



PRACE Course: Advanced Fortran Topics

23 – 26 November 2021



PRACE Training



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

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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/>

Lecturers



- **Lecturers:**

- Dr. Reinhold Bader (LRZ)
- Dr. Gilbert Brietzke (LRZ)



Agenda



Time	Day 1	Day 2	Day 3	Day 4
10:00 – 10:30	The Environment problem (Bader/Brietzke)	Generic type-bound procedures (Brietzke/Bader)	Interoperation with C (1) (Brietzke/Bader)	Advanced synchronization: Events and locks (Patel/Brietzke)
10:30 – 11:00				
11:00 – 11:30	Dynamic memory and object-based design (Brietzke/Bader)	Advanced I/O topics: DTIO, asynchronous processing (Bader/Brietzke)	Interoperation with C (2) (Bader/Brietzke)	Coarray-related program design aspects (Brietzke/Patel)
11:30 – 12:00				
12:00 – 12:30	Exercise Session 1 and Lunch Break	Exercise Session 3 and Lunch Break	Exercise Session 5 and Lunch Break	Exercise Session 7 and Lunch Break
12:30 – 13:00				
13:00 – 13:30				
13:30 – 14:00	Object oriented programming (1) Type extension and polymorphism (Bader/Brietzke)	Parameterized derived types	PGAS introduction and basic coarray features: declaration, communication, synchronization (Bader/Brietzke)	Composable parallelism with teams Coindexing rules Interoperation with MPI (Bader/Brietzke)
14:00 – 14:30		Creation and destruction of objects (Brietzke/Bader)		
14:30 – 15:00	Object oriented programming (2) Type- and object-bound procedures Dependency inversion with submodules (Brietzke/Bader)	Returning to the Environment problem (Bader/Brietzke)	Collectives dynamic memory management (Brietzke/Bader)	Fault tolerance (Bader/Brietzke)
15:00 – 15:30				
15:30 – 16:00				
16:00 – 16:30	Exercise Session 2	Exercise Session 4	Exercise Session 6	Exercise Session 8
16:30 – 17:00				
17:00 – 17:30				

Course Webpage



- All slides and materials will be made available under:

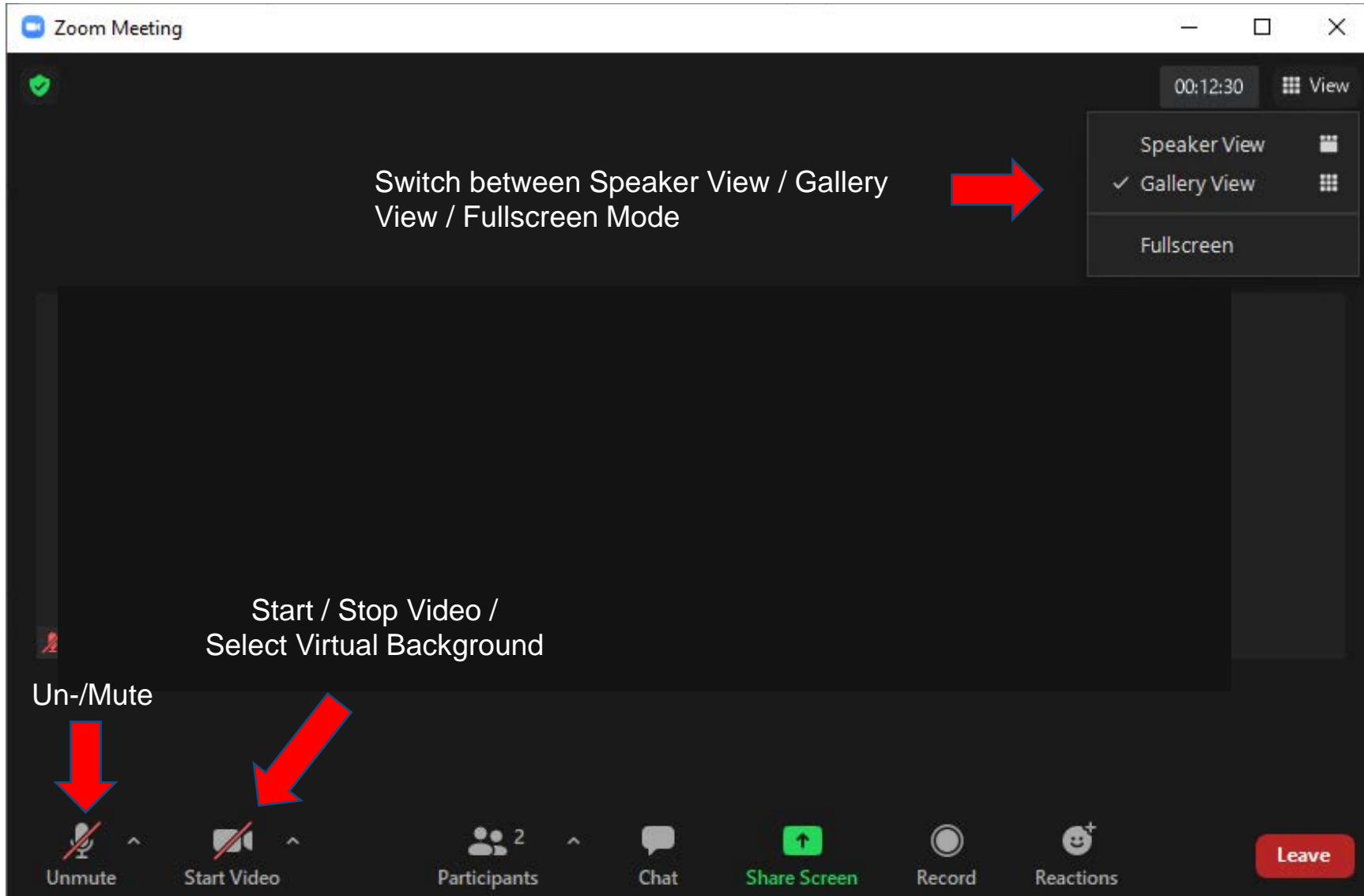
- <https://tinyurl.com/advanced-fortran>

- Further information on:

- Agenda
- Lecture notes
- Exercise skeletons
- Solutions for exercises and example code



- 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/aeaPLRITtm>



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' (selected), 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.

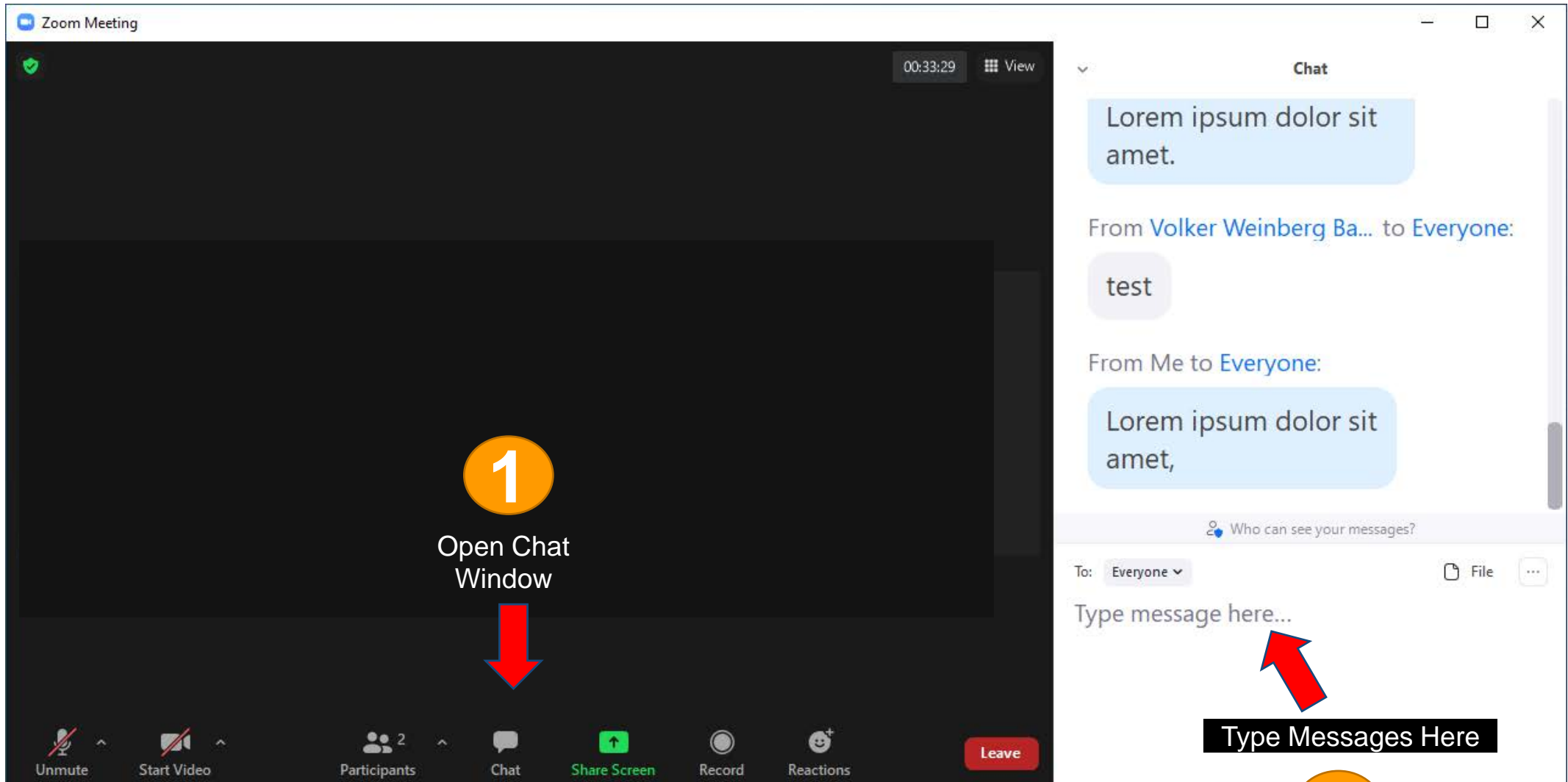
zoom

Participants List



Kindly use “first-name family-name (institute)” as your screenname.

The screenshot shows a Zoom Meeting window with a dark background. In the top right corner, the time is 00:19:17 and the view is set to 'View'. The main area is mostly black. At the bottom, there is a toolbar with icons for Unmute, Start Video, Participants (with a '2' next to it), Chat, Share Screen, Record, Reactions, and a red 'Leave' button. A red arrow points from the 'Participants' icon to a white 'Participants (2)' panel on the right. This panel lists two participants: 'Volker Wei... (Me)' and 'Volker Weinberg Backup (Host)'. The 'Me' participant has an 'Unmute' button and a 'More >' button. A blue-bordered menu is open over the 'More >' button, containing 'Edit Profile Picture' and 'Rename'. A red arrow points from a black box labeled 'Rename Yourself' to the 'Rename' option. A large orange circle with the number '1' is overlaid on the main meeting area, with the text 'Open Participants List' below it and a red arrow pointing to the 'Participants' icon. Another large orange circle with the number '2' is overlaid on the 'Rename Yourself' box.



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

Type message here...

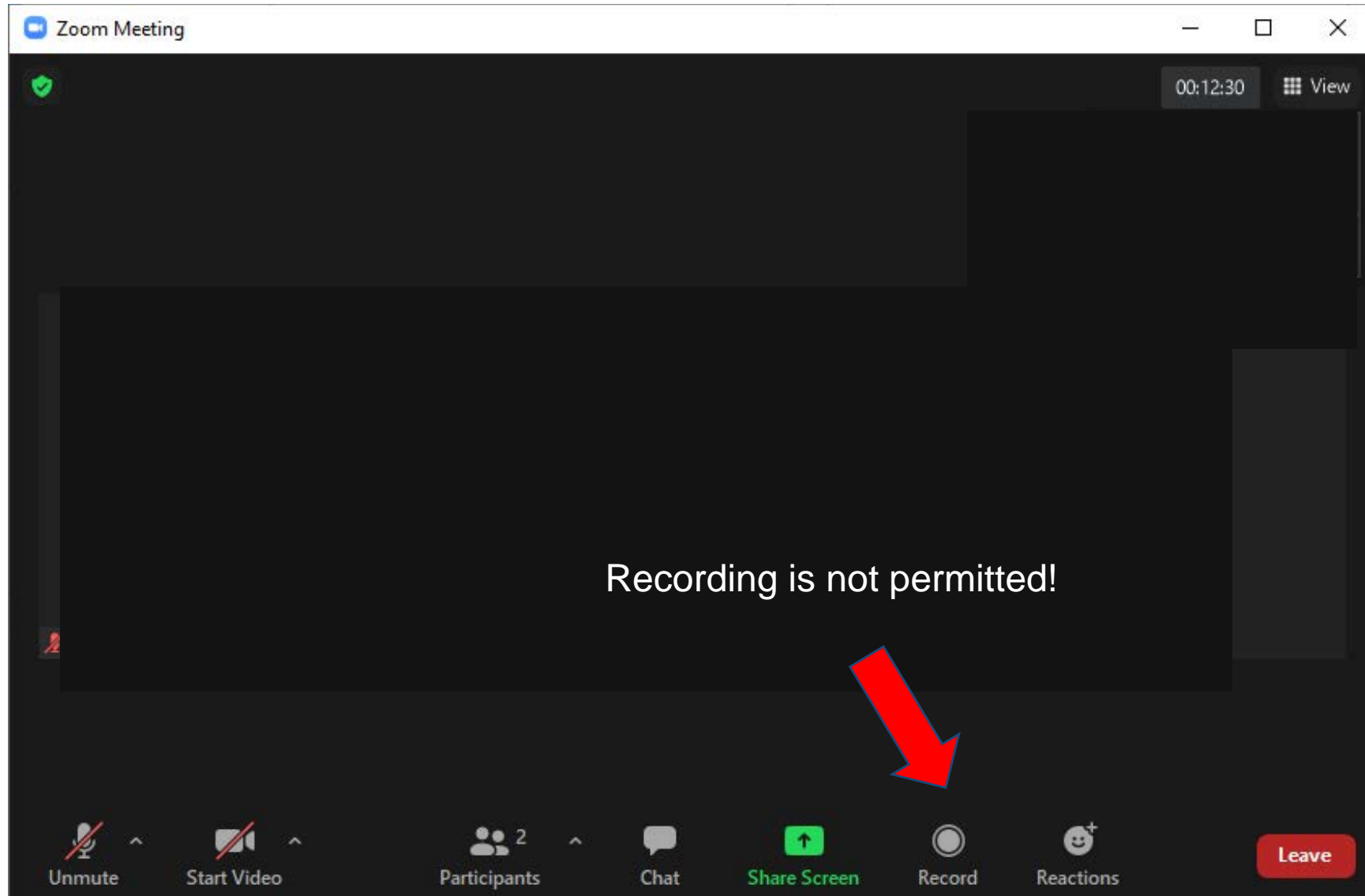
Unmute Start Video Participants Chat Share Screen Record Reactions Leave

1

Open Chat Window

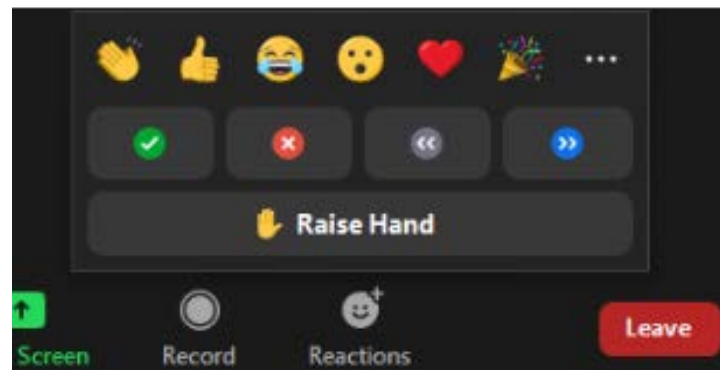
2

Type Messages Here



- 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!