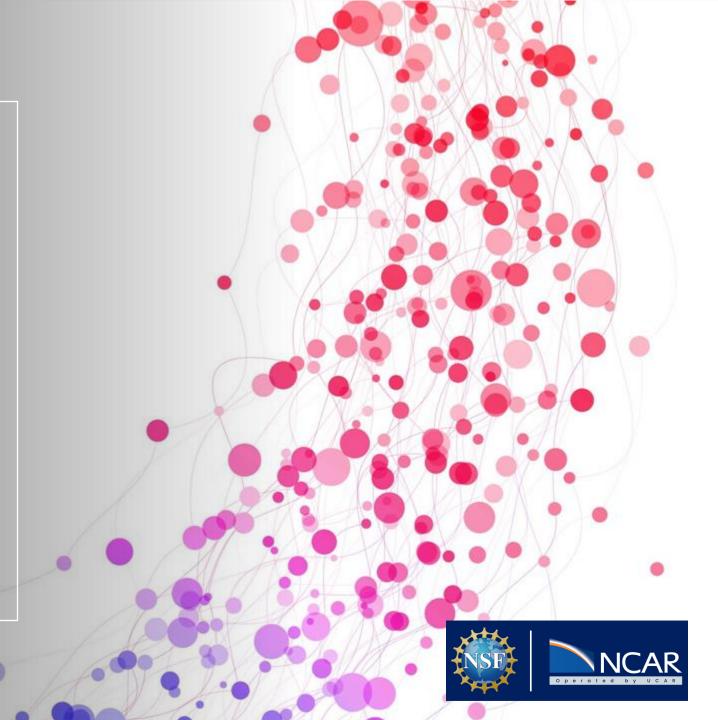
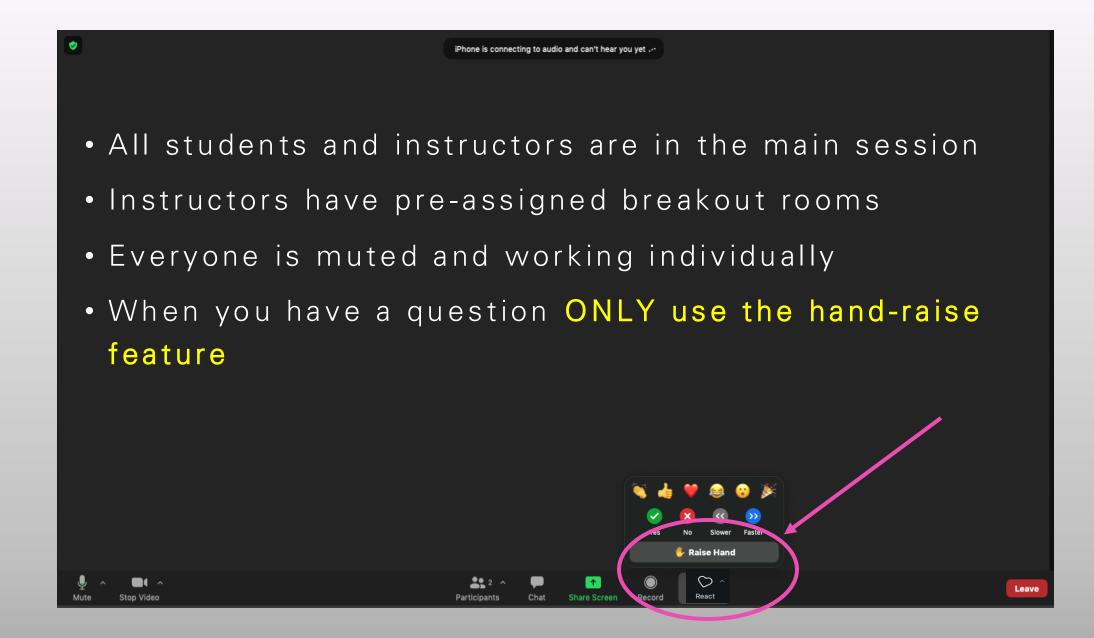
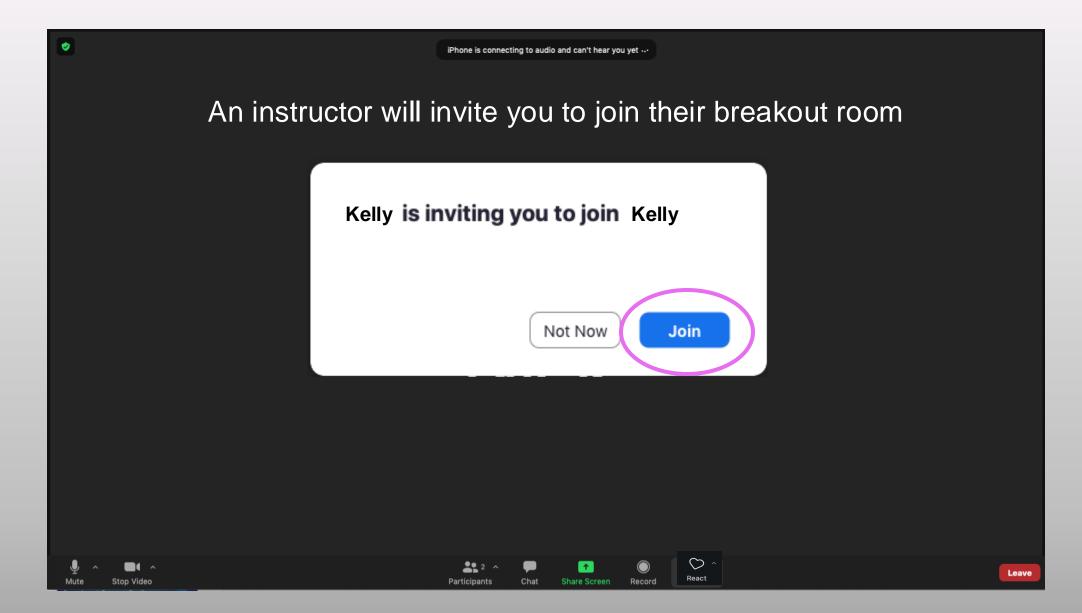
PRACTICE INSTRUCTIONS

Kelly Werner

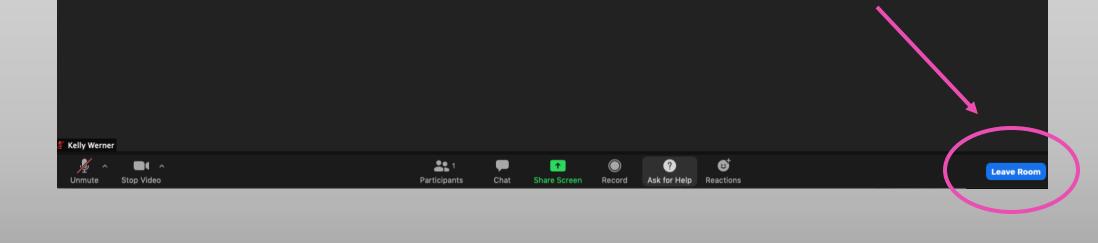






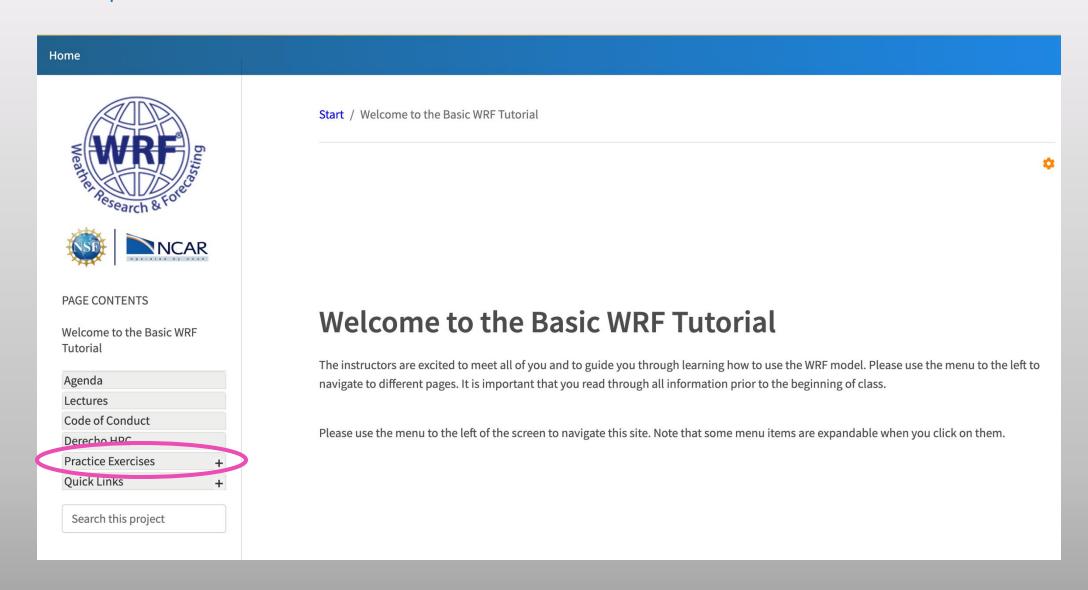
Kelly's Breakout Room

When your issue is resolved, you and the instructor will leave the breakout room and go back to the main room



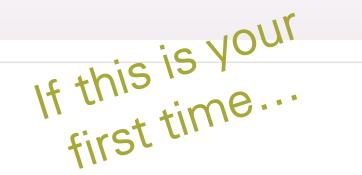
TUTORIAL WEBSITE

https://www2.mmm.ucar.edu/wrf/wrf_tutorial/build/html/index.html



PRACTICE HOME PAGE

Practice Exercises



Welcome to the WRF Tutorial Practice Exercises!

If this is your first time visiting this page, start by clicking the button below to set up your NSF NCAR Derecho computing environment - *note* that this is not the same as setting up your Derecho account - after logging-in to Derecho, everyone must do this once. If you are returning for more exercises, you may skip to the Standard Practice Exercises.



Set up your Derecho computing environment







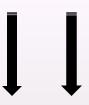


Important

WRF Tutorial instructors are not able to help with this process. If you cannot obtain help from a systems administrator at your institution, you will need to contact NCAR'S CISL HPC User Support.

1. Open a terminal window on your local system.

Terminal Last login: Mon Feb 5 08:55:03 on ttys008 Setting system paths for Mac OS Host: mmmmacncheese TERMINAL TYPE = xtermmodule: Command not found. module: Command not found. cheeseburger:/Users/kkeene>



Logging-in to Derecho

2. Type in one of the following commands, depending on what type of system you're using, but **use your own user name** instead of *user*.

Mac-OS

ssh -Y user@derecho.hpc.ucar.edu

Windows or Linux

ssh -X user@derecho.hpc.ucar.edu

Then press the *enter/return* key. You should then see the following:

 $(user@derecho.hpc.ucar.edu) \ ncar-two-factor:\\$

Logging-in to Derecho

3. Type your password here (the password you set up using the emailed instructions from NSF NCAR/CISL). Note that your password will not display as you type it. This is normal. After you type it in, just hit the *enter/return* key.

If you have the DUO app installed on your phone, you should get a DUO notification like the following:



4. Tap on the notification and you should see a screen that looks like the following.

Are you logging in to Authentication?

UCAR

Boulder, CO, US

5:13 PM

kkeene

Approve

rd will not

Notification

on your

ohone!

5. Tap the "Approve" button and then you should be let in to the Derecho system.





Important

WRF Tutorial instructors are not able to help with this process. If you cannot obtain help from a systems administrator at your institution, you will need to contact NCAR'S CISL HPC User Support.







Setting-up Your Derecho Environment

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).

Before doing the practice exercises, a few environmental settings must be in place. We included them all in a .bashrc script you can simply copy to your home directory.

1. From your home directory, issue the following (don't forget the "." at the end to tell the copy command to place the script "here"):

cp -r /glade/campaign/mmm/wmr/wrf_tutorial/.bashrc .

2. "Source" the .bashrc script to implement the environment settings.

source .bashrc



Now that you have the *.bashrc* file in your home directory, next time you log-in to Derecho, it will automatically apply the settings, so you will not need to do this step at any point after this.





Setting Up for Practice Exercises

During this tutorial, all exercises must be run in the *scratch* directory (/glade/derecho/scratch/\$USER). Each student has their own *scratch* directory. The entire preconfigured directory structure is available for running the practices. You just need to unpack that folder in your own working space. Follow the below instructions to do so.

1. Move into the scratch directory

cd /glade/derecho/scratch/\$USER

2. Unpack the *practices_exercises.tar* file in your current directory:

tar -xf /glade/campaign/mmm/wmr/wrf_tutorial/practice_exercises.tar

This may take several minutes. Once it completes, you will be given the command line prompt again in your terminal window.

3. Once you are given the command line prompt again, you can move into the practice_exercises directory

cd practice_exercises

If you issue the Ls command, you should see the following directories:

- troubleshooting_exercise: Used specifically for a "Troubleshooting" exercise
- wps: For running all WPS processes (geogrid, ungrib, and metgrid)
- wrf : For running most of the WRF processes (real and wrf)
- wrf_ideal_dm: For running idealized cases built for distributed-memory processing (you will learn more about this later)
- wrf_ideal_serial: For running idealized cases built for serial processing
- wrf_vortex : Used specifically for the vortex-following exercise



Useful Tools on Derecho

Editors

To make modifications to scripts, namelists, etc., the following editors are available:

- vi : only use if you are familiar with vi
- emacs: only use if you are familiar with emacs
- gedit: Recommended option if you are unfamiliar with vi or emacs. Note that this option is only available if you have x
 forwarding installed.

To use these editors, the command is in the format of <editor name> <file name>. For e.g.,

gedit namelist.input

Viewing .pdf Files

To view a .pdf file on Derecho, use the following command:

display file.pdf

Note that this option is only available if you have x-forwarding installed.

Comparing Files

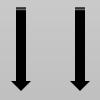
To compare two text files (for e.g., to see the differences in two different namelist files), use either diff or xxdiff. diff can be used to see a couple of differences. If there are numerous differences, xxdiff may be more viewer-friendly, as it displays a side-by-side view of the two files. Both commands expect the same format. For e.g.,

xxdiff path-to-file/file path-to-file/file

Note that the xxdiff option is only available if you have x-forwarding installed.

File Editors Available on Derecho:

- vi
- emacs
- gedit
 *Recommended if
 inexperienced with
 vi/emacs*



You are now ready to begin running the practice exercises!

Return to Practice Exercises



Practice Exercises

Welcome to the WRF Tutorial Practice Exercises!

If this is your first time. See start by clicking the but that this is not the same as setup. See start by clicking the but that this is not the same as setup. See start by clicking the but that this is not the same as setup. See start by clicking the but that this is not the same as setup. See start by clicking the but that this is not the same as setup. See start by clicking the but that this is not the same as setup. See start by clicking the but the same as setup. See start by clicking the but that this is not the same as setup. See start by clicking the but the same as setup. See start by clicking the same as se

Set up your mputing environment

Please read the following important notes before proceeding:

- Complete the Initial Exercise, and then the Single Domain case before moving on to others.
 - You will use output files from some earlier exercises (e.g., the Single Domain Run) for later exercises. Follow instructions at the end
 of each exercise to save your files before starting a new exercise.
- You are not expected to complete all exercises. After the *Initial Exercise* and the *Single Domain Run*, experiment with exercises that align more with your research and/or application.
- Once you are comfortable with the general process, try the Set-up and Run Your Own Case exercise.
- All code has been precompiled to save time. Compiling exercises are available if you want to experiment with compiling the code on these machines. For all other exercises please use the pre-compiled code.
- Feel free to reference the WRF-ARW User's Guide or recorded lectures while working through exercises.

Important

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

PRACTICE EXERCISES: IMPORTANT INFORMATION

Read important notes

New to Unix commands?

PRACTICE

EXERCISES

Start with:

- 1. Initial Exercise
- Includes basic information on WPS and WRF processes
- Pre-configured namelists
- Become familiar with process
 & commands

Standard Practice Exercises

Initial Exercise - - Run this exercise first!

Single Domain Run -- Run uns exercise second!

Restart the Model

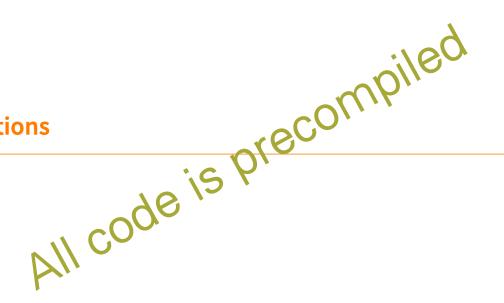
Two-way Nested Domain

Troubleshooting Exercise

Set-up and Run Your Own Case

Cases for Specific Options

Idealized cases
Climate Simulation
Vortex Following
Compute a New Diagnostic Variable
Using the Runtime I/O Option
Output Time Series Data
The Adaptive Time Step Option
Spectral Nudging
The Ndown Program



Compile Code

WRF & WPS for Real Data Cases WRF for Idealized Cases

PRACTICE

EXERCISES

Start with:

1. Initial Exercise

Next:

2. Single Domain Run

* Output from these two exercises are used in later exercises

Standard Practice Exercises

Initial Exercise - - Run this exercise first!

Single Domain Run - - Run this exercise second!

Restart the Model

Two-way Nested Domain

Troubleshooting Exercise

Set-up and Run Your Own Case

Troubleshooti ng Exercise

Cases for Specific Options

Set-up and Run Your Own

Idealized cases
Climate Simulation
Vortex Following
Compute a New Diagnostic Variable
Using the Runtime I/O Option
Output Time Series Data
The Adaptive Time Step Option
Spectral Nudging
The Ndown Program

Compile Code

WRF & WPS for Real Data Cases WRF for Idealized Cases

- THIS PRESENTATION
- Recorded tutorial presentations
- WRF Users' Guide
- UNIX commands
- Practice exercise data
 - Moving files from Derecho to local machine and vice versa

Tutorial Agenda

USEFUL RESOURÇES







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Practice Exercises +

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Recorded Presentations
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NCAR Supercomputers

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Start / Welcome to the Basic W

Welcome to

The instructors are excited to me the left to navigate to different p

Please use the menu to the left of them.



- Title link: .pdf version of lecture
 - Initially version from previous tutorial (July 2024)
 - Links updated with this week's lectures throughout the week
- (video) link : recorded presentation on YouTube
 - From Jan 2021
 - Sometimes different instructors

TUTORIAL AGENDA

Basic WRF Tutorial Agenda

Tutorial Dates: 3-7 February, 2025



Note

All times in the below agenda are in U.S. Mountain Standard Time (MST).

Monday

February 3

Time	Lecture	Instructor
9:00	Welcome Remarks	Joe Klemp
9:15	Instructor and Student Introductions	
9:45	WRF Modeling System Overview (video)	Wei Wang
10:15	WPS Overview (video)	Michael Duda
10:45	Break	
11:05	Program Real (video)	Wei Wang
11:25	Running WPS and WRF (video1) (video2)	Kelly Werner
12:00	Break	
1:00	Practice Instructions	Kelly Werner
	Live Practice Session	
2:15	Break	
2:35 - 3:30	Live Practice Session	

DAILY QUIZ



Start / Practice Exercises

Practice Exercises

Welcome to the WRF Tutorial Practice Exercises!

If this is your first time visiting this page, start by clicking the button I environment - note that this is not the same as setting up your Derech once. If you are returning for more exercises, you may skip to the Star

Set up your Derecho computing environment

Please read the following important notes before proceeding:

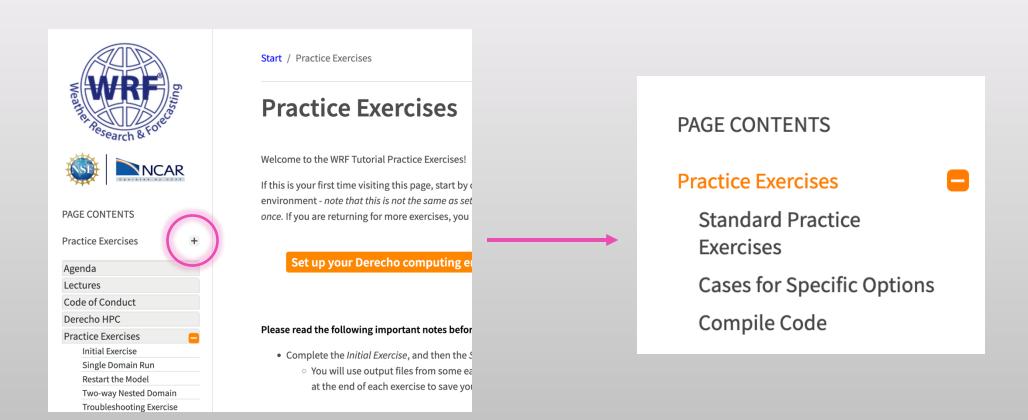
- Complete the *Initial Exercise*, and then the *Single Domain* case
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- All code has been precompiled to save time. Compiling exercise code on these machines. For all other exercises please use the
- Feel free to reference the WRF-ARW User's Guide or recorded le

- Quizzes cover important lecture content
- Quizzes are ANONYMOUS and optional, but recommended
- Explanations are given for incorrect answers

Important

If you are new to using Unix commands, please first go through the common commands.

WEBSITE NAVIGATION



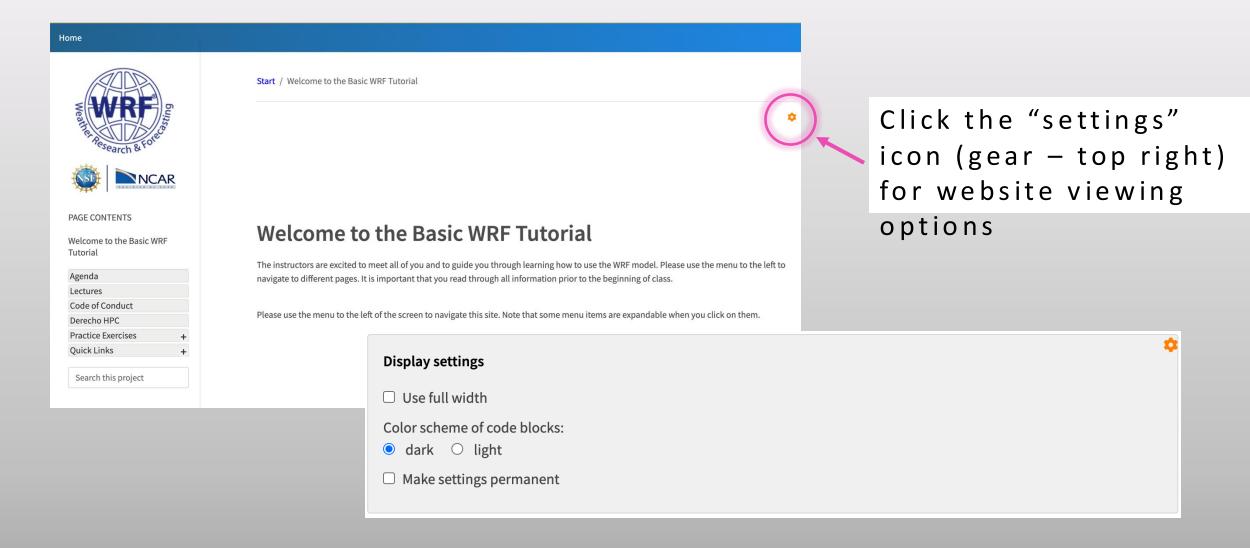
Click "+" to expand current page's table of contents to include sections and subsections

WEBSITE NAVIGATION



Click "WRF logo" from any page to take you back to the home page

WEBSITE NAVIGATION



COMPUTING RESOURCE AVAILABILITY

- Everyone has access to Derecho through the end of February (28 Feb, 2025)!
- This tutorial website will continue to be available after the tutorial, with no plans to remove it in the future.

REMINDERS

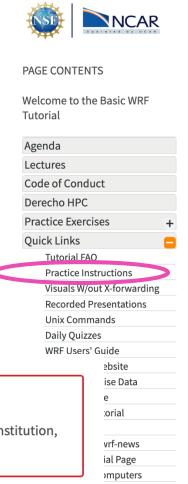
• THIS presentation is available from the Quick Links tab.

 You must have X11 (x-forwarding) installed on your local system to view plots – Tutorial instructors cannot help with this.

Important

WRF Tutorial instructors are not able to help with this process. If you cannot obtain help from a systems administrator at your institution, you will need to contact NCAR'S CISL HPC User Support.





Welcome to

The instructors are excited to navigate to different pages. It

Please use the menu to the le

Search this project

QUESTIONS?

