

**Community Earth System Model (CESM) Tutorial**  
**NCAR Mesa Lab, Boulder, CO**  
**10-14 July 2023**

All sessions in Mesa Lab Seminar Room unless otherwise specified  
CL = component lecture; SL = specialized lecture

**Monday, July 10**

8:15-8:30 Welcome, intro & logistics (*Alice DuVivier, Elizabeth Faircloth, Cam Brinkworth*)  
8:30-9:00 CL 1: CESM overview and intro to the coupled system (*Gokhan Danabasoglu*)  
9:00-9:15 Q&A  
9:15-9:30 Break  
9:30-10:00 CL 2: Atmosphere Modeling I: Dynamics (*Peter Lauritzen*)  
10:00-10:15 Q&A  
10:15-10:30 Break  
10:30-10:50 SL 1: NCAR HPC environment (*Rory Kelly*)  
10:50-11:00 Q&A  
11:00-11:15 Intro to Lab: Basics of CESM (*Katherine Thayer-Calder*)  
11:15-11:45 Lab exercises 1 (**Breakout rooms**)  
11:45-1:00 Lunch on your own  
1:00-1:30 CL 3: Atmosphere Modeling II: Parameterizations (*Rich Neale*)  
1:30-1:45 Q&A  
1:45-2:00 Lab exercises check in (*Katherine Thayer-Calder & Alice DuVivier*)  
2:00-4:30 Lab exercises 2 (**Breakout rooms**)  
2:45-3:00 Break  
4:30-4:45 Daily debrief (*Alice DuVivier*)  
5:00 Shuttle departs ML

**Tuesday, July 11**

8:25-8:30 Welcome, daily logistics (*Alice DuVivier & Elizabeth Faircloth*)  
8:30-9:00 CL 4: Land Modeling I: Biogeophysics (*David Lawrence*)  
9:00-9:15 Q&A  
9:15-9:30 Break  
9:30-10:00 CL 5: Land Modeling II: Biogeochemistry/ecosystems (*Adrianna Foster*)  
10:00-10:15 Q&A  
10:15-10:30 Break  
10:30-10:45 Intro to Lab: XML changes (*Hui Li*)  
10:45-11:30 Lab exercises 3 (**Breakout rooms**)  
11:30-1:00 Lunch on your own

- Meet a Scientist 1 (**cafeteria and breakout rooms to be assigned**)
- (*Julio Bacmeister, Anna-Lena Deppenmeier, Meg Fowler, Peter Lawrence, Steve Yeager, Bette Otto-Bliesner/Sophia Macaerewich*)

1:00-1:15 Group Photo  
1:15-1:35 SL 2: Simpler Models (*Isla Simpson*)  
1:35-1:45 Q&A  
1:45-2:00 Lab exercises check in (*Hui Li & Alice DuVivier*)  
2:00-4:30 Lab exercises 4  
2:45-3:00 Break  
4:30-4:45 Daily debrief (*Alice DuVivier*)

5:00 Shuttle departs ML

### Wednesday, July 12

8:25-8:30 Welcome, daily logistics (*Alice DuViver & Elizabeth Faircloth*)  
8:30-9:00 CL 6: Atmosphere III: WACCM (*Nick Davis*)  
9:00-9:15 Q&A  
9:15-9:30 Break  
9:30-10:00 CL 7: Atmosphere IV: Chemistry and aerosols (*Simone Tilmes or Rebecca Buchholtz*)  
10:00-10:15 Q&A  
10:15-10:30 Break  
10:30-10:45 Intro to Lab: namelist and source changes (*Cecile Hannay*)  
10:45-11:30 Lab exercises 5 (**Breakout rooms**)  
11:30-1:00 Lunch on your own

- Meet a Scientist 2 (**cafeteria and breakout rooms to be assigned**)
- (*Marika Holland, Kristen Krumhardt, Dave Lawrence, Jesse Nusbaumer, Christine Shields*)
- ML tour with SciEd 12-1 (**front door**)

1:00-1:30 CL 8: Sea ice modeling (*Dave Bailey*)  
1:30-1:45 Q&A  
1:45-2:00 Lab exercises check in (*Cecile Hannay and Alice DuViver*)  
2:00-4:30 Lab exercises 6 (**Breakout rooms**)  
2:45-3:00 Break  
4:30-4:45 Daily debrief (*Alice DuViver*)  
5:00 Shuttle departs ML

### Thursday, July 13

8:25-8:30 Welcome, daily logistics (*Alice DuViver & Elizabeth Faircloth*)  
8:30-9:00 CL 9: Ocean I: overview of model (*Gustavo Marques*)  
9:00-9:15 Q&A  
9:15-9:30 Break  
9:30-10:00 CL 10: Ocean II: parameterizations/physics (*Peter Gent*)  
10:00-10:15 Q&A  
10:15-10:30 Break  
10:30-10:50 SL 4: Model tuning/coupling (*Cecile Hannay*)  
10:50-11:00 Q&A  
11:00-11:20 SL 5: Climate Variability (*Clara Deser*)  
11:20-11:30 Q&A  
11:30-1:00 Lunch on your own

- Meet a Scientist 3 (**cafeteria and breakout rooms to be assigned**)
- (*Frank Bryan, Katie Dagon, Gunter Leguy, Rich Neale, Isla Simpson, Yang Tian*)
- ML tour with SciEd 12-1 (**front door**)

1:00-1:20 SL 6: Paleoclimate (*Sophia Macarewich*)  
1:20-1:30 Q&A  
1:30-1:50 SL 7: Porting/new features (*Jim Edwards*)  
1:50-2:00 Q&A  
2:00-2:10 Intro to Lab: Diagnostics and Tools (*Jesse Nusbaumer*)  
2:10-4:30 Lab exercises 7

2:45-3:00 Break  
4:30-4:45 Daily debrief (*Alice DuVivier*)  
5:00 Shuttle departs ML

### Friday, July 14

8:25-8:30 Welcome, daily logistics (*Alice DuViver & Elizabeth Faircloth*)  
8:30-9:00 CL 11: Ocean III: biogeochemistry (*Keith Lindsay*)  
9:00-9:15 Q&A  
9:15-9:30 Break  
9:30-10:00 CL 12: Land ice modeling (*Gunter Leguy*)  
10:00-10:15 Q&A  
10:15-10:30 Break  
10:30-10:50 SL 8: Variable Resolution (*Adam Herrington*)  
10:50-11:00 Q&A  
11:00-11:20 SL 9: Climate Justice (*Monica Morrison*)  
11:20-11:30 Q&A  
11:30-1:00 Lunch on your own  
- ML tour with SciEd 12-1 (**front door**)  
1:00-1:20 SL 10: Earth System Prediction (*Steve Yeager*)  
1:20-1:30 Q&A  
1:30-1:45 Intro to Lab (*Alice DuVivier and others*)  
Ocean/Sea Ice/Land Ice (*A. Altuntas, D. Bailey*)  
Land/BGC (*P Lawrence/E. Kluzek, K. Lindsay*)  
Atm/Chem/WACCM (*C. Hannay, Simone, Rebecca, Nick*)  
1:45-3:45 Challenge Lab exercises (**Breakout rooms**)  
2:45-3:00 Break  
3:45-4:00 SL 11: The CESM project, NCAR, and YOU (*Alice DuVivier*)  
4:00-4:15 Q&A  
4:15-4:45 Daily debrief, quiz, surveys, etc. (*Alice DuVivier*)  
5:00 Shuttle departs ML

### As a result of attending the CESM Tutorials, attendees will:

1. Gain a foundational scientific understanding of the core CESM components and CESM features.
  - Activities: component lectures, challenge lab activities
2. Be able to run and modify the model and use the output.
  - Activities: lab sessions, lectures on output/diagnostic packages/etc.
3. Have opportunities to network with peers and CESM scientists.
  - Activities: Meet a Scientist, lecture about CESM project (structure of project/liasons/forums), group work during labs
4. Attain an understanding of HPC needed for CESM.
  - Activities: Lecture about the supercomputer including allocations and how to access after tutorial, Porting lecture, lecture about CESM project (structure of project/liasons/forums)
5. Perceive the tutorials to be an inclusive learning environment.