



2024 CESM Tutorial

Lab check-in

Cecile Hannay

Climate & Global Dynamics, NSF NCAR

Aug 5-9, 2024

CESM Tutorial Website

<https://www.cesm.ucar.edu/events/tutorials/cesm>

The screenshot shows the website for the CESM Tutorial 2024. At the top left is the NCAR logo and 'COMMUNITY EARTH SYSTEM MODEL' with a 'CESM' tag. A search bar is at the top right. A navigation menu includes Home, About, What We Do, Models, Working Groups, Events, and News. The breadcrumb trail is Home / Events / Tutorials. The main heading is 'CESM Tutorial 2024'. Below it is a photo of three people working on laptops. A yellow bar below the photo says 'TUTORIAL'. The dates are 'Aug. 5 to Aug. 9, 2024' with the time '8:00 am – 5:00 pm MDT' and location 'NSF NCAR MESA LAB, BOULDER, CO'. A paragraph of text describes the CESM model. On the right, a sidebar has a 'CESM TUTORIAL 2024' section with links for 'Logistics', 'Agendas, Presentations, and Resources', and 'RESOURCE LINKS'. The 'RESOURCE LINKS' section includes 'Lab Materials', 'Agenda', and 'Photo Gallery'.

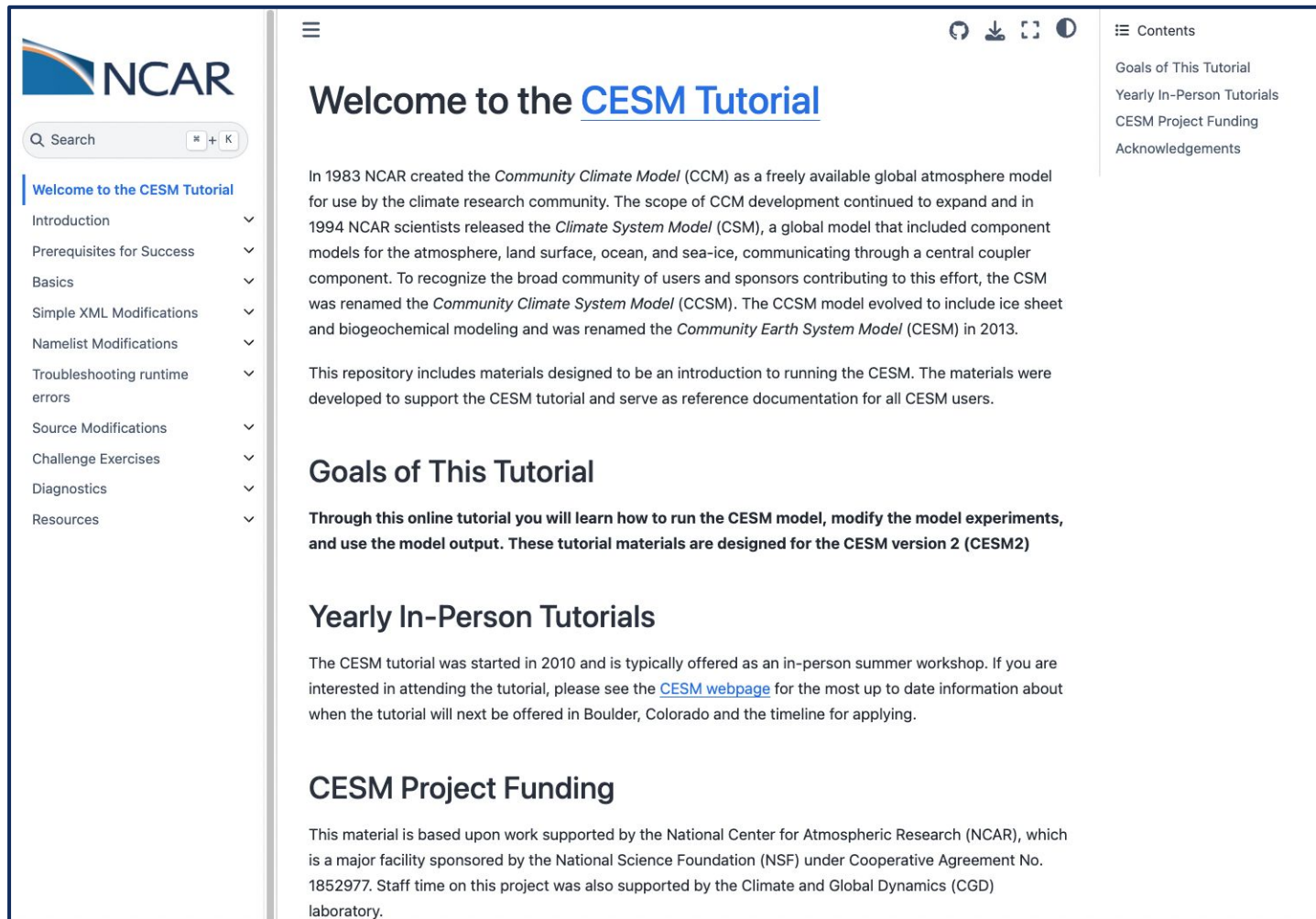
agenda (including slides of lectures)

lab materials

Additional info about logistics, photos, etc

Did everyone find the lab documentation?

<https://ncar.github.io/CESM-Tutorial/README.html>



The screenshot shows the NCAR GitHub repository page for the CESM Tutorial. The page has a dark blue header with the NCAR logo and a search bar. The main content area is white with a dark blue sidebar on the left containing a table of contents. The main text area contains the following sections:

- Welcome to the CESM Tutorial**: A paragraph explaining the history of the Community Climate Model (CCM) and the Community Earth System Model (CESM).
- Goals of This Tutorial**: A bolded statement: "Through this online tutorial you will learn how to run the CESM model, modify the model experiments, and use the model output. These tutorial materials are designed for the CESM version 2 (CESM2)".
- Yearly In-Person Tutorials**: A paragraph explaining that the tutorial is typically offered as an in-person summer workshop.
- CESM Project Funding**: A paragraph explaining that the material is based upon work supported by the National Center for Atmospheric Research (NCAR), which is a major facility sponsored by the National Science Foundation (NSF) under Cooperative Agreement No. 1852977.

Rough guidelines for the lab

Day 1: Basics

Day 2: Simple xml modifications

Day 3: Namelist, Troubleshooting, Source Mods

Day 4: Challenge exercises

Day 5: Diagnostics

BUT

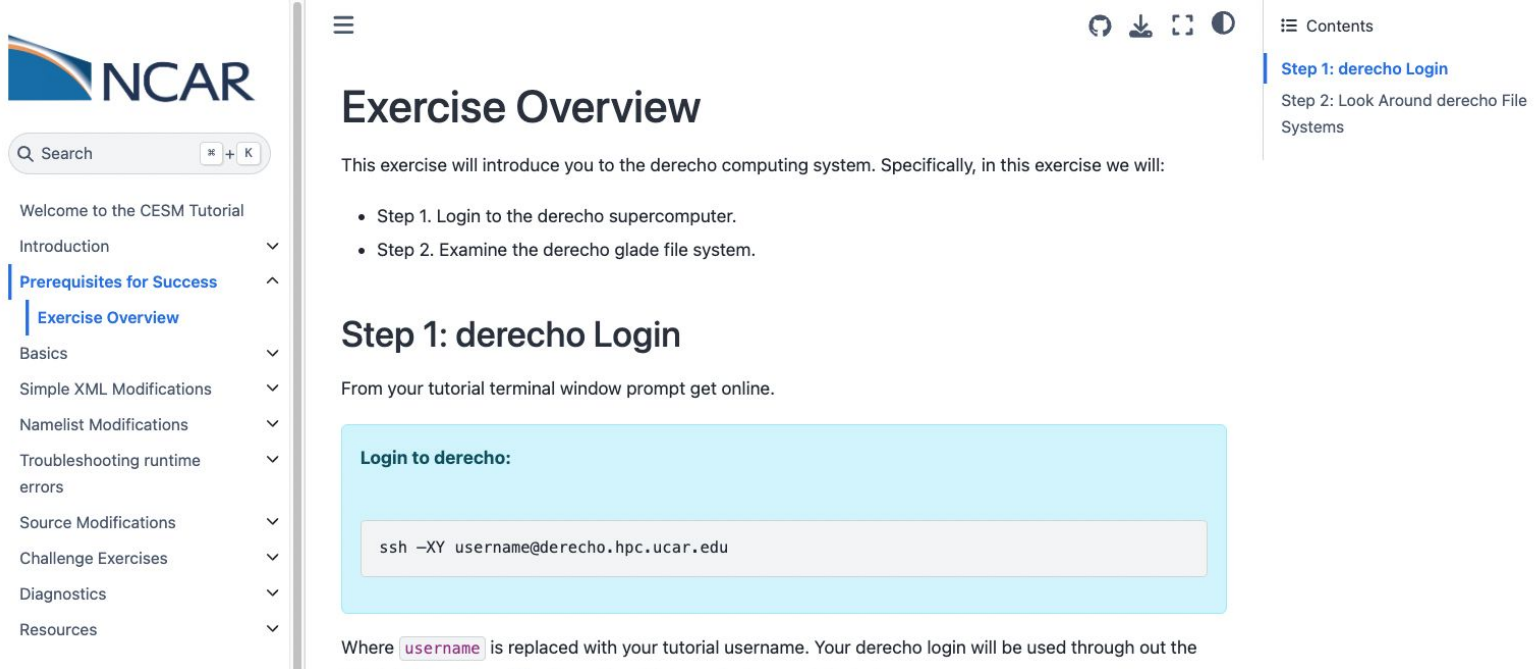
This is a **self-paced lab**.

We all come from different backgrounds. Some people will move faster, and some will move slower. It's completely okay.

Was everyone able to log on derecho ?

If not, talk to Rory ASAP. We will create one for you.

Did you complete pre-requisite for success?

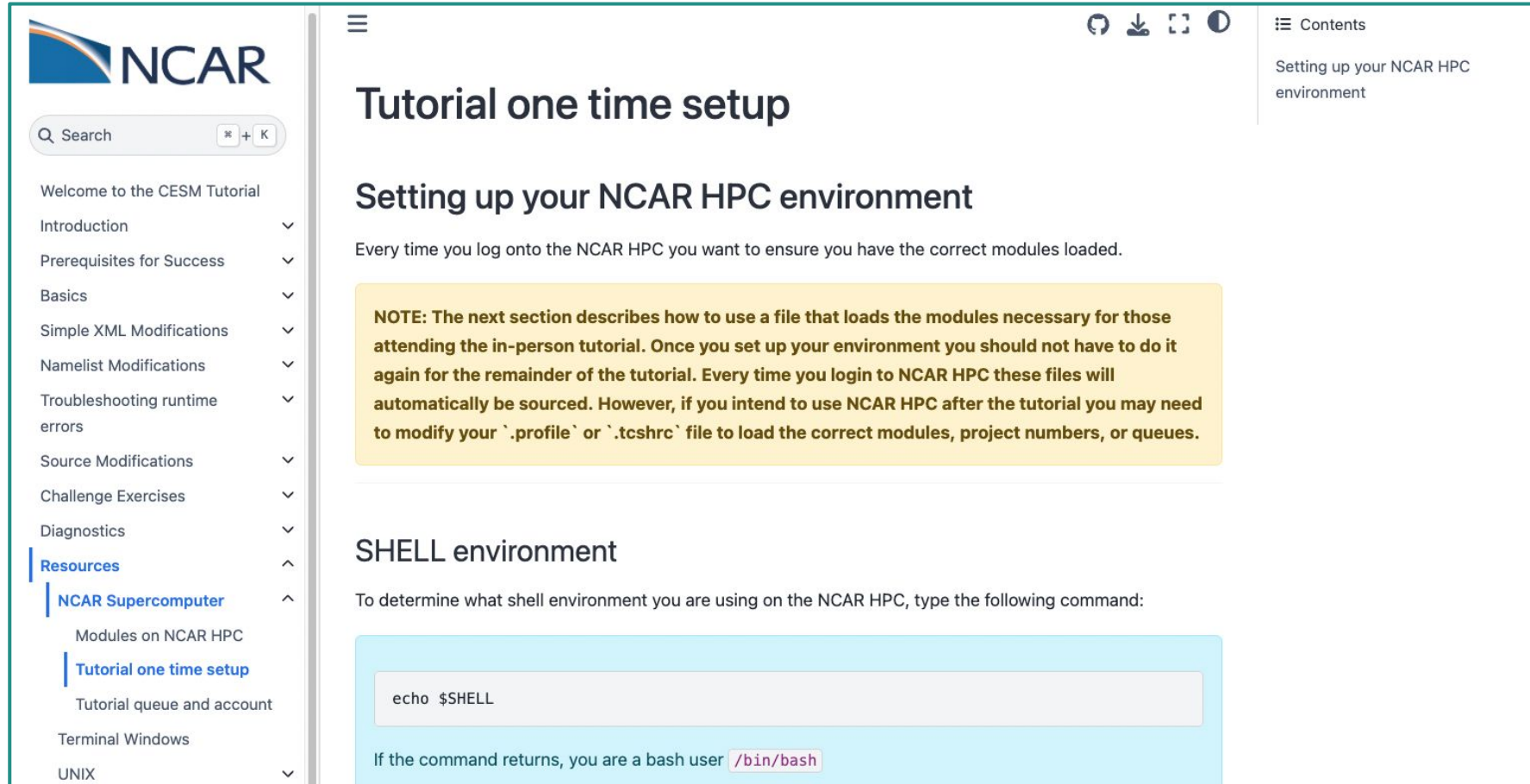


The screenshot shows the NCAR tutorial interface. On the left is a navigation menu with the NCAR logo at the top, a search bar, and a list of topics: Welcome to the CESM Tutorial, Introduction, Prerequisites for Success, Exercise Overview, Basics, Simple XML Modifications, Namelist Modifications, Troubleshooting runtime errors, Source Modifications, Challenge Exercises, Diagnostics, and Resources. A green arrow points to the 'Prerequisites for Success' item. The main content area is titled 'Exercise Overview' and contains the following text: 'This exercise will introduce you to the derecho computing system. Specifically, in this exercise we will:' followed by a bulleted list: 'Step 1. Login to the derecho supercomputer.' and 'Step 2. Examine the derecho glade file system.' Below this is a section titled 'Step 1: derecho Login' with the instruction 'From your tutorial terminal window prompt get online.' A light blue box contains the text 'Login to derecho:' and a code block with the command `ssh -XY username@derecho.hpc.ucar.edu`. At the bottom, it says 'Where `username` is replaced with your tutorial username. Your derecho login will be used through out the'.

Setting your profile

Were you able to do the Tutorial One Time setup ?

If not, talk to us



The screenshot shows the NCAR HPC tutorial interface. On the left is a navigation sidebar with the NCAR logo at the top, a search bar, and a list of topics including 'Welcome to the CESM Tutorial', 'Introduction', 'Prerequisites for Success', 'Basics', 'Simple XML Modifications', 'Namelist Modifications', 'Troubleshooting runtime errors', 'Source Modifications', 'Challenge Exercises', 'Diagnostics', 'Resources', 'NCAR Supercomputer', 'Modules on NCAR HPC', 'Tutorial one time setup', 'Tutorial queue and account', 'Terminal Windows', and 'UNIX'. A green arrow points to the 'Tutorial one time setup' link. The main content area is titled 'Tutorial one time setup' and 'Setting up your NCAR HPC environment'. It contains a note: 'NOTE: The next section describes how to use a file that loads the modules necessary for those attending the in-person tutorial. Once you set up your environment you should not have to do it again for the remainder of the tutorial. Every time you login to NCAR HPC these files will automatically be sourced. However, if you intend to use NCAR HPC after the tutorial you may need to modify your `.profile` or `.tcshrc` file to load the correct modules, project numbers, or queues.' Below this is a section for 'SHELL environment' with the instruction: 'To determine what shell environment you are using on the NCAR HPC, type the following command:'. A code block shows the command `echo $SHELL`. Below the code block, it says 'If the command returns, you are a bash user `/bin/bash`'.

Sorry: there was an old link from last year that was not updated. This should work now.

Project account and Reservation Queues

As a **full time participant**, you should have access to

- account number: **UESM0013**
- reservation queue: **tutorial**

Instructions how to
use these are here:



NCAR

Q Search [x] [+ K]

Welcome to the CSM Tutorial

- Introduction
- Prerequisites for Success
- Basics
- Simple XML Modifications
- Namelist Modifications
- Troubleshooting runtime errors
- Source Modifications
- Challenge Exercises
- Diagnostics
- Resources**
- NCAR Supercomputer
- Terminal Windows
- UNIX

Tutorial queue and account

You should have access to project account **UESM0013** and use this for your simulations.

You can change the account in your case directory using the following command:

```
./xmlchange PROJECT=UESM0013
```

Special Queues

Schedule for Tutorial Reservation Queues

- We have a special queue **tutorial** during the lab sessions to ensure you get through the derecho queues quickly and get your jobs run. This queue are only active during our lab sessions.
- Outside the lab sessions, you should use the queue **cpu** to run cesm.

If you need to change the value for a run, you can change the reservation queue in your case directory using

Auditor will not have access to these (Sorry!)

How to use project number and reservation queue

To use project number (in theory it is set in your profile)

```
./xmlchange PROJECT=UESM0013
```

How do I use the reservation queue (active during lab)

during lab

```
cd /glade/u/home/$USER/code/my_cesm_code/cime/scripts  
./create_newcase --case ~/cases/b1850.basics --res f19_g17 --compset B1850
```

```
cd ~/cases/cases/b1850.basics  
./case.setup
```

```
qcmd -q tutorial -- ./case.build
```

```
./xmlchange JOB_QUEUE=tutorial --force
```

```
./case.submit
```

outside lab

```
cd /glade/u/home/$USER/code/my_cesm_code/cime/scripts  
./create_newcase --case ~/cases/b1850.basics --res f19_g17 --compset B1850
```

```
cd ~/cases/cases/b1850.basics  
./case.setup
```

```
qcmd -- ./case.build
```

```
./xmlchange JOB_QUEUE=cpu
```

```
./case.submit
```

Chapter Basic

CESM workflow doesn't expect you to enter command

NCAR

Q Search

Welcome to the CESM Tutorial

Introduction

Prerequisites for Success

Basics

Workspaces

CESM code

CESM Workflow

Exercise Overview

Simple XML Modifications

Namelist Modifications

CESM Workflow

CESM has been designed to be easy to use. Once you have downloaded the CESM code, a CESM `case` can be run with a set of 4 commands.

Note: In CESM jargon, a case refers to a specific instance of a model simulation.

1. Create a new case using `create_newcase`
2. Set up the case by invoking `case.setup`
3. Build the executable using `case.build`
4. Run your case using `case.submit`

The following sections will go into more detail about these 4 commands and also provide information about

CESM workflow doesn't expect you to enter command

Commands are entered in **Exercise overview**

Example of basic `./create_newcase` syntax:

```
./create_newcase --case /glade/u/home/$USER/cases/CASE --res RES --compset COMPSET
```

NOTE: Do not enter the example above at the command line. You will create your first case in the Exercise at the end of this section.

▼ [Click here for the solution](#)

Create a new case `b1850.basics` with the command:

```
cd /glade/u/home/$USER/code/my_cesm_code/cime/scripts
./create_newcase --case /glade/u/home/$USER/cases/b1850.basics --res f19_g17 --compset E
```


Questions ?

