



ONLINE: PRACE Course: Advanced Fortran Topics

22 – 25 September 2020

PRACE Training



LRZ as part of the Gauss Centre for Supercomputing (GCS), CSC and IT4Innovations belong to the 14 **PRACE Training Centres** that started in 2012-2017-2020:

- Barcelona Supercomputing Center (Spain)
- CINECA Consorzio Interuniversitario (Italy)
- CSC – IT Center for Science Ltd (Finland)
- EPCC at the University of Edinburgh (UK)
- Gauss Centre for Supercomputing (Germany)
- Maison de la Simulation (France)
- GRNET – Greek Research and Technology Network (Greece)
- ICHEC – Irish Centre for High-End Computing (Ireland)
- IT4I – National Supercomputing Center VSB Technical University of Ostrava (Czech Republic)
- SURFsara (The Netherlands)
- TU Wien – VSC Research Center (Austria)
- University ANTWERPEN – VSC & CÉCI (Belgium)
- 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/>

Lecturers



- **Lecturers:**

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



Course 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 (Brietzke/Patel)
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 (Patel/Brietzke)
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 Creation and destruction of objects (Brietzke/Bader)	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				
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



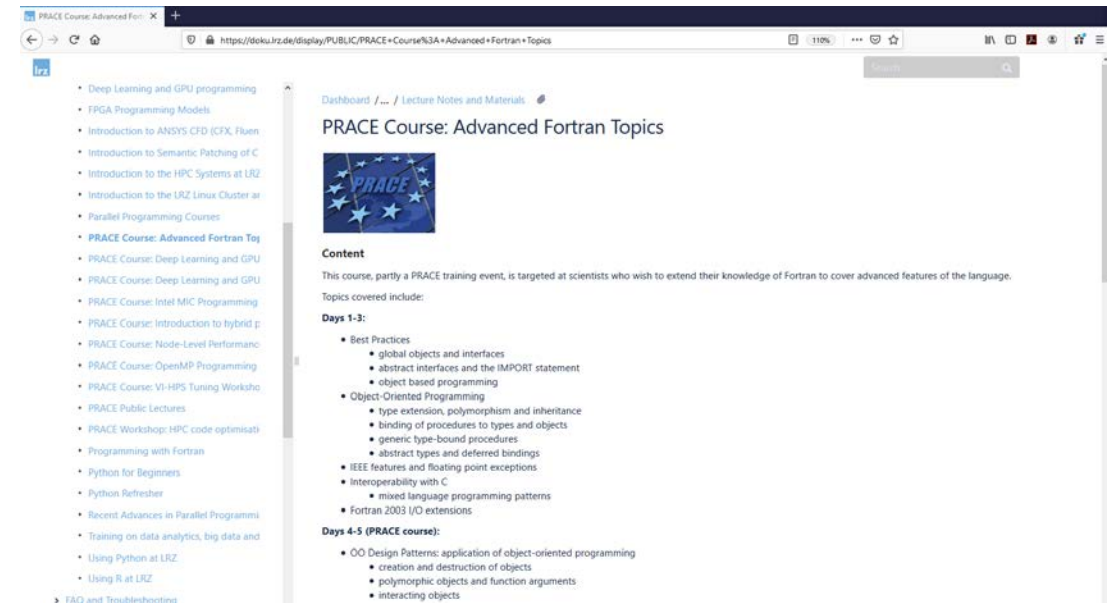
- All slides and materials will be made available under:

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



- Further information on:

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





Joining the Meeting

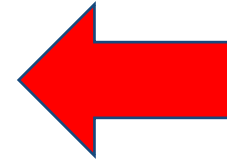


Join Zoom Meeting (same link for the complete course)

<https://us02web.zoom.us/j/84446215739?pwd=QUhPSlgyUVJraUtKaHM5NHdsTXN4Zz09>

Meeting ID: 844 4621 5739

Passcode: 9wDTcu



Please use “first-name family-name (institute)” as your screenname!

You can change your screenname in the participants window as well.



If you have any audio problems, you can also join via phone:

Meeting ID: 844 4621 5739

Passcode: 682792

Find your local number: <https://us02web.zoom.us/j/84446215739>

- **ZOOM help centre** has great resources with help articles and videos for getting started: <https://support.zoom.us/hc/en-us>.
- This “**Getting Started**” page is a great resource: <https://support.zoom.us/hc/en-us/categories/200101697>
- This **FAQ** has tons of useful info: <https://support.zoom.us/hc/en-us/articles/206175806-Frequently-Asked-Questions>.
- We strongly encourage you to read some of the basic info relevant to your operating system:
 - Getting Started on **Windows and Mac**: <https://support.zoom.us/hc/en-us/articles/201362033-Getting-Started-on-Windows-and-Mac>.
 - Getting Started on **Chrome OS**: <https://support.zoom.us/hc/en-us/articles/213298746-Getting-Started-On-Chrome-OS>.
- You may log in via the **app or a browser**. We recommend **downloading the app** from <https://zoom.us/download> for the best experience
- You may sign up for a free account at zoom.us/signup. Or, you may join a meeting as a guest without a Zoom account. It is not necessary for the course to create an account.



Speaker View vs. Gallery View, Virtual Background

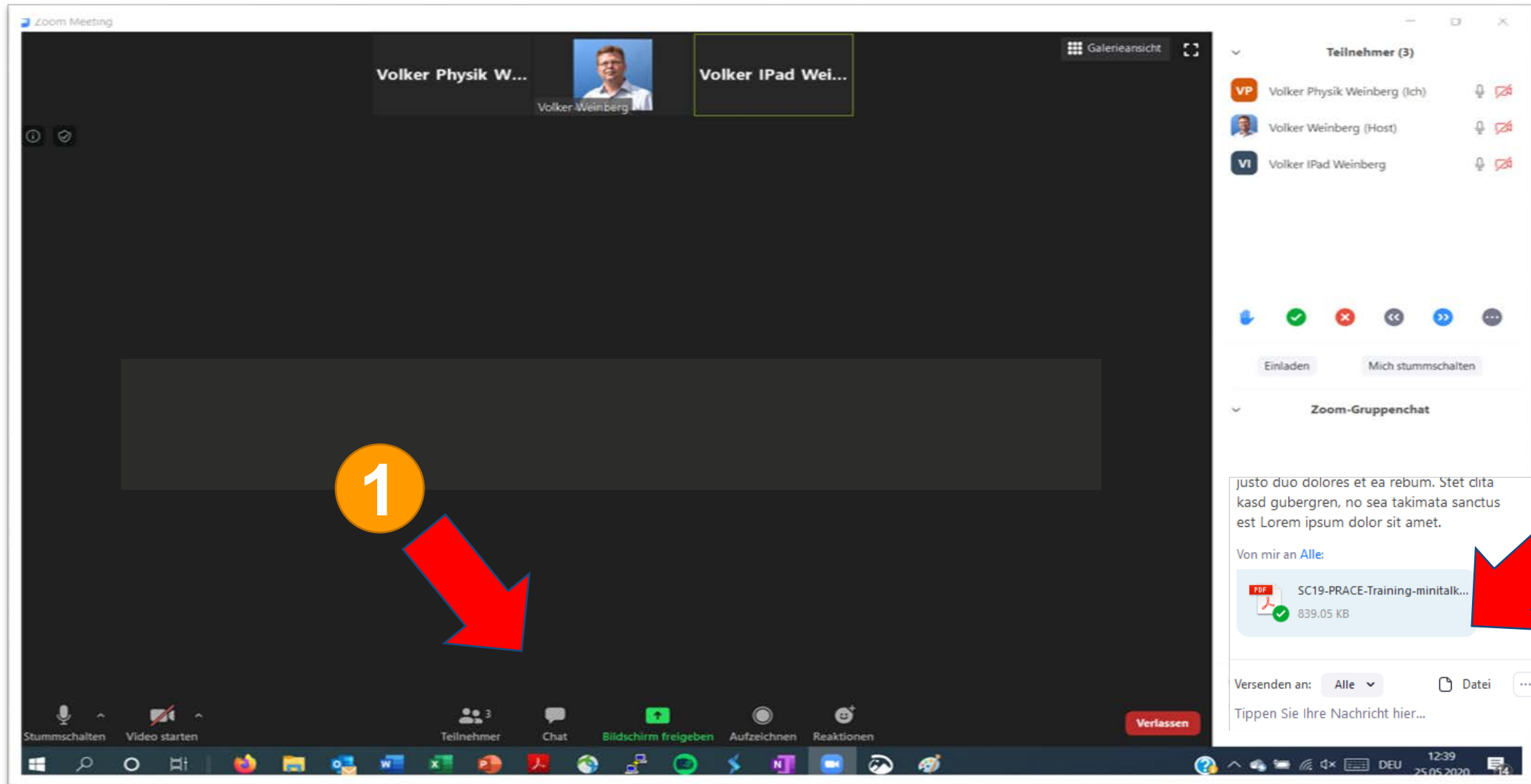
The screenshot shows the Zoom Meeting interface. On the left, the 'Einstellungen' (Settings) window is open to the 'Virtueller Hintergrund' (Virtual Background) section. The main meeting area shows a gallery view with two participants: 'Volker Physik W...' and 'Volker iPad Wei...'. A red arrow points to the 'Galeriansicht' button in the top right corner, with the text 'Switch between Speaker View / Gallery View' and 'Fullscreen Mode' next to it. Another red arrow points to the 'Stummschalten' (Mute) button in the bottom left corner, with the text 'Mute' next to it. A third red arrow points to the 'Video starten' (Start Video) button in the bottom left corner, with the text 'Start video / Select virtual background' next to it. The bottom of the screen shows the Windows taskbar with various application icons and the system tray.

The screenshot shows a Zoom meeting window with a dark theme. At the top, there are three participant thumbnails: 'Volker Physik W...', 'Volker Weinberg' (with a profile picture), and 'Volker iPad Wei...'. A green box highlights the 'Volker iPad Wei...' name. On the right side, a 'Teilnehmer (3)' list shows three participants: 'Volker Physik Weinberg (Ich)', 'Volker Weinberg (Host)', and 'Volker iPad Weinberg'. Below the list is a toolbar with various icons. A red arrow labeled '1' points to the 'Teilnehmer' icon in the bottom toolbar. Another red arrow labeled '2' points to the 'Weitere nonverbale Rückmeldungen' (More non-verbal feedback) button in the bottom toolbar. A tooltip for this button shows icons for thumbs down, thumbs up, clapping hands, a coffee cup, and a clock. The bottom of the screen shows the Windows taskbar with various application icons and the system tray showing the time as 12:30 on 25.05.2020.



- If you do not mind, please show your video when asking questions.
- **Push to Talk:**
The Push to Talk feature allows you to remain muted throughout your Zoom meeting and hold down the spacebar when you want to be unmuted and talk.
- **Instant Feedback:**





And now ...



Enjoy the course!