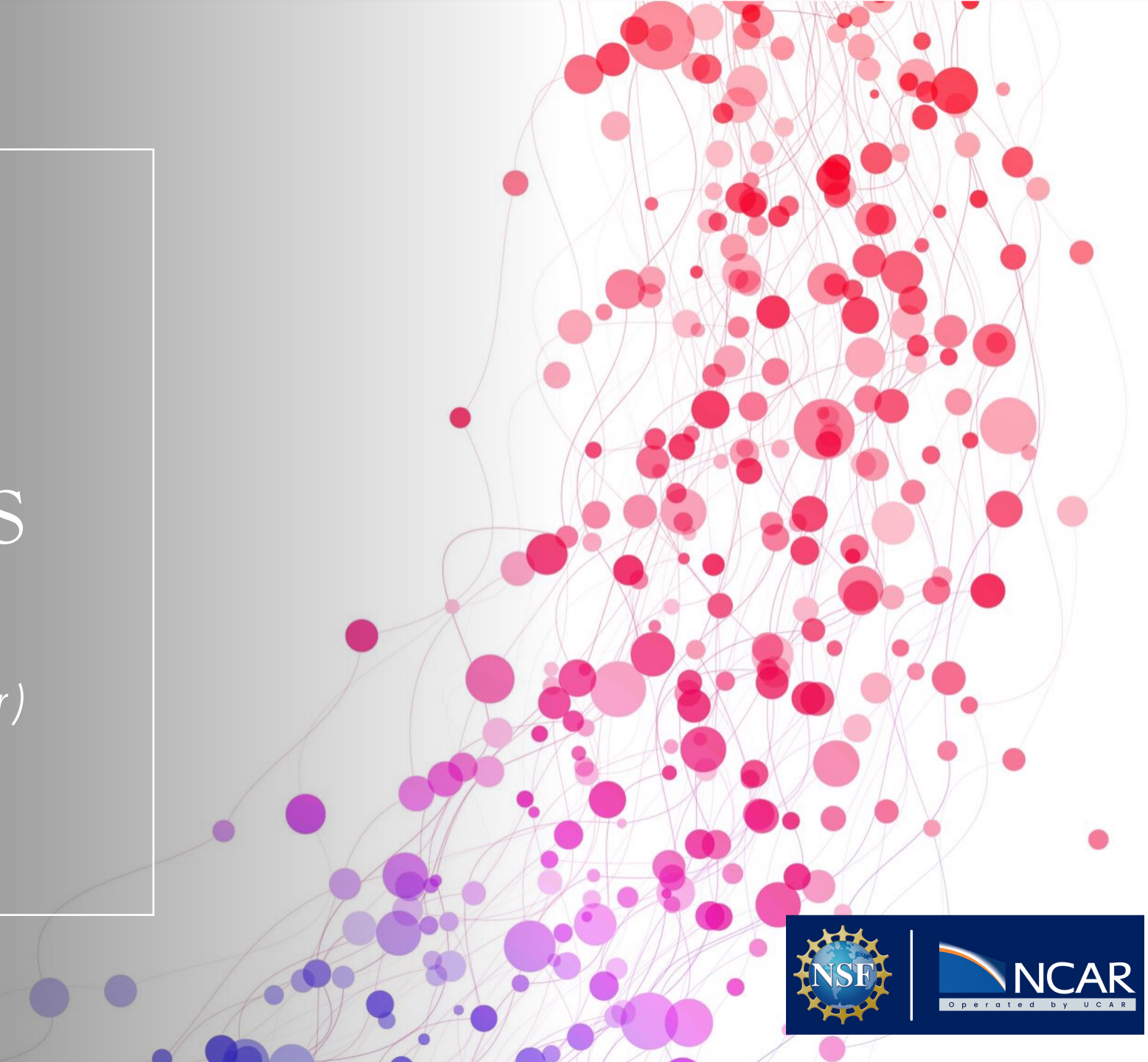
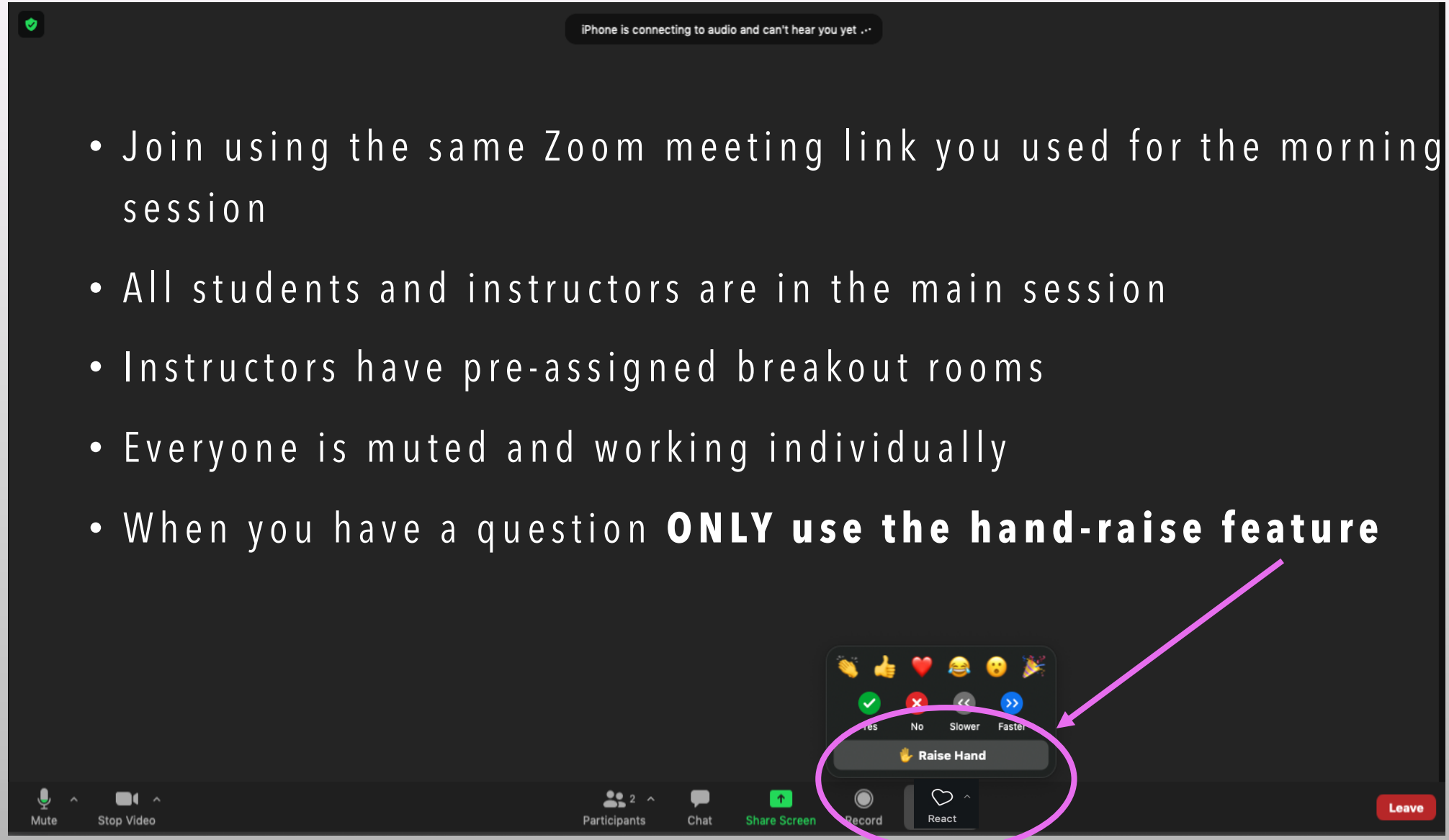
PRACTICE INSTRUCTIONS

Kelly Werner (she/her)

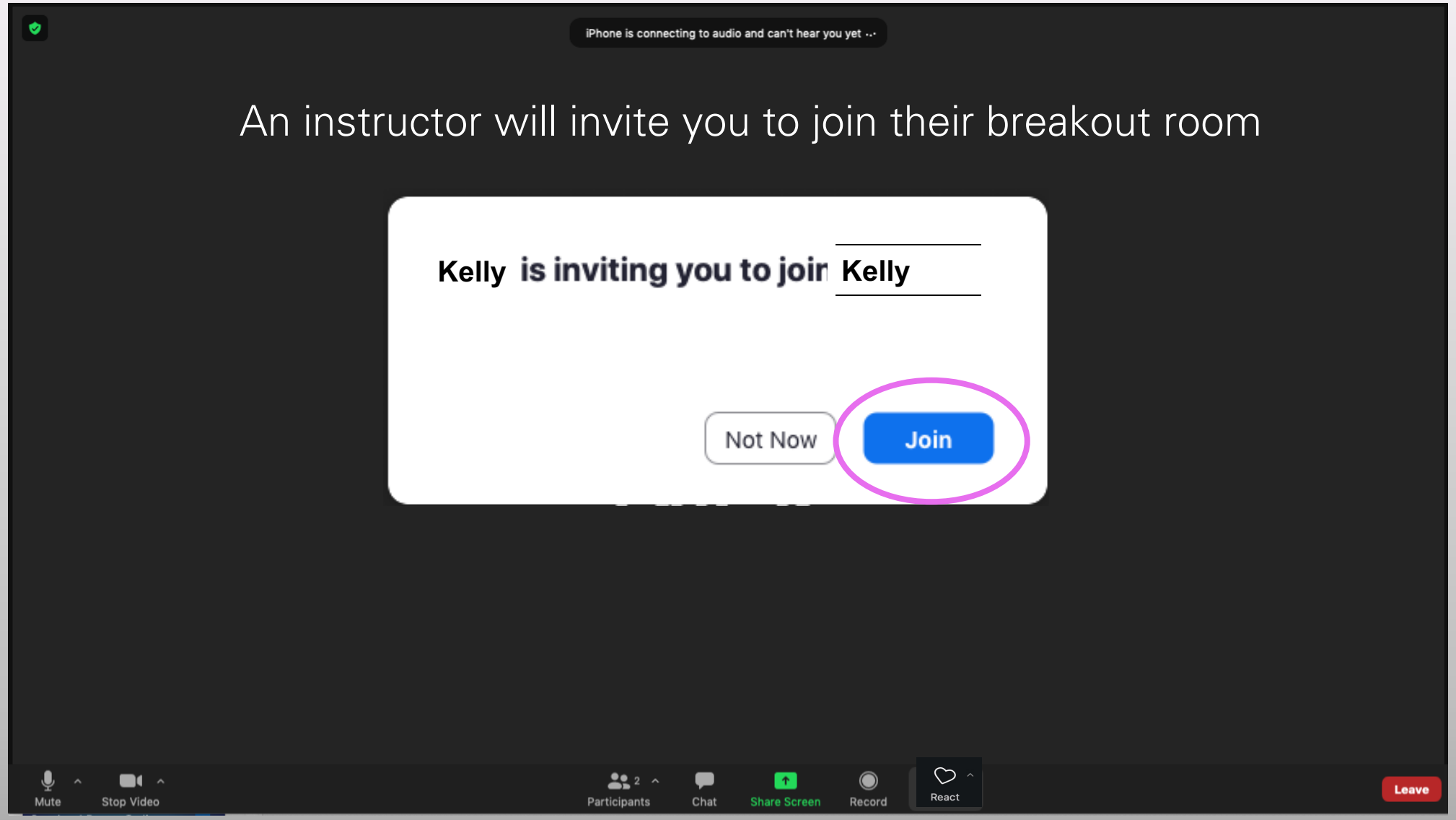


LOGISTICS

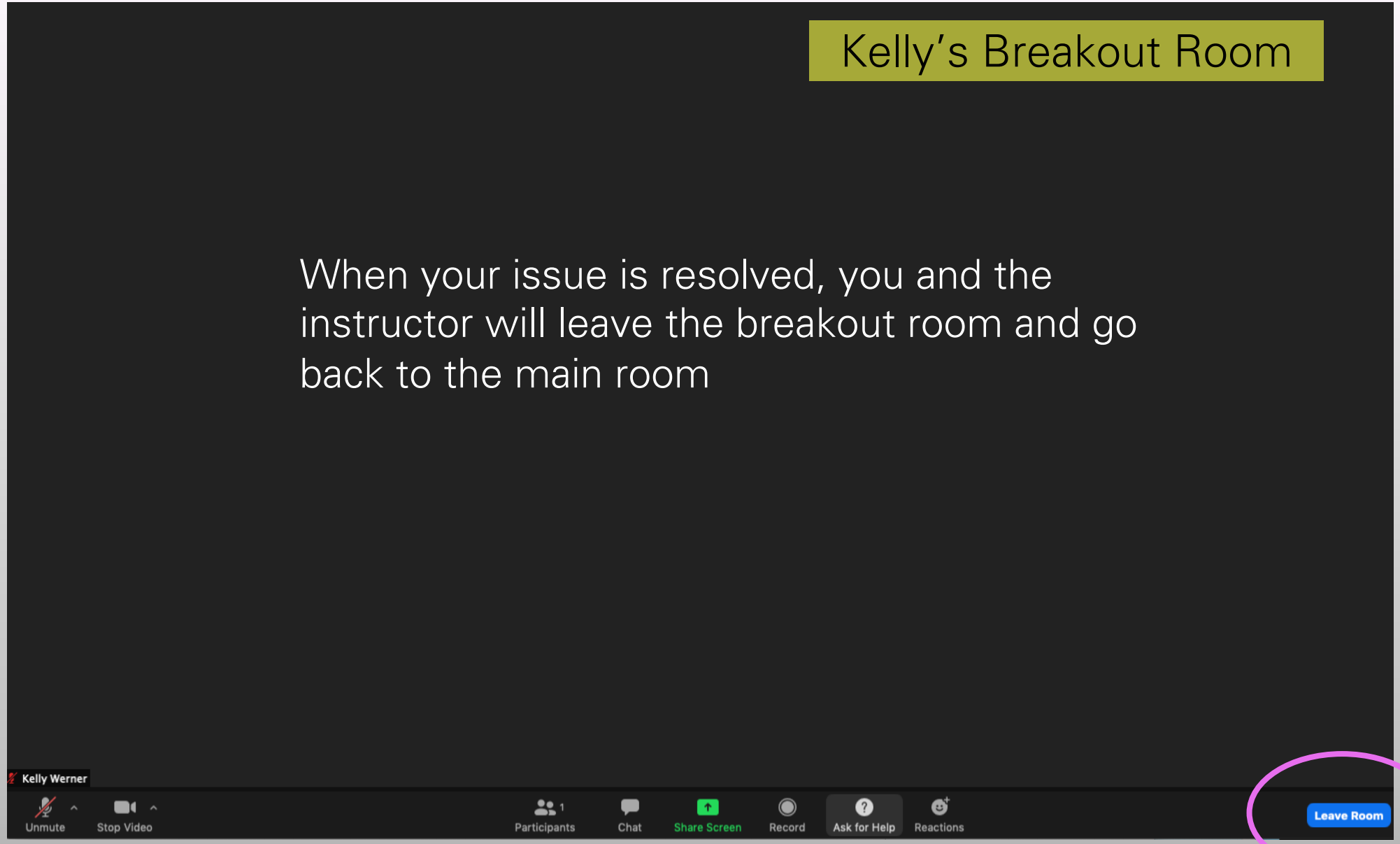
- Join using the same Zoom meeting link you used for the morning session
- All students and instructors are in the main session
- Instructors have pre-assigned breakout rooms
- Everyone is muted and working individually
- When you have a question **ONLY use the hand-raise feature**



LOGISTICS


iPhone is connecting to audio and can't hear you yet
An instructor will invite you to join their breakout room
Kelly is inviting you to join Kelly
Not Now
Join
Mute
Stop Video
Participants
Chat
Share Screen
Record
React
Leave

LOGISTICS


Kelly's Breakout Room
When your issue is resolved, you and the instructor will leave the breakout room and go back to the main room
Kelly Werner
Unmute
Stop Video
Participants
1
Chat
Share Screen
Record
Ask for Help
Reactions
Leave Room

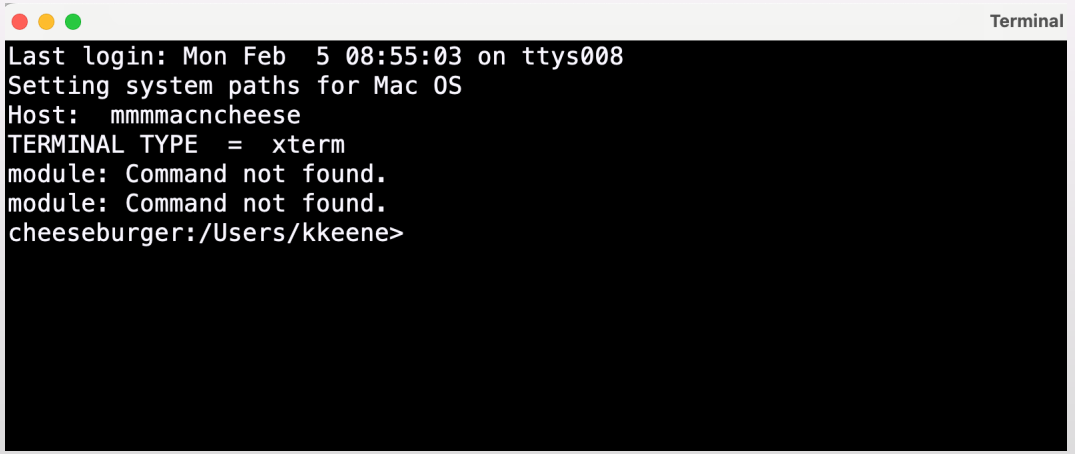
1. From your laptop, open a terminal (Unix) window

2. From the command line, log-in to NCAR's HPC system

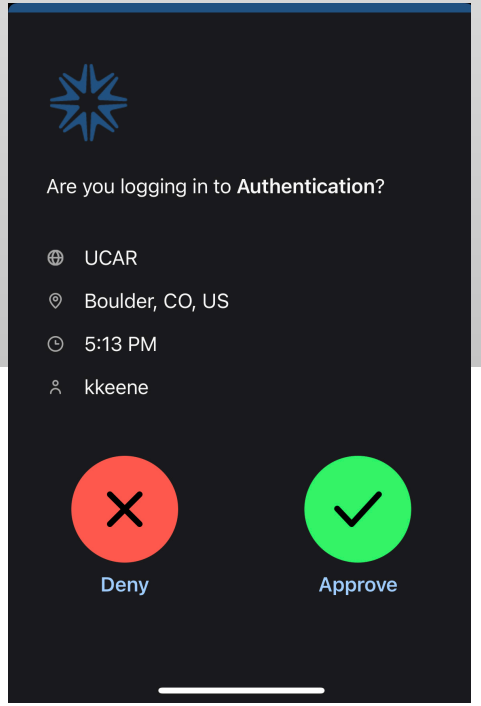
   `ssh -X user_name@derecho.hpc.ucar.edu`

   (unless using a Mac – then use "-Y" instead of "-X")

   Use the password provided by NCAR/CISL (via email)



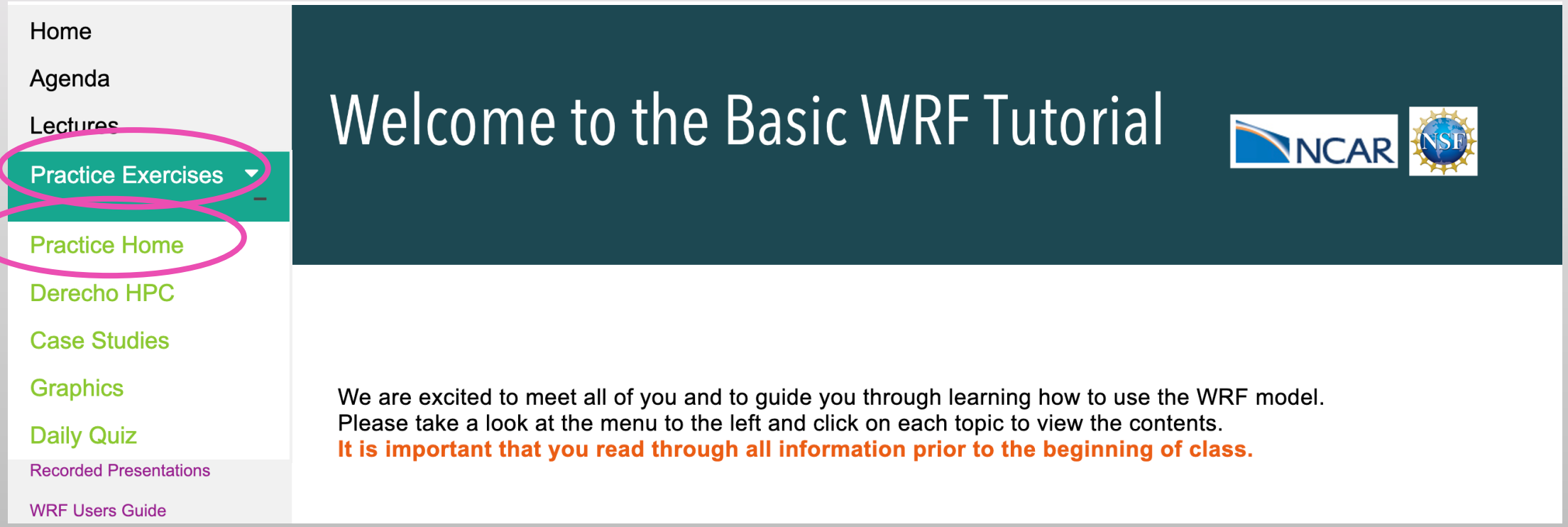
3. You should receive a DUO app notification on your smart phone
   - Click the notification
   - Choose "Approve"



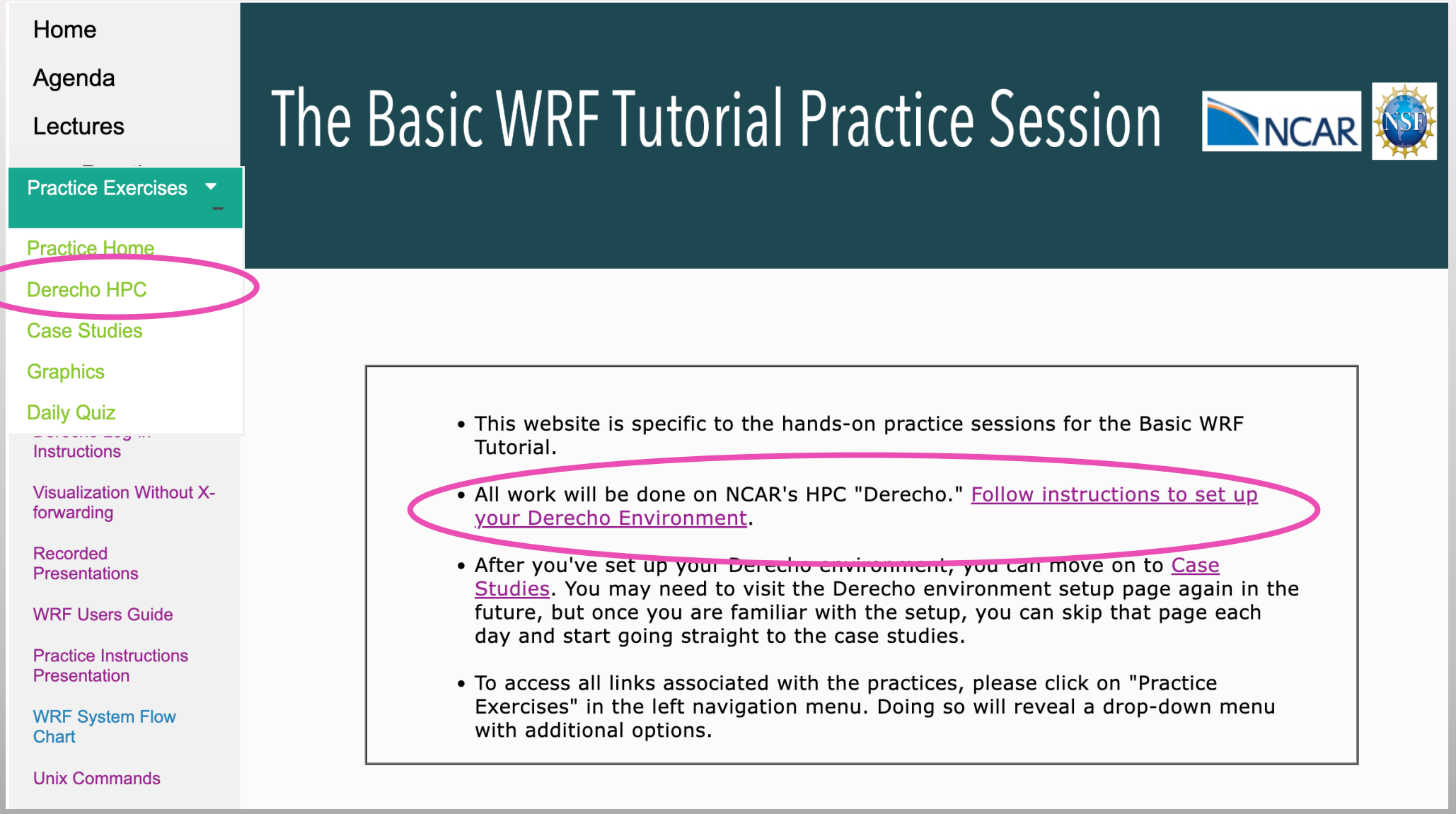
LOGGING-IN TO NCAR'S DERECHO HPC

TUTORIAL WEBSITE

https://www2.mmm.ucar.edu/wrf/OnLineTutorial/tutorial_practice/class_welcome/index.php



PRACTICE HOME PAGE



DERECHO ENVIRONMENT SET-UP

Derecho Environment Setup

The practical exercises in this tutorial are tailored to work on the NCAR's Derecho system. Derecho is an HPC cluster that includes the libraries needed by WRF and its pre- and post-processing tools through modules. When you first log-in to Derecho, you will be placed in your home directory (`/glade/u/home/$USER`, where "$USER" is your CISL log-in name).

Setting-up Your Environment

Before going through any of the exercises in subsequent sections, you will need to run several commands to prepare your environment.

1. First purge all loaded modules to begin from a known starting point (with no modules loaded).

```
> module purge
```

2. Now you will need to load several modules to give access to the Intel compilers as well as an MPI implementation.

```
> module load intel
> module load ncarcompilers
> module load cray-mpich
> module load craype
> module load hdf5
> module load netcdf
```

GO TO CASE STUDIES

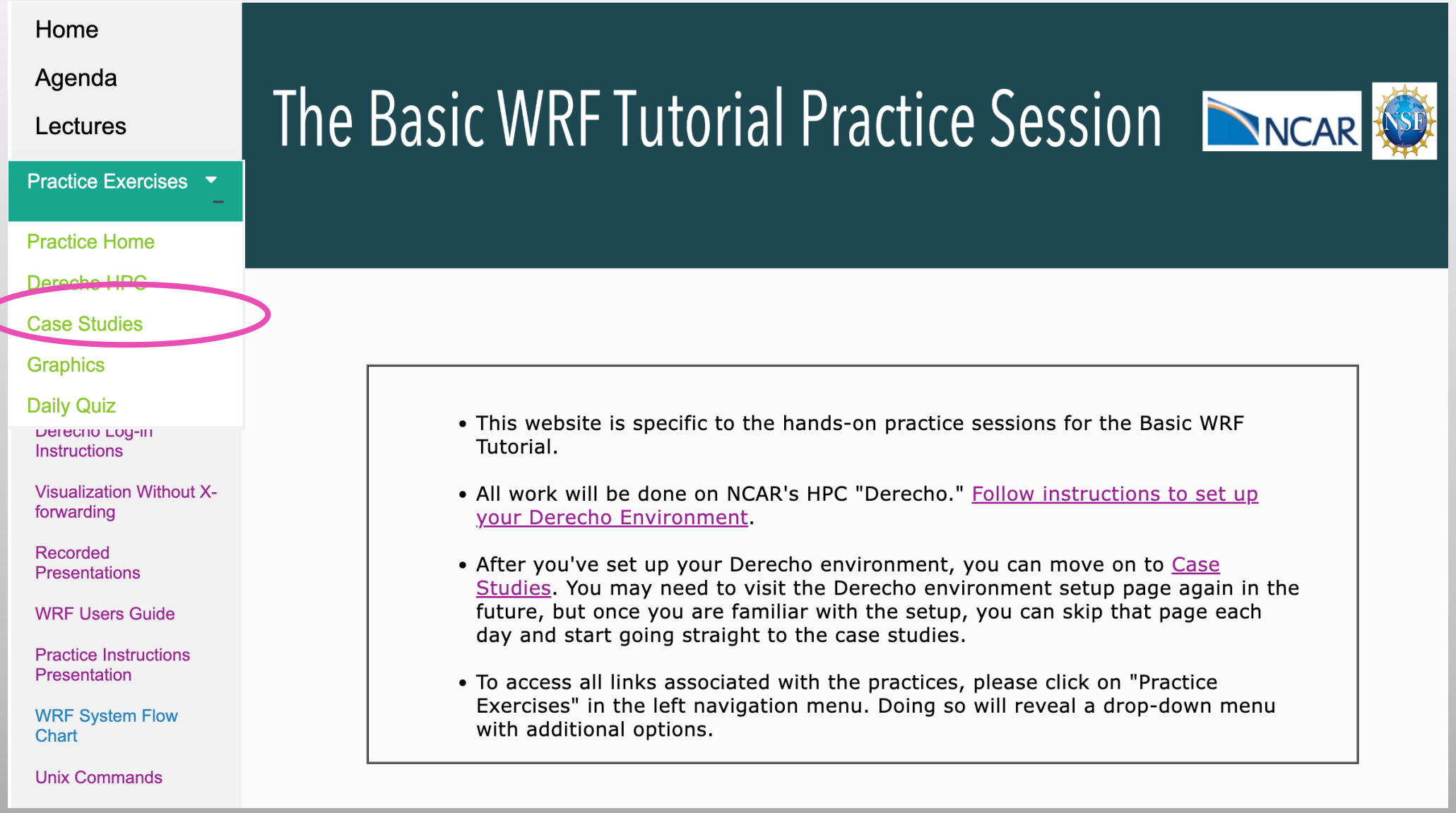
Derecho Environment Setup

After setting up your environment, scroll to the bottom of the *Cheyenne Environment Set-up* page

You are now ready to begin running the practice exercises!

You will find all case studies here. **Make sure to start with the Initial Exercise, and then do the Single Domain case** before trying other cases.

GO TO CASE STUDIES



PRACTICE CASES

Important!
Read the notes!

Run WRF Case Studies

Important Notes – Please read!

- Complete the **Initial Exercise**, and then the **Single Domain Case** before moving on to others.
- It is not expected that you complete all the cases. *Once you have run the Initial Exercise and the Single Domain Run*, experiment with cases you are more likely to use in your research.
- Once you are more comfortable running cases, try the Set-up and Run Your Own Case exercise.
- All code has been precompiled to save time. A Compiling exercise is available if you want to experiment with compiling the code on these machines, but for all other exercises please use the pre-compiled code.
- You may find it handy to have a copy of the latest version of the WRF-ARW User's Guide open on your desktop.
- **You will need the output files from some cases (e.g., the Single Domain case) for future exercises**. Please follow instructions at the end of each exercise to save those files before starting a new exercise.

If you are new to using Unix commands, please first go through this quick exercise to become familiar with some of the common commands.

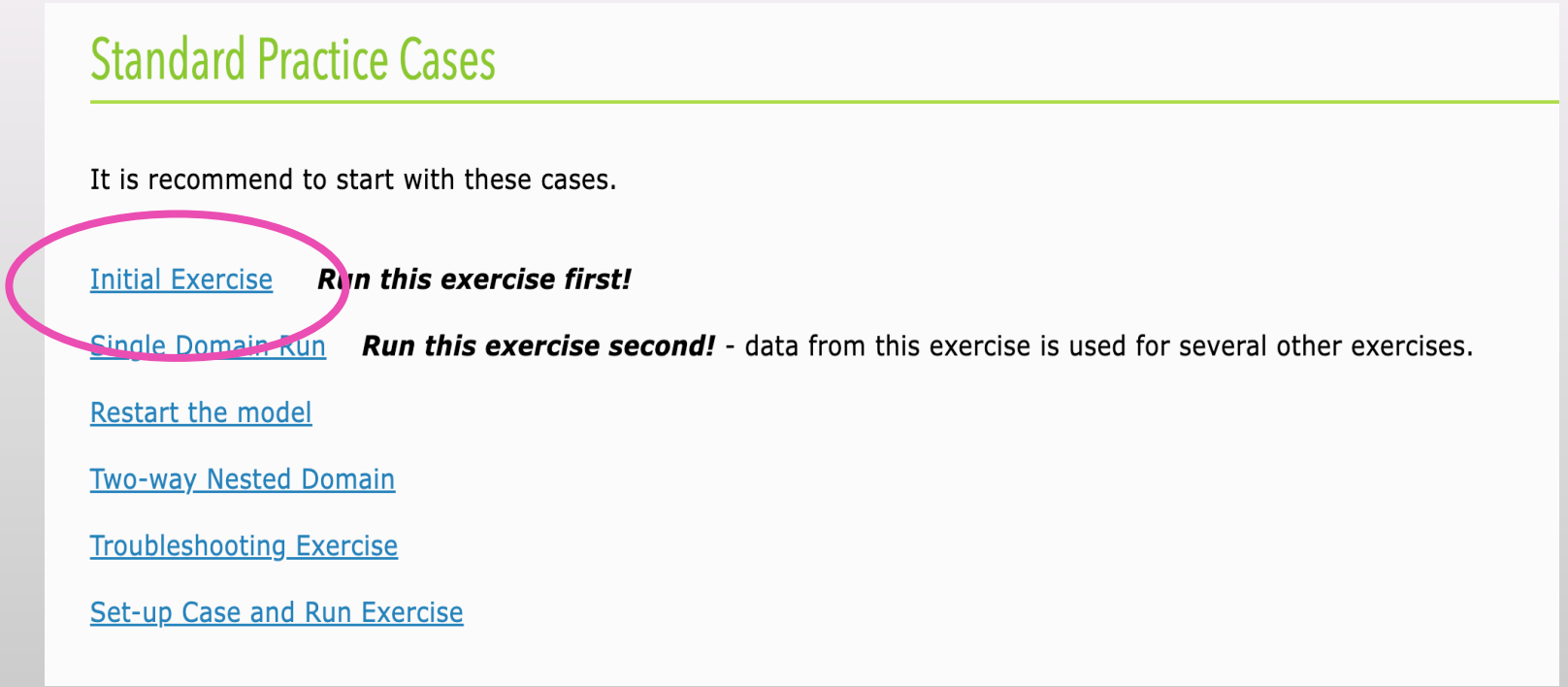
Standard Practice Cases

It is recommend to start with these cases.

Initial Exercise ***Run this exercise first!***

Single Domain Run ***Run this exercise second!*** - data from this exercise is used for several other exercises.

START WITH THE INITIAL EXERCISE



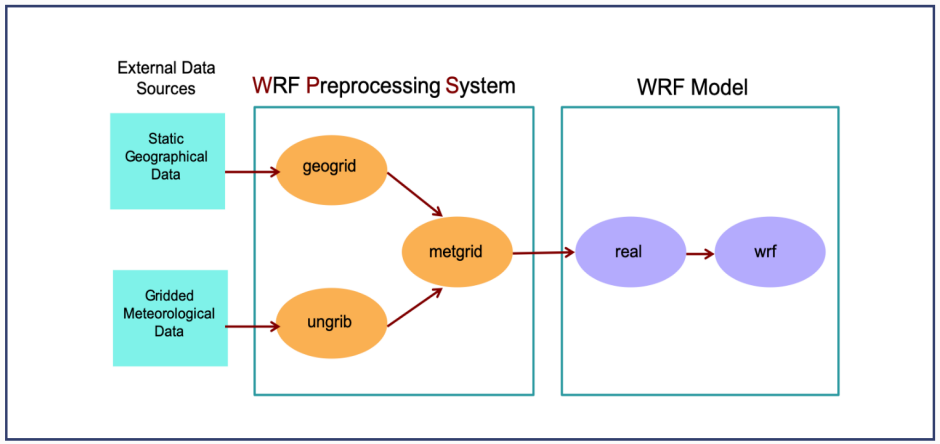
Scroll down to *Standard Practice Cases* and choose the ***Initial Exercise***

INITIAL EXERCISE

Initial Exercise

The purpose of this exercise is to familiarize yourself with the basic process of running WRF. For this case, the namelists have already been modified, so you should not need to make any modifications.

There are 5 steps to running WRF, broken down into 2 major programs: The WRF Preprocessing System (WPS) and the WRF model.



The **WPS** is a set of three programs that prepare input for the WRF program:

- **geogrid** : defines the model domain and interpolates static geographical data to the grids
- **ungrib** : extracts meteorological fields from GRIB-formatted input data files
- **metgrid** : horizontally interpolates the meteorological fields extracted by ungrib to the model domain defined by geogrid

The **WRF** model is broken into 2 programs:

- **real** : vertically interpolates the meteorological fields (from WPS) to WRF eta levels
- **wrf** : simulates the model run, using all previously-defined settings for the domain, input data, vertical interpolation, physics, and dynamics settings

Includes basic information on WPS and WRF processes

Pre-configured namelists

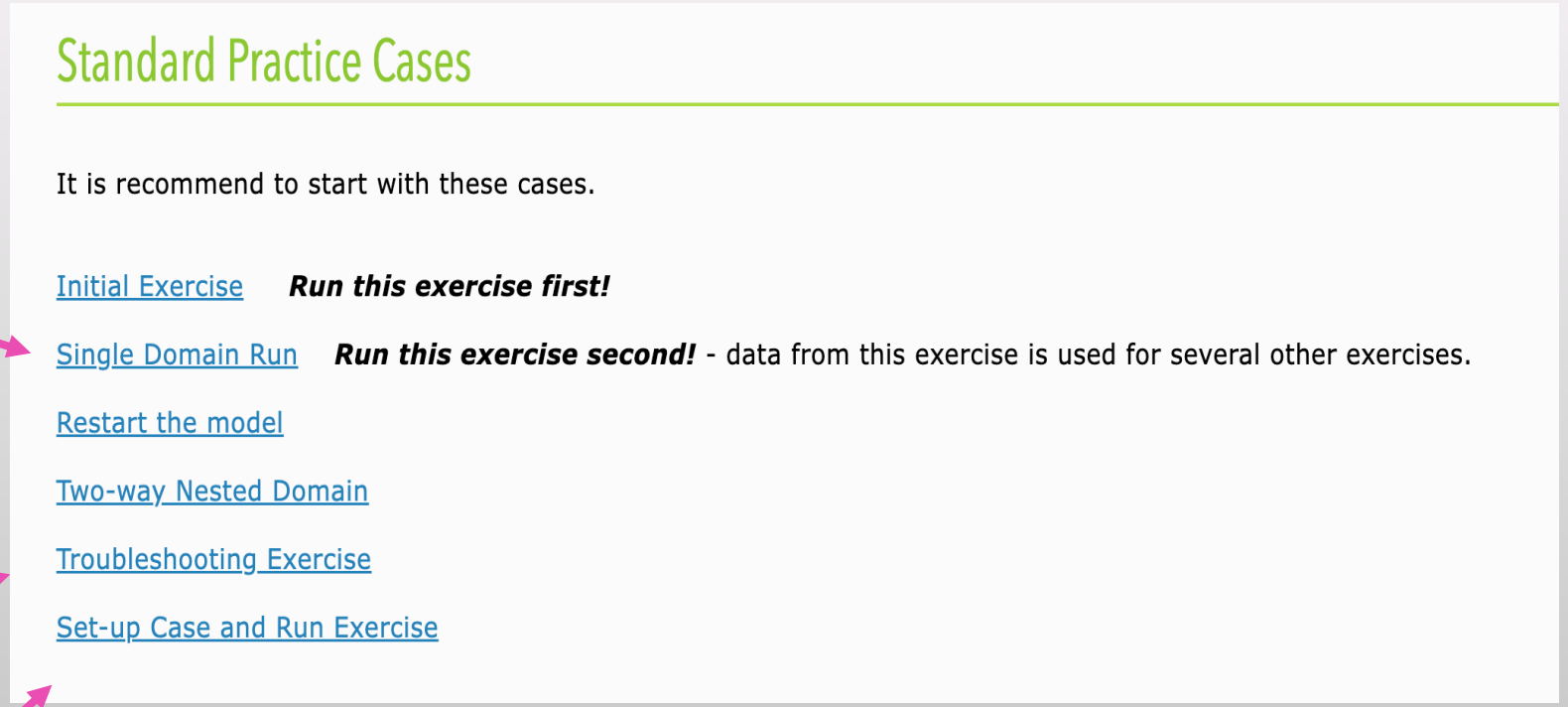
Simply issue commands for processing

STANDARD PRACTICE CASES

Once you've completed the *Initial Exercise*, complete the ***Single Domain Run***

Troubleshooting Exercise

Set-up and Run Your Own Case



Cases for Specific Options

Idealized cases

Setting up WRF for Climate Simulations

Vortex Following Case

Compute a diagnostic variable

Increasing Frequency of WRF Output Variables

Output Additional Variables in History Files

Output Time Series Data at Station Locations

Running with Adaptive Time Step

Spectral Nudging

One-way nested run using ndown

Compile Code

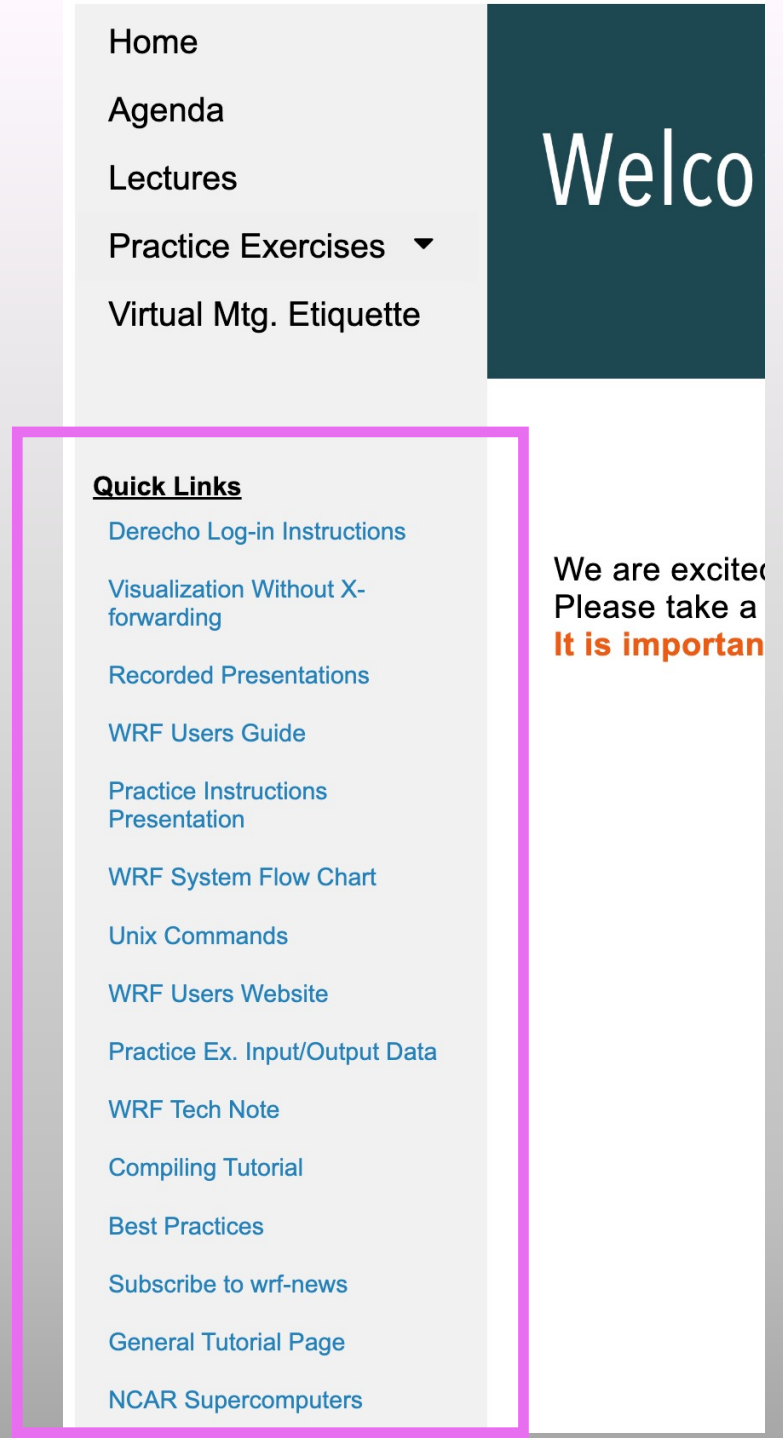
WRF & WPS for Real Data Cases

WRF for Idealized Cases

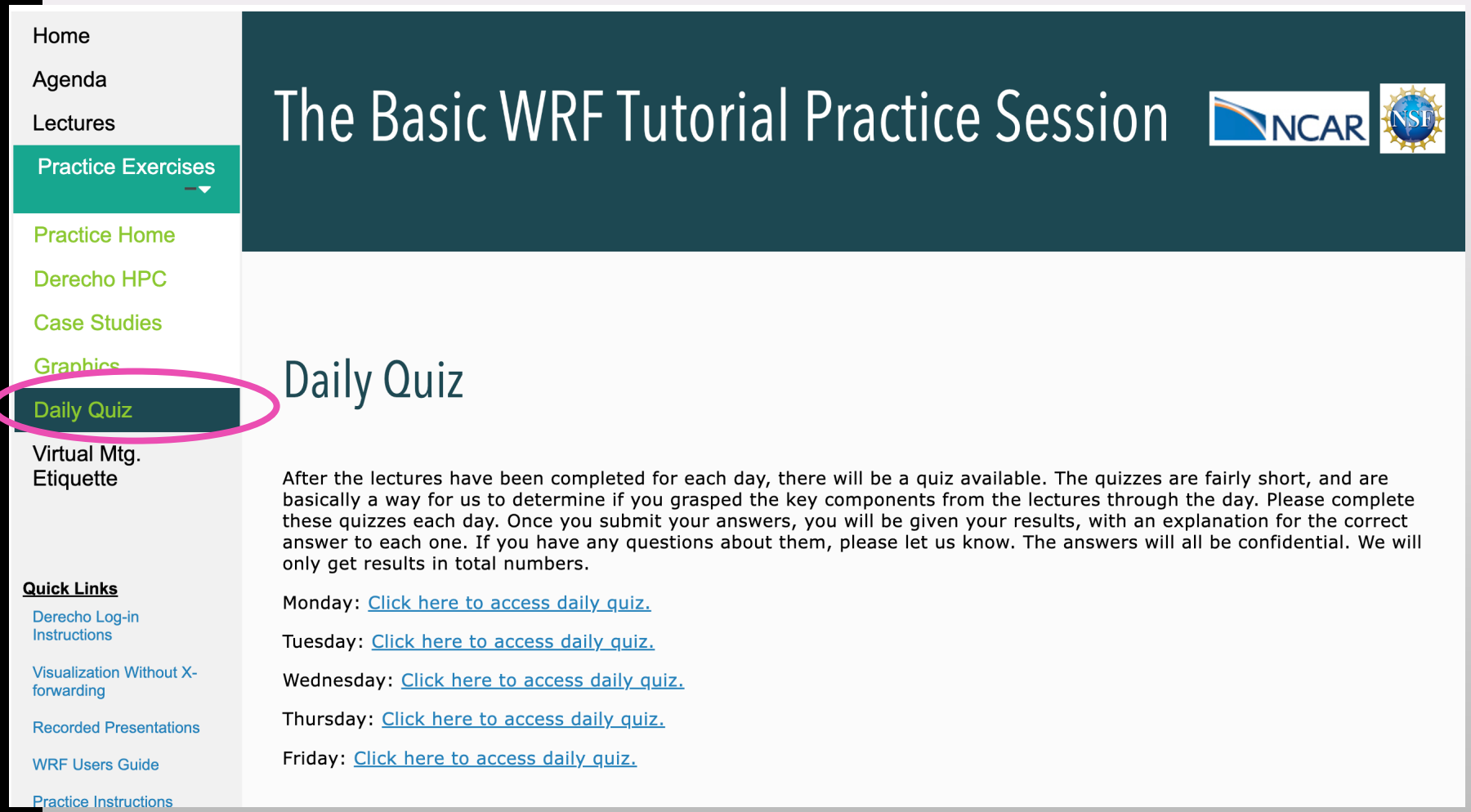
See the Compilation Web Page for compiling on your own machine.

USEFUL LINKS

- Derecho Log-in Instructions
- Recorded tutorial presentations
- WRF Users' Guide
- UNIX commands
- Input & output data
- THIS PRESENTATION



DAILY QUIZ


Home
Agenda
Lectures
Practice Exercises
Practice Home
Derecho HPC
Case Studies
Graphics
Daily Quiz
Virtual Mtg. Etiquette
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Derecho Log-in Instructions
Visualization Without X-forwarding
Recorded Presentations
WRF Users Guide
Practice Instructions
The Basic WRF Tutorial Practice Session
NCAR
NSF
Daily Quiz
After the lectures have been completed for each day, there will be a quiz available. The quizzes are fairly short, and are basically a way for us to determine if you grasped the key components from the lectures through the day. Please complete these quizzes each day. Once you submit your answers, you will be given your results, with an explanation for the correct answer to each one. If you have any questions about them, please let us know. The answers will all be confidential. We will only get results in total numbers.
Monday: Click here to access daily quiz.
Tuesday: Click here to access daily quiz.
Wednesday: Click here to access daily quiz.
Thursday: Click here to access daily quiz.
Friday: Click here to access daily quiz.

QUESTIONS?