



PRACE Course: HPC Code Optimisation Workshop

ONLINE | 27– 29 June 2022



PRACE Training



LRZ as part of the Gauss Centre for Supercomputing (GCS) belongs to the 14 **PRACE Training Centres** that started in 2012-2017-2020:

- Barcelona Supercomputing Center (Spain)
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- Gauss Centre for Supercomputing (Germany)
- Maison de la Simulation (France)
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- ICHEC – Irish Centre for High-End Computing (Ireland)
- IT4I – National Supercomputing Center VSB Technical University of Ostrava (Czech Republic)
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- TU Wien – VSC Research Center (Austria)
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- University of Ljubljana – HPC Center Slovenia (Slovenia)
- Swedish National Infrastructure for Computing (SNIC) (Sweden)



Mission: Serve as **European hubs and key drivers of advanced high-quality training** for researchers working in the computational sciences.

<http://www.training.prace-ri.eu/>

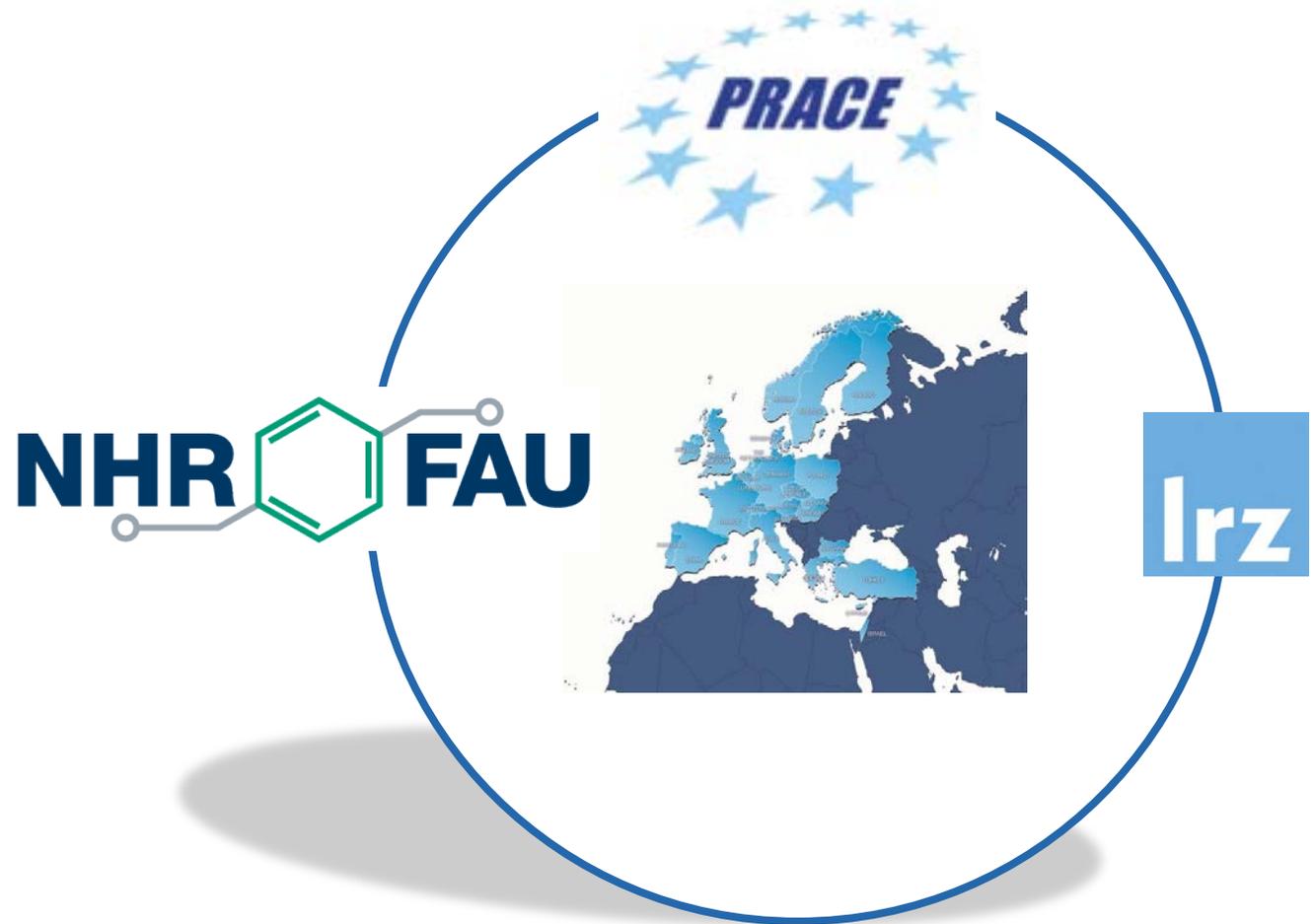


Presenters



- **Presenters:**
- Dr. Patrick Böhl (LRZ)
- Dr. Jonathan Coles (LRZ)
- Dr. Gerald Mathias (LRZ)
- Dr. Carla Guillen (LRZ)
- Nisarg Patel (LRZ)
- Dr. Josef Weidendorfer (LRZ)

- Thomas Gruber (NHR@FAU)



Course Webpage

- All slides and materials will be made available under:

<https://tinyurl.com/hcow1s22>

- Further information on:

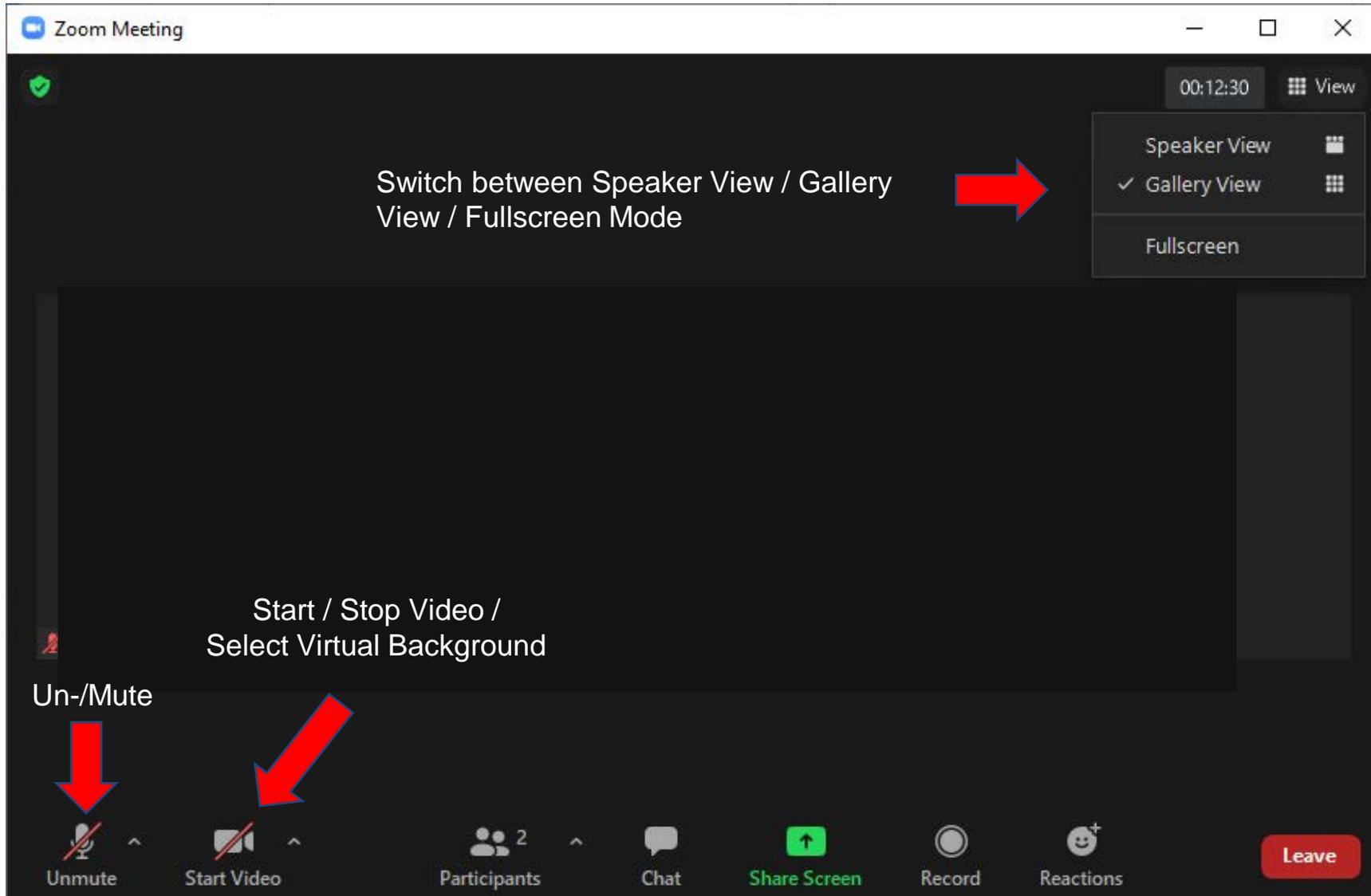
- Agenda
- Slides
- Exercises
- Supplementary material



Session	
1st day morning (10:00-12:00)	Intro (Volker Weinberg) Intro to LRZ HPC Systems and Software Stack (Gerald Mathias, Nisarg Patel) Principles of optimization (Jonathan Coles)
1st day afternoon (13:00-16:00)	HPC Architecture, Vectorization Example code Data structures (Jonathan Coles)
2nd day morning (10:00-12:00)	Profiling: Code instrumentation, Roofline Model, Intel Advisor (Jonathan Coles)
2nd day afternoon (13:00-16:00)	Debuggers (Gerald Mathias) Additional Tools: valgrind and Cache simulators. (Josef Weidendorfer) I/O Considerations (Patrick Böhl)
3rd day morning (10:00-12:00)	LikWid (Carla Guillen/Thomas Gruber) HPC report (Carla Guillen)
3rd day afternoon (13:00-16:00)	Optimisation highlights by LRZ (CXS Group LRZ) Q&A



- To ensure a pleasant experience with Zoom Meeting, we encourage participants to **download and install the latest Zoom application** via <https://zoom.us/download>.
- If you have problems with your computer audio, you can also **join by phone**.
Find your local number: <https://lrz-de.zoom.us/j/aLMvQOJB>



Zoom Meeting

00:12:30 View

Switch between Speaker View / Gallery View / Fullscreen Mode

Speaker View

✓ Gallery View

Fullscreen

Start / Stop Video / Select Virtual Background

Un-/Mute

Unmute Start Video Participants Chat Share Screen Record Reactions Leave

The screenshot shows the Zoom meeting interface with several annotations. A red arrow points from the text 'Switch between Speaker View / Gallery View / Fullscreen Mode' to the 'View' dropdown menu, which is open and shows 'Speaker View', 'Gallery View' (checked), and 'Fullscreen'. Another red arrow points from the text 'Start / Stop Video / Select Virtual Background' to the 'Start Video' button in the bottom toolbar. A third red arrow points from the text 'Un-/Mute' to the 'Unmute' button in the bottom toolbar. The bottom toolbar also includes 'Participants', 'Chat', 'Share Screen', 'Record', 'Reactions', and 'Leave' buttons.

zoom

Participants List

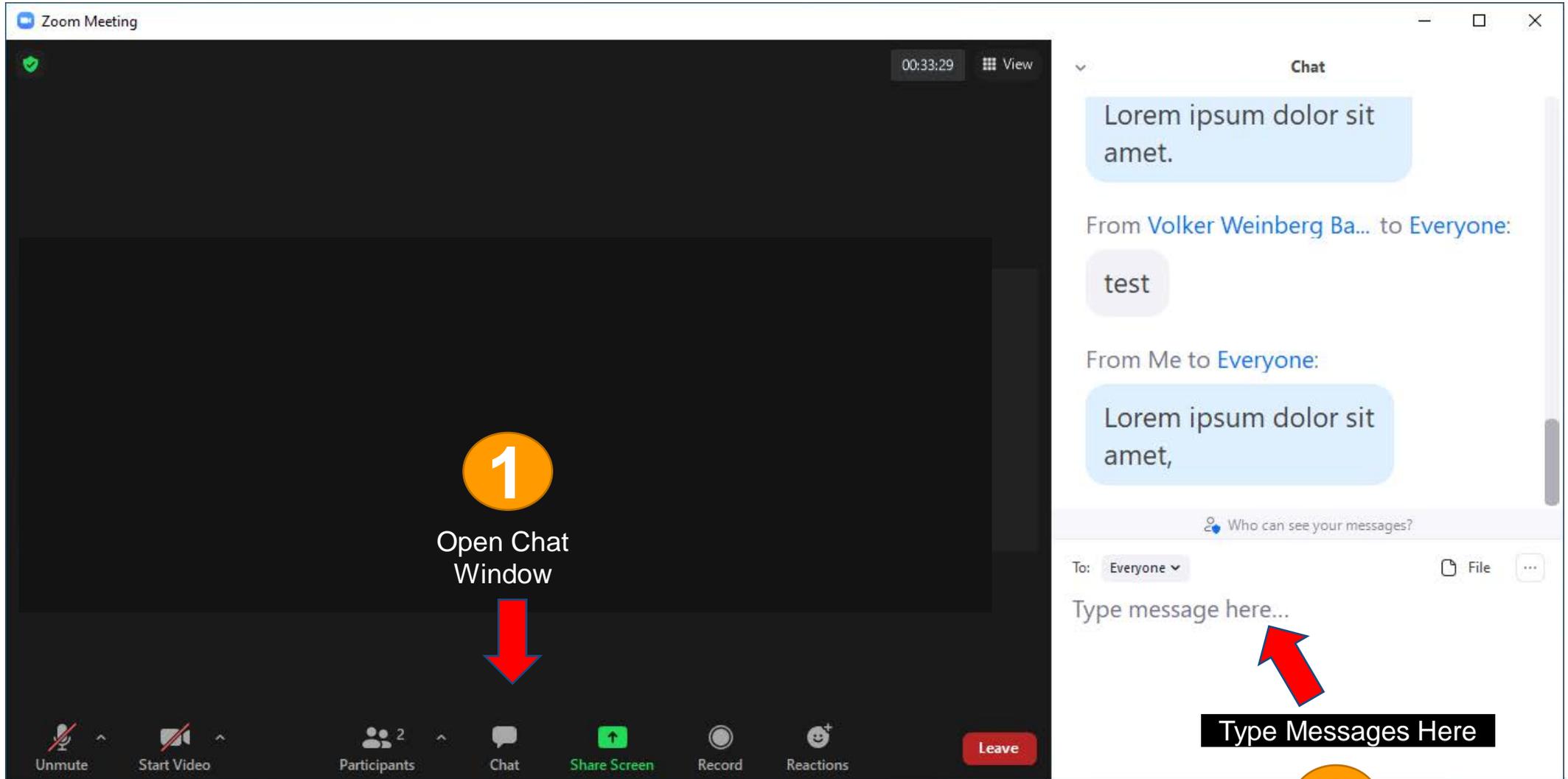
Kindly use “<first name> <last name> (<institute>)” as your screenname.

Otherwise you will not receive a certificate of attendance after the course.

The image shows a Zoom Meeting window with the Participants List open. The main window displays a 'Zoom Meeting' title bar, a green checkmark, a timer at 00:19:17, and a 'View' button. The Participants List window shows two participants: 'Volker Wei... (Me)' and 'Volker Weinberg Backup (Host)'. A red arrow points to the 'More >' button for the first participant, which has opened a context menu with 'Edit Profile Picture' and 'Rename' options. A red arrow points from the 'Rename' option to a black box containing the text 'Rename Yourself'. A large orange circle with the number '1' is positioned over the 'Participants' button in the Zoom toolbar, with the text 'Open Participants List' below it. A red arrow points from this text to the 'Participants' button. A second large orange circle with the number '2' is positioned below the 'Rename Yourself' text.

1
Open Participants List

2
Rename Yourself



Zoom Meeting

00:33:29 View

Chat

Lorem ipsum dolor sit amet.

From Volker Weinberg Ba... to Everyone:

test

From Me to Everyone:

Lorem ipsum dolor sit amet,

Who can see your messages?

To: Everyone File

Type message here...

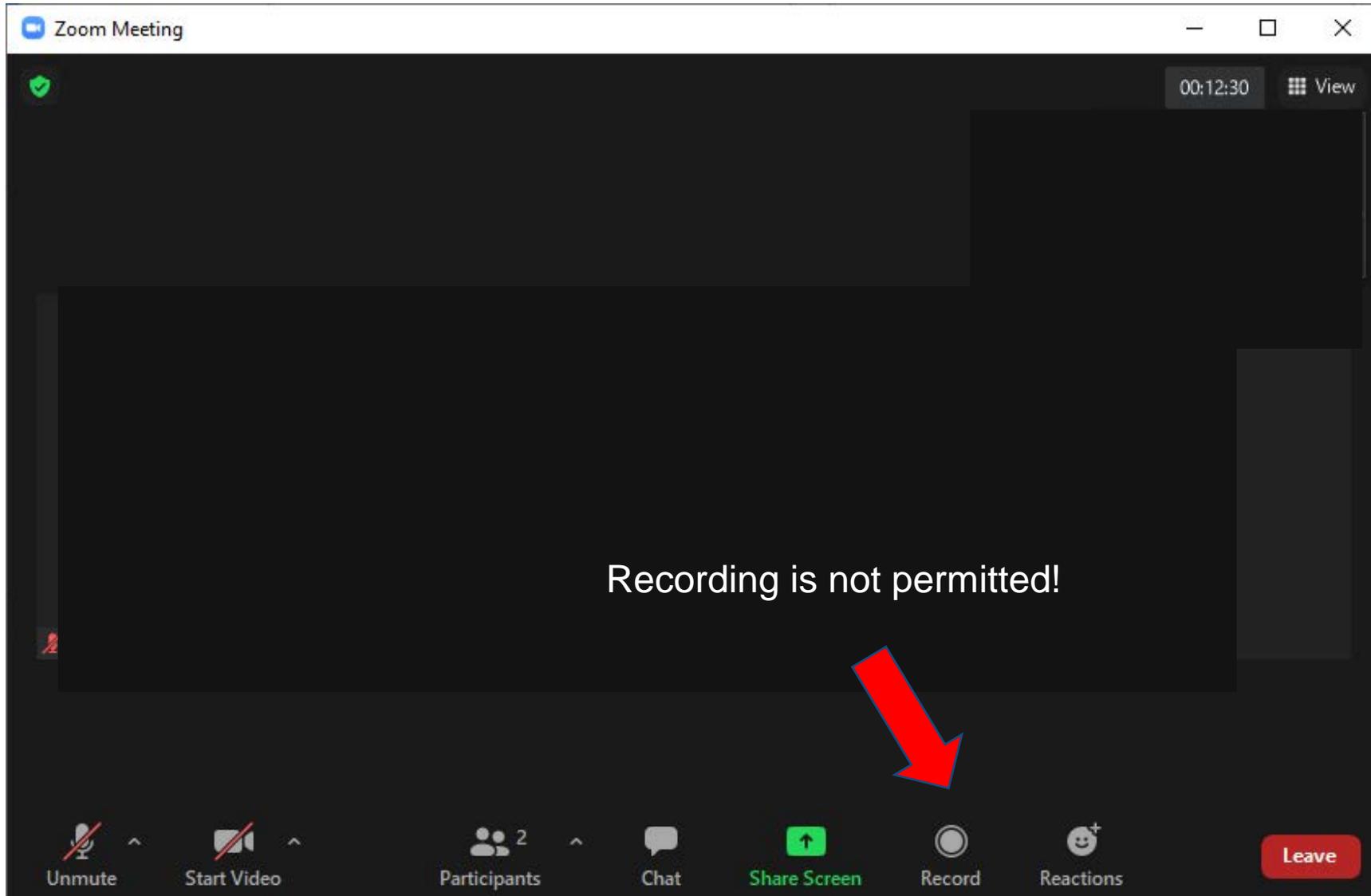
Type Messages Here

1

Open Chat Window

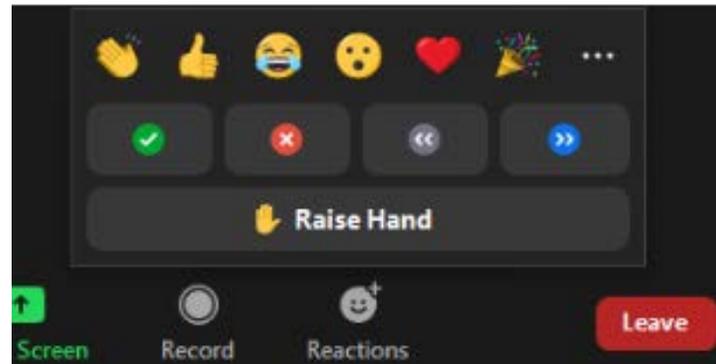
2

Unmute Start Video Participants Chat Share Screen Record Reactions Leave



- Use **chat window** to ask questions **during the presentations**.
- In **Q&A sessions**:
 - You can also **raise your hand** if you have questions.
 - If you do not mind, please **show your video when asking questions** to make this workshop as interactive as possible.
- **Push to Talk**: The Push to Talk feature allows you to remain muted throughout the Zoom meeting and only if you hold down the spacebar you will be unmuted.

• **Instant Feedback:**



And now ...



Enjoy the course!

