

PRACTICE INSTRUCTIONS

*Familiarizing with
the*

*WRF & WPS
Programs*



TUTORIAL AGENDA

Ratings: *basic, moderate, advanced*

Practice Sessions

Coffee Breaks & Lunch

Information Exchange

Monday, July 17

Instructor

8:00 - 8:30	Registration and Coffee	
8:30 - 9:00	Welcome and Introductions	Jon Klump
9:00 - 9:30	WRF Modeling System Overview (basic)	Wei Wang
9:30 - 9:45	Practice Instructions: Familiarizing with the WRF/WPS Programs	Kelly Warner
9:45 - 10:00	Coffee Break	
10:00 - 11:15	****PRACTICE SESSION****	
11:15 - 11:30	WPS: Fundamental Capabilities (basic)	Michael Dada
11:30 - 11:45	Lunch Break	
11:45 - 12:45	Program Real (basic)	Wei Wang
12:45 - 2:30	Running WPS and WRF (basic)	Kelly Warner
2:30 - 2:45	Practice Instructions: Configure and Run WPS/WRF Using a Single Domain	Kelly Warner
2:45 - 3:00	Coffee Break	
3:00 - 5:00	****PRACTICE SESSION****	

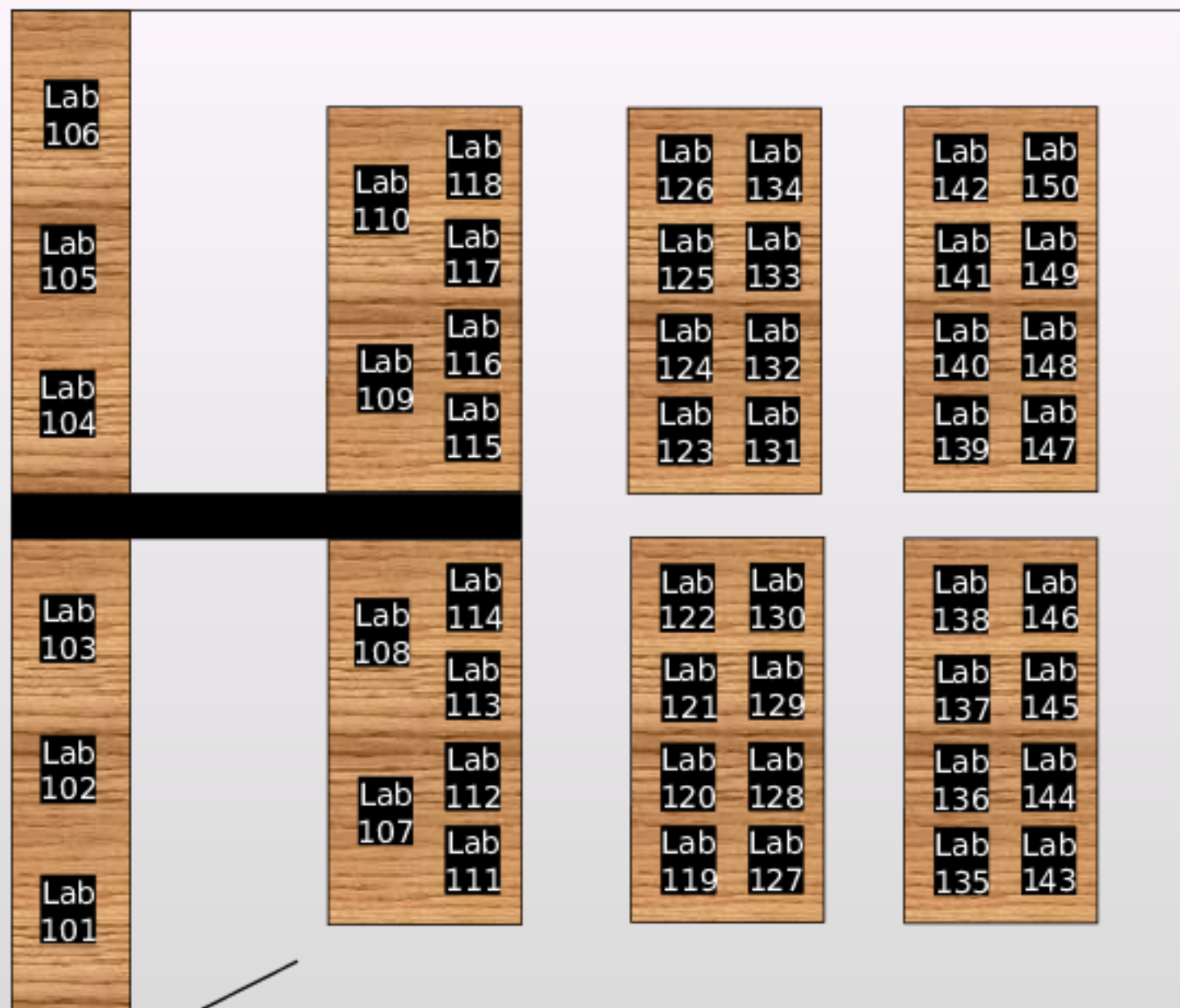
Tuesday, July 18

Instructor

8:30 - 9:30	Nested Domains (basic)	Kelly Warner
9:30 - 9:50	Coffee Break	
9:50 - 11:00	****PRACTICE SESSION****	

11:00 - 12:00	WRF-Python Post-processing Tool	Abby Jaya
12:00 - 1:00	Lunch Break	
1:00 - 1:40	Compiling WRF and WPS (basic)	Kelly Warner
1:40 - 2:00	Coffee Break	
2:00 - 3:30	WPS/WRF Set up and Run Demo	Michael Dada
3:30 - 5:00	****PRACTICE SESSION****	
5:00 - 6:30	Information Exchange (appetizers and drinks will be served)	

CLASSROOM M LAYOUT

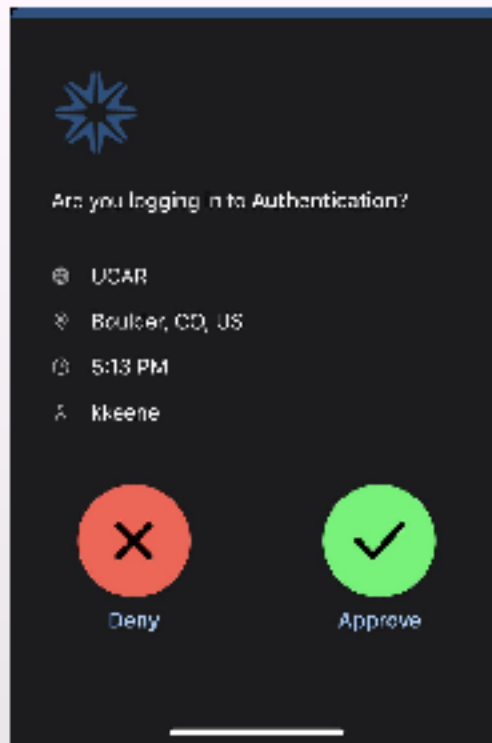


From your laptop, open a terminal (Unix) window

From the command line, log-in to the Cheyenne system
`ssh -X user_name@cheyenne.ucar.edu`

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

You should receive a DUO app notification on your smartphone.
Click the notification
Choose "Approve"



LOGGING-IN
TO NCAR'S
CHEYENNE
HPC



TUTORIAL PRACTICE WEBSITE

www2.mmm.ucar.edu/wrf/OnLineTutorial/tutorial_practice_in-person/index.html

The Basic WRF Tutorial Practice Session



[Home](#)

[Cheyenne HPC](#)

[Case Studies](#)

[Graphics](#)

[Daily Quiz](#)

[Useful Links](#)

- This website is specific to the hands-on practice sessions for the Basic WRF Tutorial.
- Use the links above to navigate around the website.
- All work will be done on NCAR's [Cheyenne HPC](#). Follow instructions in the link to get started.
- Once you have set up your Cheyenne environment and do not need assistance navigating to your practice directory, you can go directly to [Case Studies](#).

CHEYENNE ENVIRONMENT SET-UP

Cheyenne Environment Set-up

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

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 ncarenv/1.3  
> module load intel/19.1.1  
> module load ncarcompilers/0.5.0  
> module load mpt/2.25  
> module load netcdf/4.8.1
```

3. You will also need to load a few modules that can be used for visualizing output and editing files. You may not use them all, but it does not hurt to have them loaded.

```
> module load ncview/2.1.7  
> module load ncl/6.6.2  
> module load nco/5.1.4  
> module load xxdiff/4.0.1
```

GO TO CASE STUDIES

[Home](#)[Cheyenne HPC](#)[Case Studies](#)[Graphics](#)[Daily Quiz](#)[Useful Links](#)

Cheyenne Environment Set-up



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.

START WITH THE INITIAL EXERCISE

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



Run WRF Case Studies

Important Notes – Please read!

- **Complete the Initial Exercise, and then the Single Domain Case before moving on to others.**
- The ★ rating is an estimate of difficulty.
- There is no expectation that you must complete all the cases. Experiment with cases you are more likely to use in your research.
- Once you are more comfortable running cases, try setting up your own domain, or play with different physical options (tutorial input data are global, so you can place a domain anywhere in the world).
- All code has been precompiled to save time. If you want to experiment with compiling the code, there is a separate exercise to practice compiling, 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 the instructions to save those files before starting each new exercise.**

Standard Practice Cases

We recommend starting with these cases. Below you can see the difficulty rating and the suggested day to try each one.

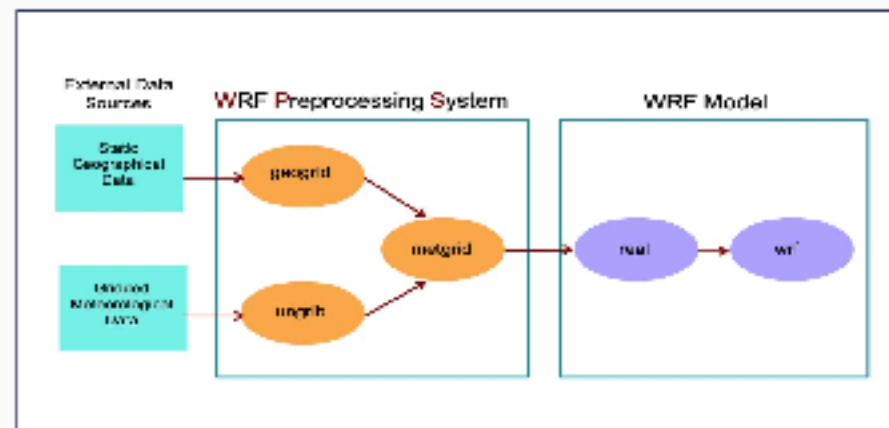
[Initial Exercise](#) ★ ★ (Monday)



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 configured for you, 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 settings

****Click on the buttons below to expand or collapse each section.****

1. Run Geogrid



2. Run Ungrib



INITIAL EXERCISE

Includes basic information
on WPS and WRF processes

Pre-configured namelists

Simply issue commands for
processing

QUESTIONS?

