

# Julia for High-Performance Computing



Julia Tutorial at ICPP25  
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# Interactive Materials

[github.com/JuliaParallel/julia-hpc-tutorial-icpp25](https://github.com/JuliaParallel/julia-hpc-tutorial-icpp25)



[juliaornl.github.io/TutorialJuliaHPC](https://juliaornl.github.io/TutorialJuliaHPC)

> Running Gray-Scott on Perlmutter/NERSC



[juliaornl.github.io/TutorialJuliaHPC](https://juliaornl.github.io/TutorialJuliaHPC)

[github.com/JuliaParallel/julia-hpc-tutorial-icpp25](https://github.com/JuliaParallel/julia-hpc-tutorial-icpp25)



Please log into your NERSC account now  
(if you've never used ssh before, please go to [jupyter.nersc.gov](https://jupyter.nersc.gov))

... or give Sameer's very slick AWS  
(next slides)

# Hands-On with AWS

## Using ParaTools Pro for E4S™ image on AWS with Heidi



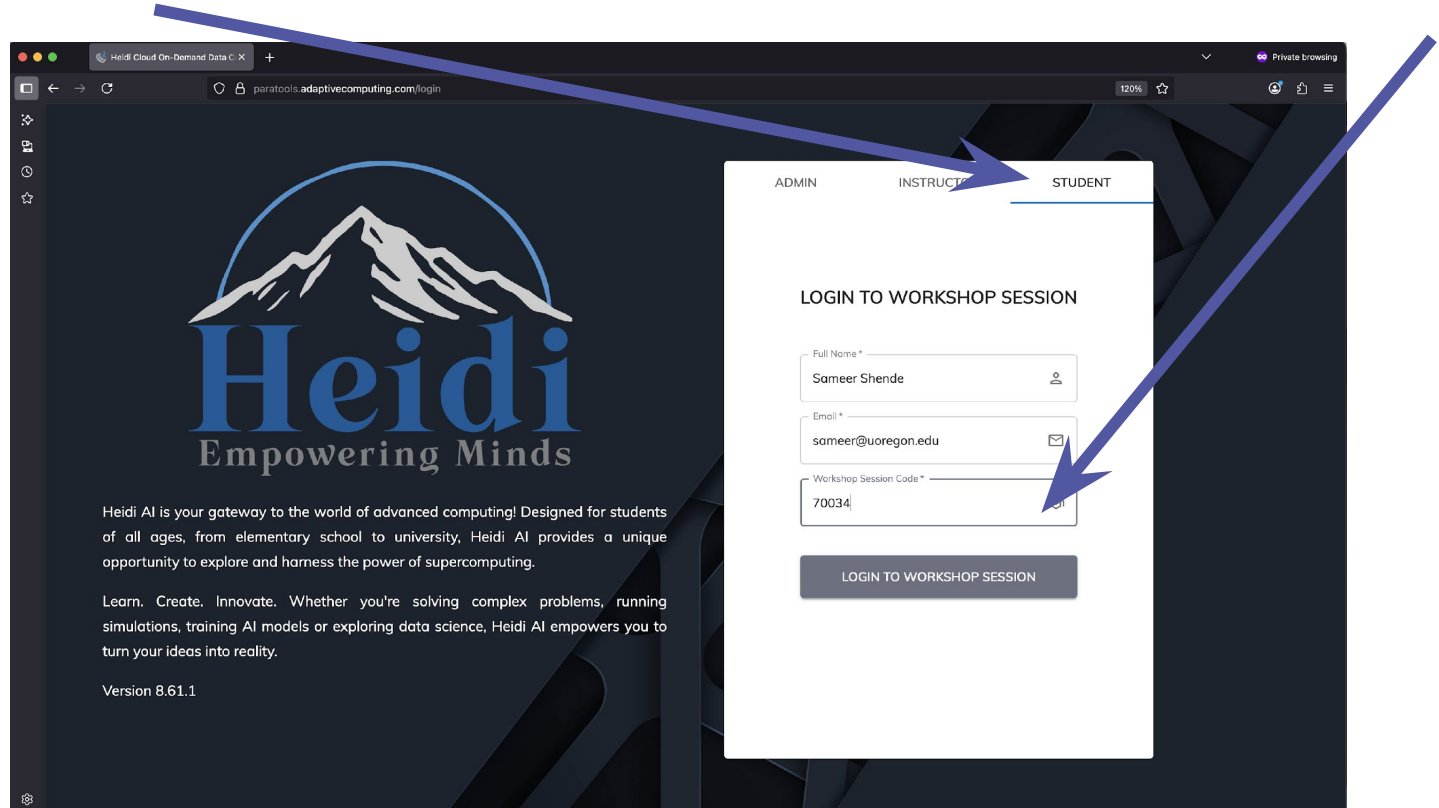
Login to:

<https://paratools.adaptivecomputing.com>

with the credentials. Firefox private window recommended.

Click on Student tab and use code: 70034

# Connect to <https://paratools.adaptivecomputing.com>



The screenshot shows a web browser window at [paratools.adaptivecomputing.com/login](https://paratools.adaptivecomputing.com/login). The page features the Heidi AI logo, which includes a mountain silhouette and the text "Heidi Empowering Minds". Below the logo, a paragraph describes Heidi AI as a gateway to advanced computing for students. A version number "Version 8.61.1" is also present. A modal form titled "LOGIN TO WORKSHOP SESSION" is overlaid on the right side of the page. The modal has three tabs: "ADMIN", "INSTRUCTOR", and "STUDENT", with "STUDENT" being the active tab. The form contains three input fields: "Full Name \*" with the value "Sameer Shende", "Email \*" with the value "sameer@uoregon.edu", and "Workshop Session Code \*" with the value "70034". A "LOGIN TO WORKSHOP SESSION" button is located at the bottom of the modal. Two blue arrows are present: one pointing from the top text to the "STUDENT" tab, and another pointing from the top text to the "Workshop Session Code" input field.

Heidi Cloud On-Demand Data C X +

paratools.adaptivecomputing.com/login

120%

Private browsing

ADMIN INSTRUCTOR **STUDENT**

LOGIN TO WORKSHOP SESSION

Full Name \*  
Sameer Shende

Email \*  
sameer@uoregon.edu

Workshop Session Code \*  
70034

LOGIN TO WORKSHOP SESSION

Heidi  
Empowering Minds

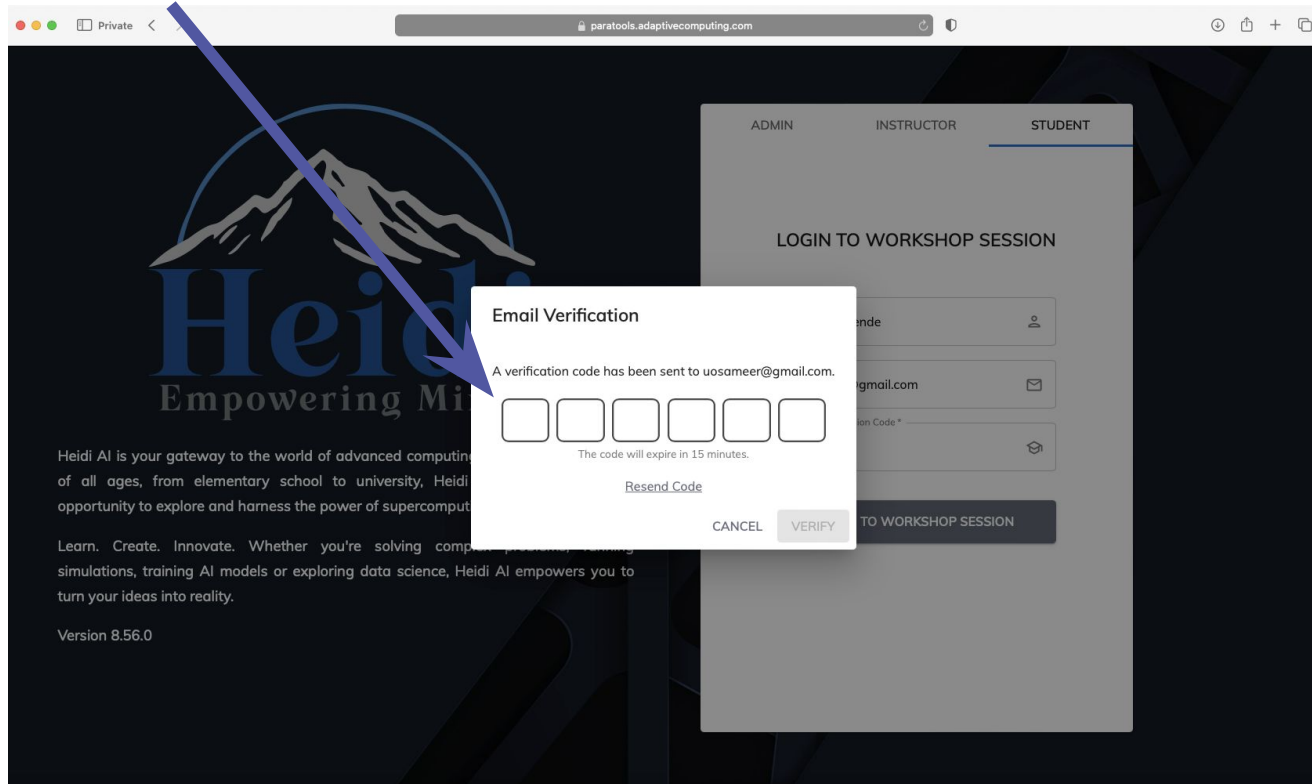
Heidi AI is your gateway to the world of advanced computing! Designed for students of all ages, from elementary school to university, Heidi AI provides a unique opportunity to explore and harness the power of supercomputing.

Learn. Create. Innovate. Whether you're solving complex problems, running simulations, training AI models or exploring data science, Heidi AI empowers you to turn your ideas into reality.

Version 8.61.1

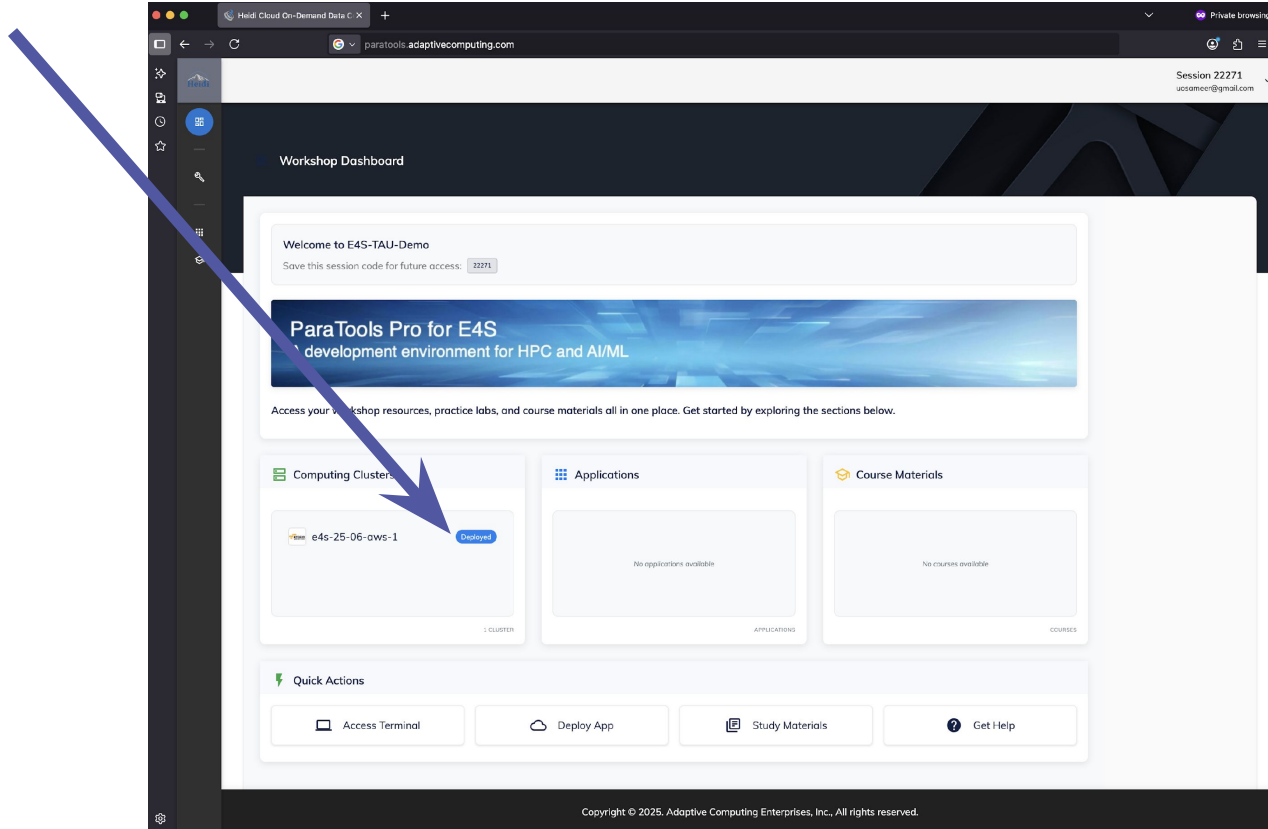
# Connect to <https://paratools.adaptivecomputing.com>

- Check your email, enter verification code.



# Connect to https://paratools.adaptivecomputing.com

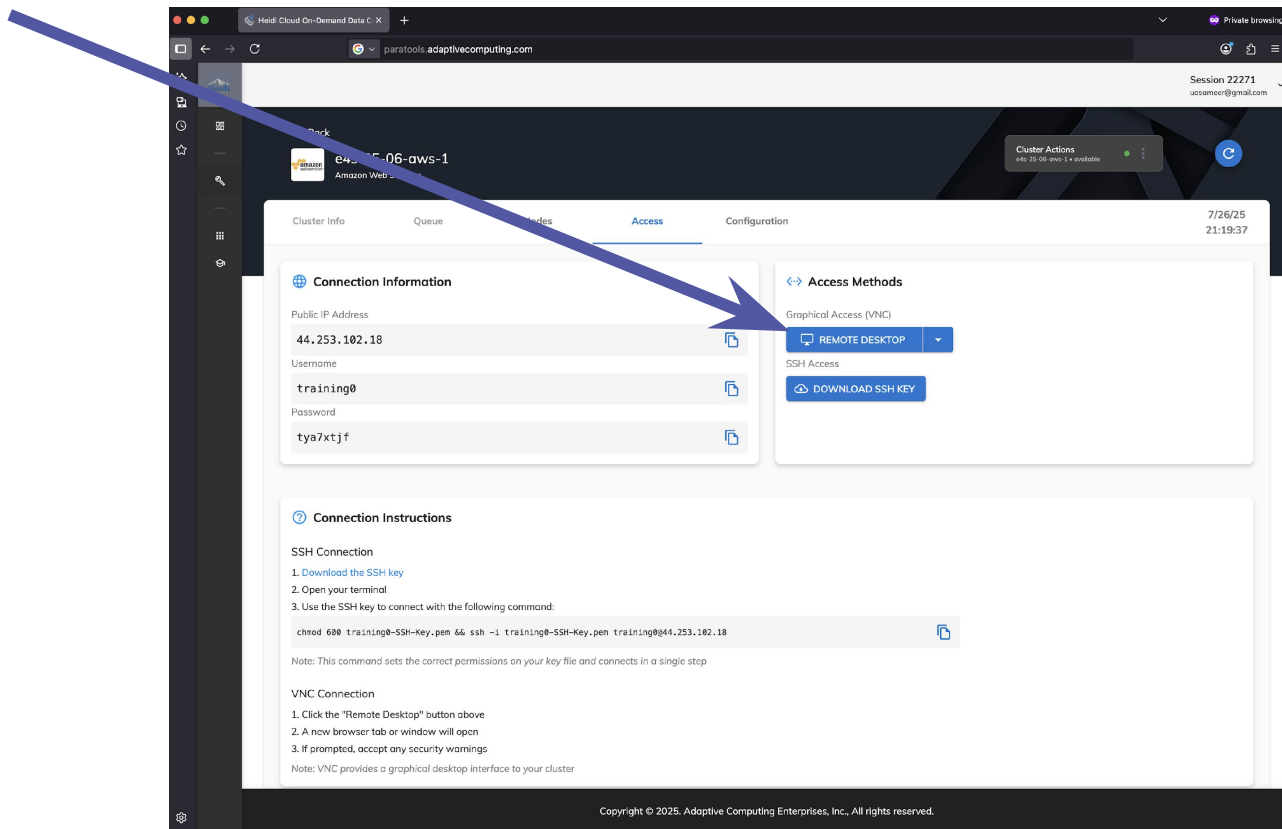
- Click cluster





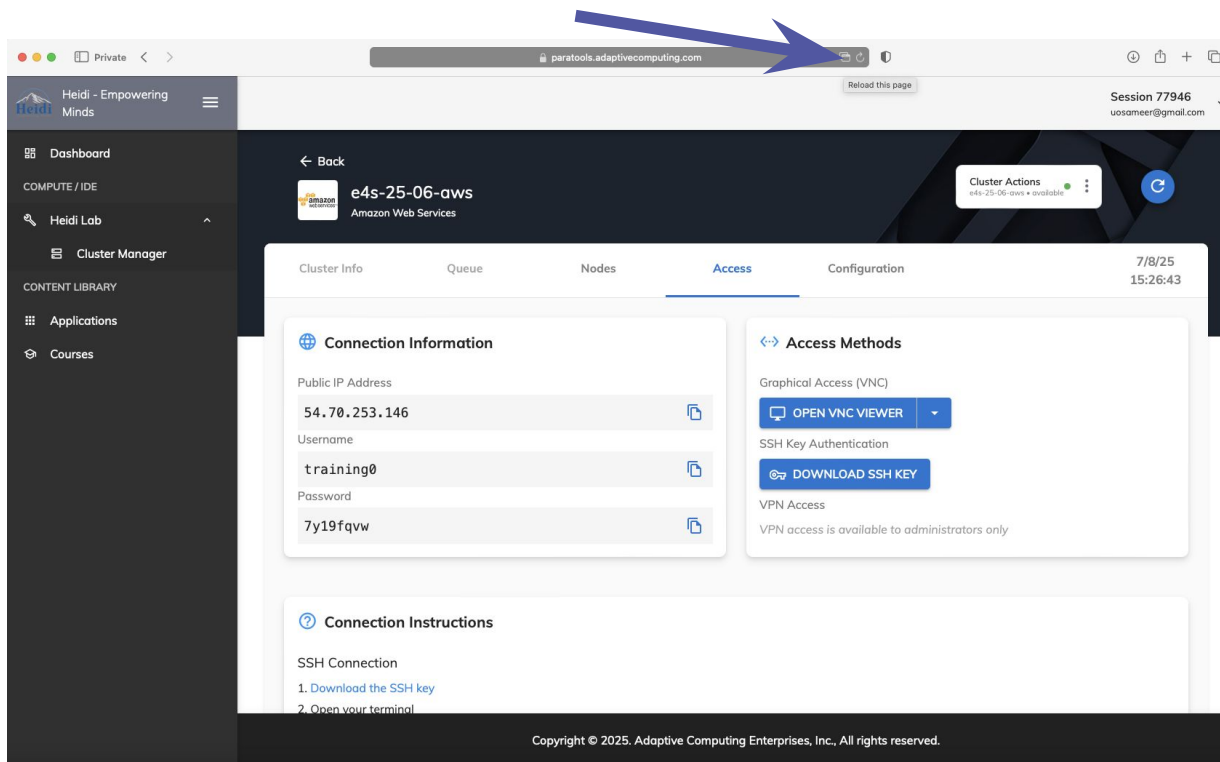
# Connect to https://paratools.adaptivecomputing.com

- Click Remote Desktop



# Connect to <https://paratools.adaptivecomputing.com>

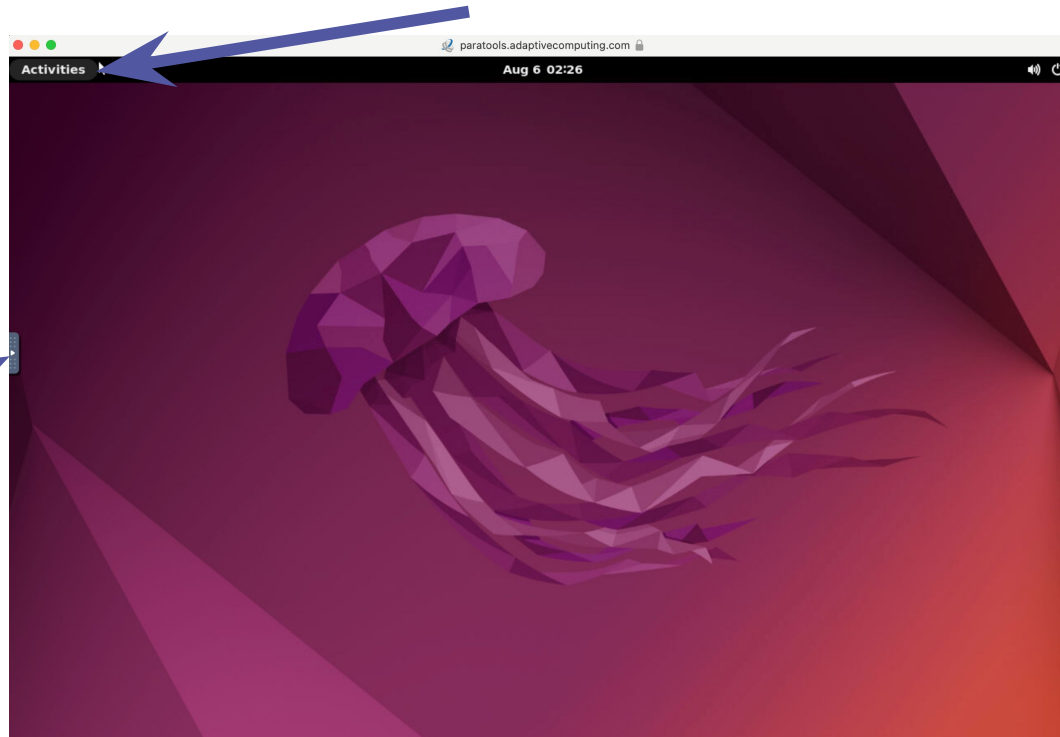
- You may have to enable pop-up windows and accept



# Connect to Students tab with code 70034 at <https://paratools.adaptivecomputing.com>

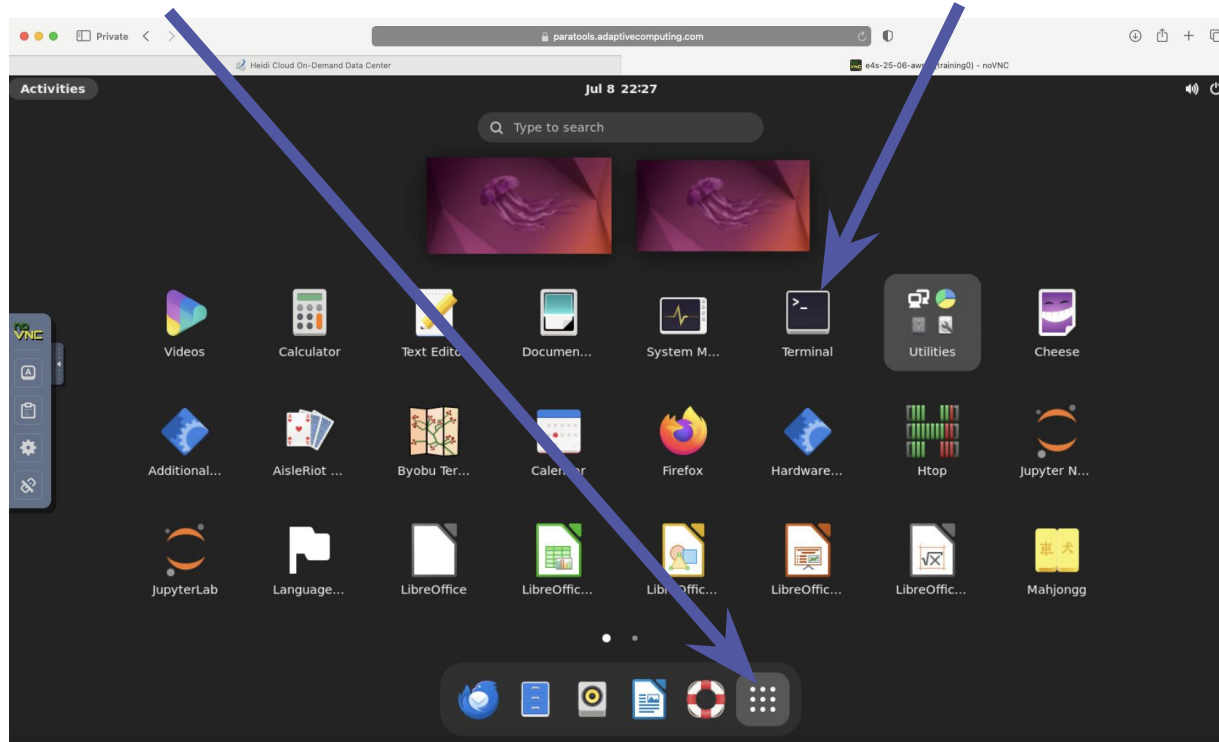
- You should see this jellyfish. Click on Activities.

To copy text from other windows, click on the this button to access the clipboard

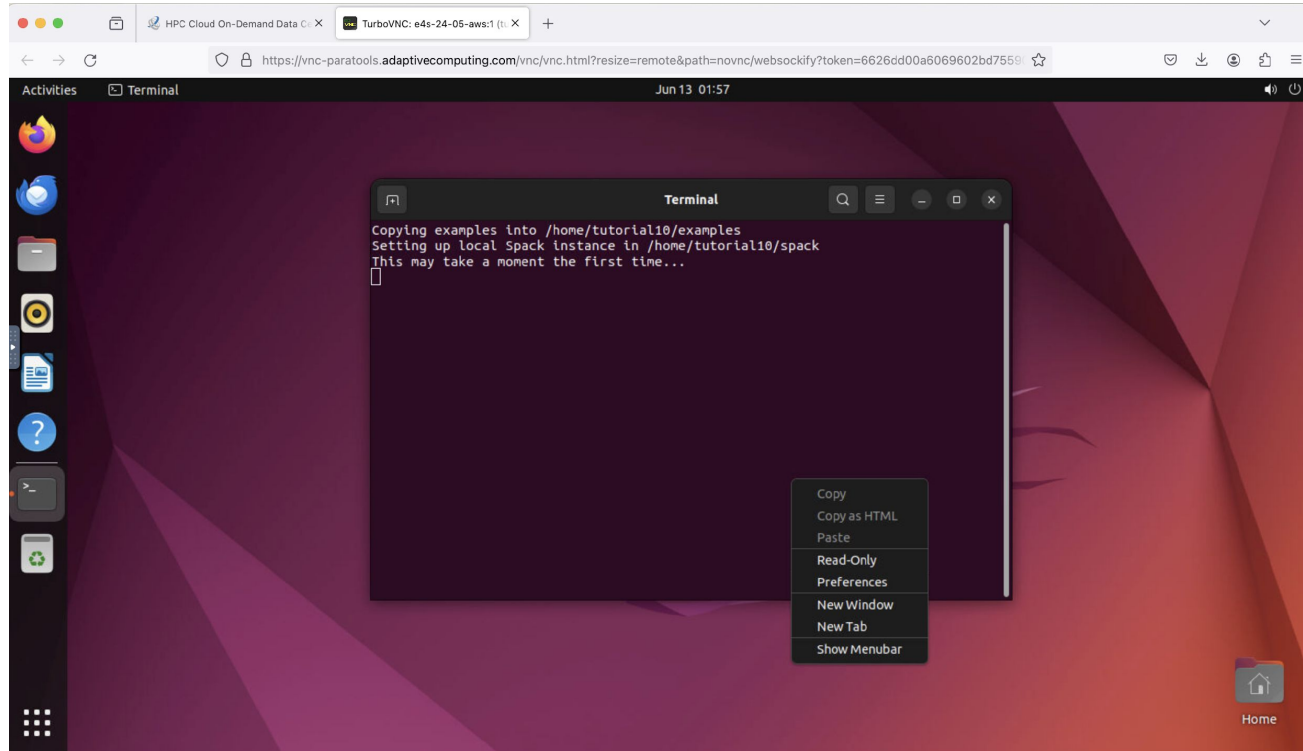


# Connect to <https://paratools.adaptivecomputing.com>

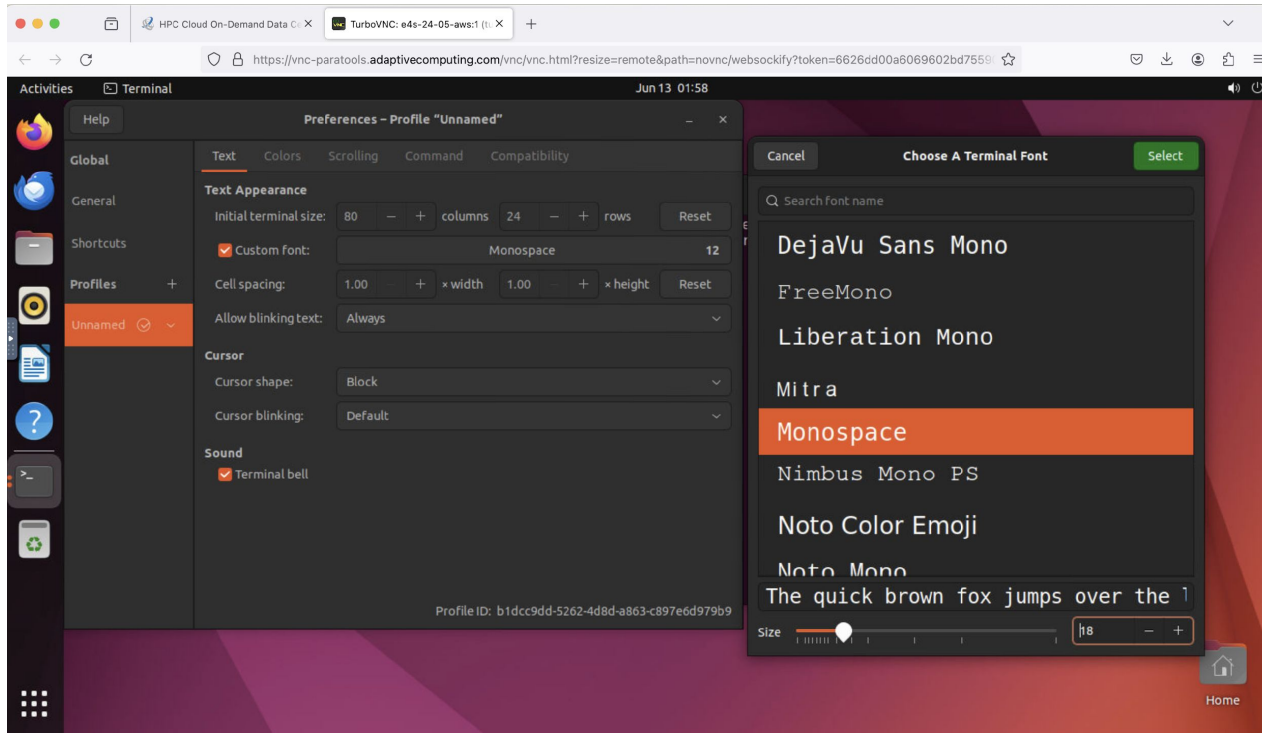
- Click on Activities, nine dots, and then select the Terminal application



# To increase font size right click and choose preferences



# Choose font size after clicking Custom Font for Terminal



# Running your first MPI application on the allocated cluster

```
% cd ~/examples/mpi-procname
% ./compile.sh
% ./run-single-node.sh          # on the login node
% cat mpiprocname.qsub
% qsub mpiprocname.qsub
% qstat -u $USER
% cat mpiprocname.o*

% cd ~/examples/osu-benchmarks
% cat bw.qsub
% qsub bw.qsub
% cat bw.o*                    # How close did you get to 50Gbps? At what message size? Multiply MB/s x 8 ...
```

# Running your first Julia application

```
% cd ~/examples/julia-mpi/hello-world;  
% julia  
Julia> import Pkg; Pkg.add("MPI")  
Julia> Pkg.add("CUDA");  
Julia>  
% mpirun -np 4 julia hello-world.jl  
% cd ~/examples/julia-cuda  
% julia cuda-test.jl
```



# Acknowledgment

- This material is based upon work supported by the U.S. Department of Energy, Office of Science, Office of Advanced Scientific Computing Research, Next-Generation Scientific Software Technologies program, under contract number DE-AC02-06CH11357. DOE SBIR DE-SC0022502.*



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**ENERGY**

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