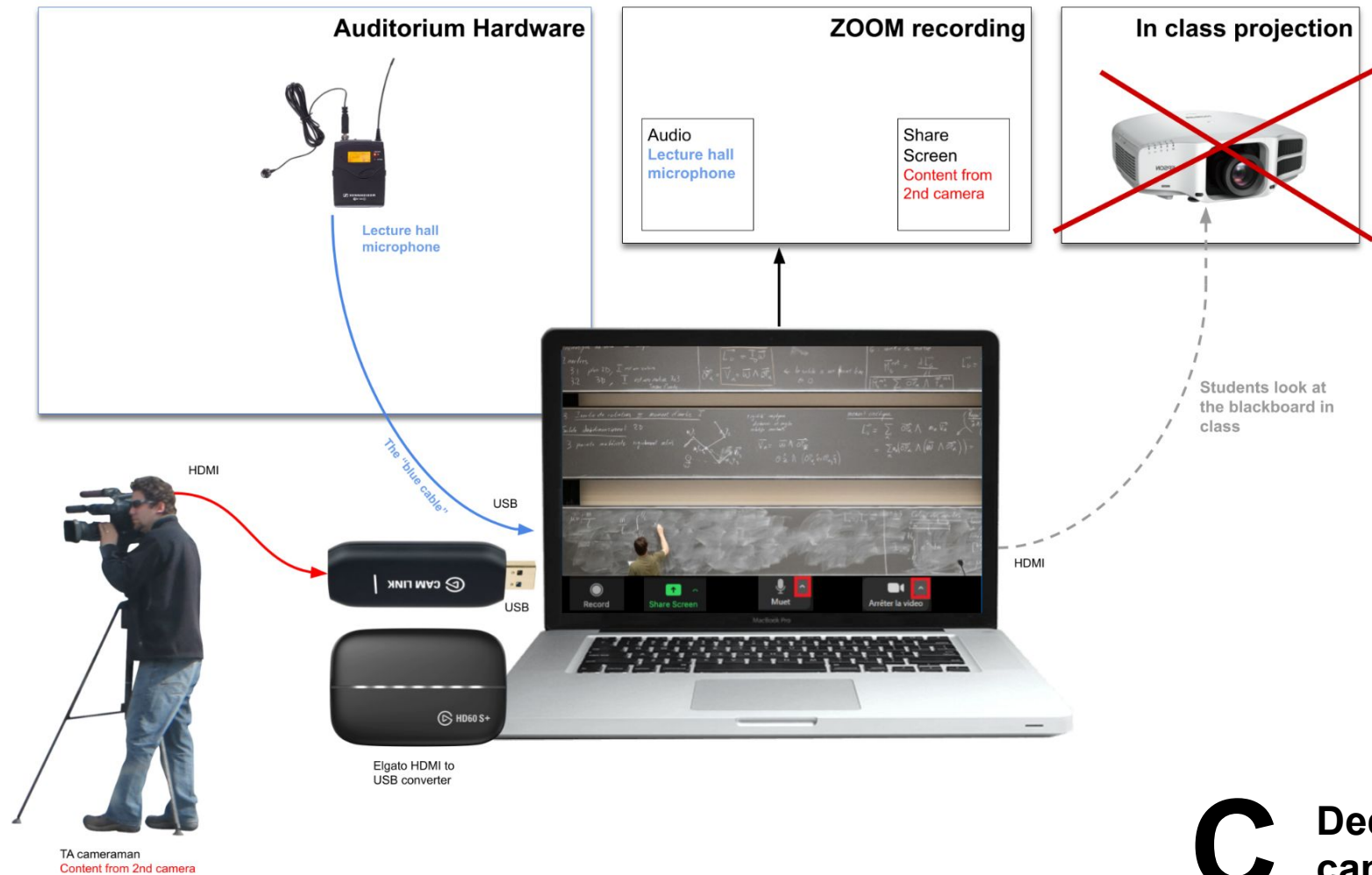


1. Connect the **blue USB** cable at the podium to your computer. This will make the audio and the camera in the lecture hall available on your computer for ZOOM.
2. Start ZOOM. For the audio, select the **Lecture hall microphone**. For the video, select the **Lecture hall camera**.
3. Start sharing. Click on “Share Screen” => select the “Advanced” tab => select “**Content from second camera**” and finally choose the **Lecture hall camera** as the second camera. Sharing the classroom camera this way results in less video compression than simply displaying the camera in ZOOM.
4. Start recording.
5. A TA can adjust the camera’s framing by using the remote control. **Attention:** not possible to use remote control in rooms MAA1 11, ME B3 31, MXF-1, ELA-1, ELA-2.

Sharing a camera or an iPad via ZOOM.

When streaming an external source (configurations B and C), the quality of the image is better through screen sharing (“Content from 2nd camera”) rather than using the main “Video” source.





Configuration C - Blackboard

Dedicated camera



1. Connect the blue USB cable at the podium to your computer. This will make the audio in the lecture hall available on your computer for ZOOM.
2. Connect the dedicated camera to the [Elgato Camlink](#) HDMI input (or to the [Elgato HD60S+](#) HDMI input)
3. Connect the Elgato Camlink (or the HD60S+) USB output to your computer. This will stream the camera feed to your laptop for recording.
4. Start sharing. Click on “Share Screen” => select the “Advanced” tab => select “**Content from 2nd camera**” and finally choose [Camlink 4K](#) as the second camera. Sharing the classroom camera this way results in less video compression than simply displaying the camera in ZOOM.
5. Start recording.
6. A TA needs to operate the camera.

Hardware (when using a dedicated camera)

- A Teaching Assistant to operate the camera.
- Camera with HDMI output
 - SAVE can lend CANON cameras and tripods
 - HDMI cable (to connect the Camera to the Elgato Camlink or Elgato HD60 S+)
- Elgato adapter (one of the two)
 - [Elgato Camlink](#) (~120 CHF). Converts a HDMI source to USB and your laptop sees it as if it was a webcam.
 - [Elgato HD 60 S+](#) (~200 CHF). Does the same as the Camlink but adds an extra HDMI output. Choosing the more expensive HD60 S+ allows you to implement the configuration *B-iPad* as well.
- USB-C cable to USB (or USB-C) (to connect the Elgato Camlink or Elgato HD60 S+) to your computer.

Configuration C - Blackboard

Recommendations

- Repeat questions from the audience out loud so that they are recorded by ZOOM.
- When pointing to the blackboards, make sure that what you point to is visible in the recording. This might entail asking the Camera operator to select a wider framing.

Possible pitfalls and how to avoid them

- Using a dedicated camera adds setup time before the class and adds complexity to the recording. SAVE will organise training sessions for TA camera operators to have panning and zooming as stable as possible (one should minimize camera movements as much as possible).

Switching Modes

The main mode here is the blackboard. Teachers could switch to using the laptop to project content quite easily by activating the projector and pulling the blackboards down.

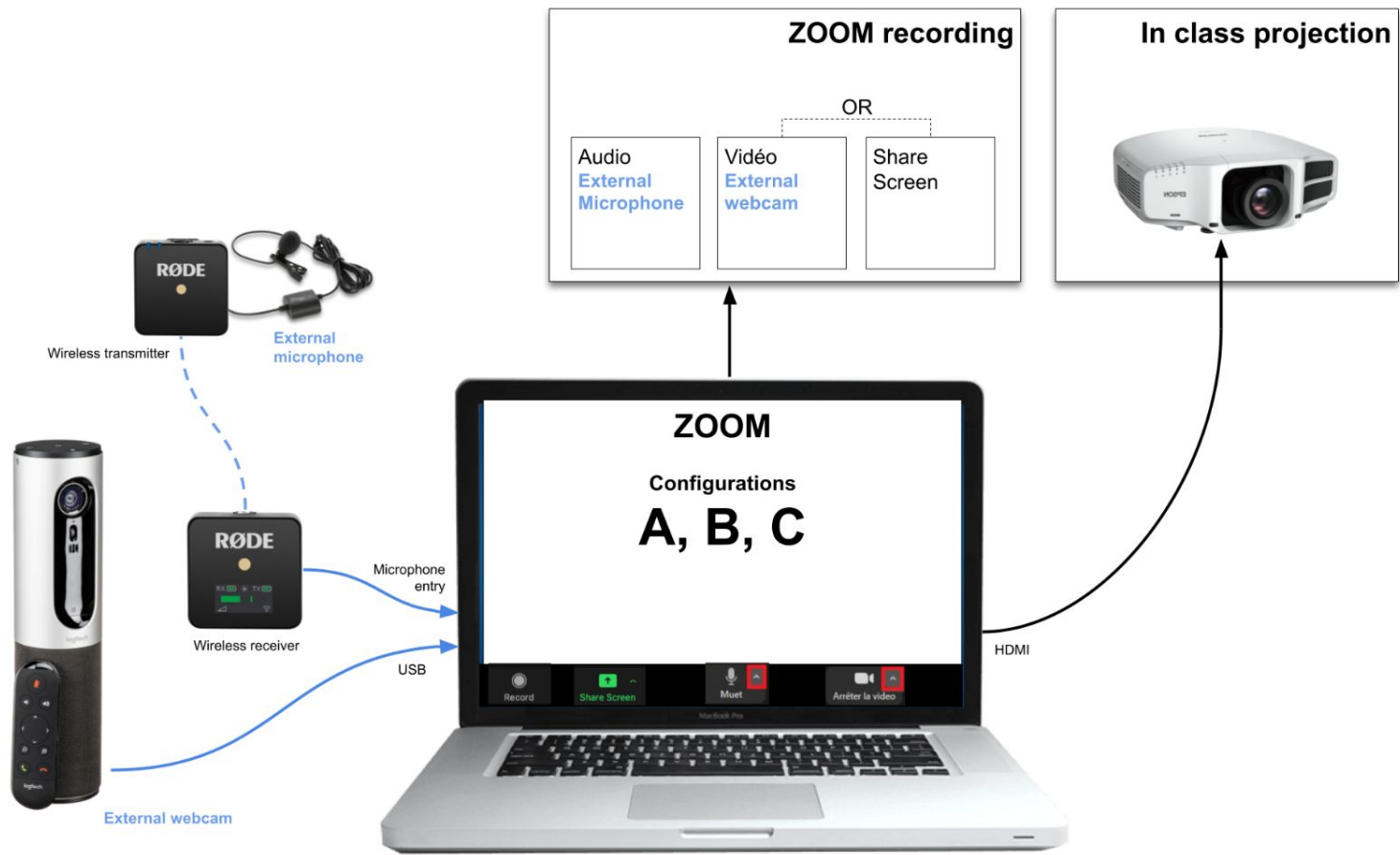
	ZOOM setting	What is recorded	What is projected
Blackboard	Screen sharing <u>on</u> (Content from 2nd camera)	Video stream from the lecture hall camera or from the dedicated camera.	Nothing
Laptop	Screen sharing <u>on</u> (Window from laptop)	The screen from the laptop.	The laptop needs to be connected to the projector in the lecture hall.

Configuration **A, B, C**

On Campus in Standard Rooms

In a standard room, there is no pre-installed microphone and no pre-installed camera. All configurations A, B, C can be implemented with the following adjustments:

- Replace the Lecture hall microphone with your own wireless microphone.
- Replace the Lecture hall camera with the camera from your laptop or an external webcam.



Standard room

On Campus - Standard Room

Choose one of these microphones. Microphone: iRig Mic Lav Microphone: Rode SmartLav+	Link Link
Get a wireless adapter and a cable adapter for the microphone Wireless adapter: Rode Wireless Go Cable adapter: Rode SC4 trs-trrs	Link Link
Use an external webcam if the laptop camera is too close. Purchase one or contact save@epfl.ch to borrow one if needed.	
Webcam: Logitech Conference Cam Connect	Link
If you use an iPad connected to the laptop Use a cable to connect the devices (see configuration B) (Airplay connection does not work on campus) (only with MAC, Windows doesn't work)	

NB: we point to digitec.ch since this vendor is a recognized EPFL supplier if you purchase via your unit.

Two separate plugs. One for the microphone and one for the headphones (or projector).
No cable adapter needed.



Wireless RODE receiver

One plug. The same plug for the microphone and the headphones. Needs a [TRRS adapter](#) to connect.



Support

<https://go.epfl.ch/flexible-teaching>

flexible-teaching@epfl.ch

For questions related to room equipments write to save@epfl.ch

Shopping List

		At home	On campus		
			Standard	Mid-tech	High-tech
Lecture Hall Microphone & Camera	Reuse the audio and camera from the lecture hall to plug into ZOOM for streaming and recording			X	X
Teacher's webcam Camera	Logitech Conference Cam Connect link	X	X		
Teacher's Microphone	Microphone: iRig Mic Lav link Microphone: Rode SmartLav+ link Adapter trrs->USBC (* iPad Pro 2020) link	X	X		
Wireless microphone adapter	Wireless adapter: Rode Wireless Go link Cable adapter: Rode SC4 trs-trrs link	(X)	X		
Tablet (if required)	iPad Pro + Apple Stylus 2 nd gen iPad Air + Apple Stylus 1 st gen	X	X	X	X
	How to connect iPad and laptop Elgato HD60S+ link	Airplay	Cable / Elgato	Cable/ Elgato	Cable / Elgato
	Microsoft Surface Stylus	X	X	X	X