

HIGH PERFORMANCE RESEARCH COMPUTING

Using Matlab on ACES

Research Computing Symposium

May 14, 2025



High Performance
Research Computing

DIVISION OF RESEARCH

Outline

- Running the Matlab GUI on the Portal
- Parallel Matlab: Multi Threading
- Parallel Matlab: Multi Processing
 - Cluster Profiles
 - Parallel Programming
 - GPUs
- Generating and submitting batch jobs using Drona Composer
- CASE Study: Monte Carlo Pi (time permitted)

Accessing the ACES Portal



TEXAS A&M HIGH PERFORMANCE RESEARCH COMPUTING



Home User Services Resources Research Policies Events Training About Portal

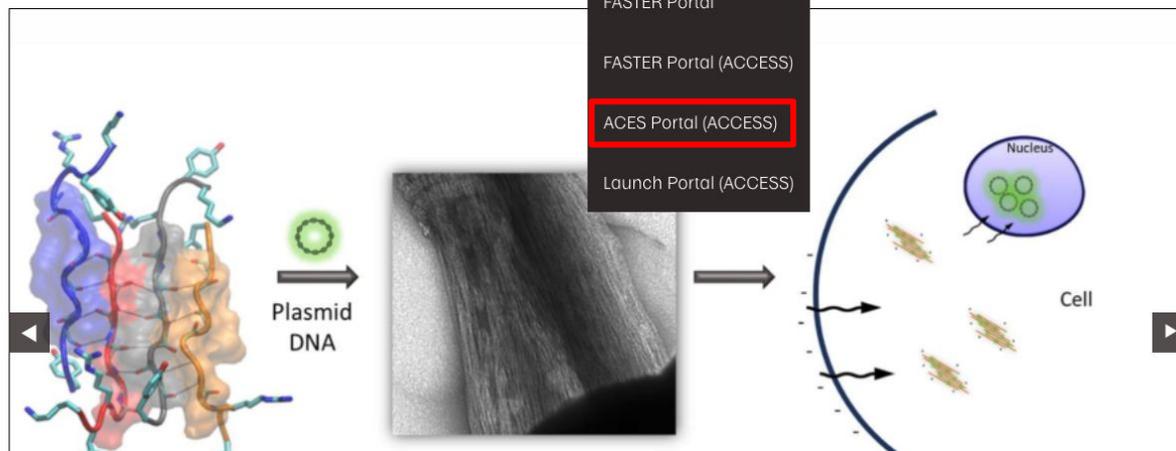
- Terra Portal
- Grace Portal
- FASTER Portal
- FASTER Portal (ACCESS)
- ACES Portal (ACCESS)**
- Launch Portal (ACCESS)

Quick Links

- New User Information
- Accounts
 - Apply for Accounts
 - Manage Accounts
- User Consulting
- Training
- Knowledge Base
- Software
- FAQ

User Guides

- ACES
- FASTER
- Grace
- Terra



HPRC webpage: hprc.tamu.edu



Login to ACES through ACCESS

Log-in using your ACCESS credentials.

The screenshot shows the ACCESS login interface. At the top left is the ACCESS logo, and at the top right is the text "Powered By CILogon" with the CILogon logo. Below the logo is a teal bar with the text "Consent to Attribute Release" and a dropdown arrow. The main content area contains a white box with the heading "TAMU FASTER ACCESS OOD" and a list of information being requested: "Your CILogon user identifier", "Your name", "Your email address", and "Your username and affiliation from your identity provider". Below this is a teal bar with the text "Select an Identity Provider". Underneath is a dropdown menu showing "ACCESS CI (XSEDE)" with a question mark icon. There is a checkbox for "Remember this selection" and a teal "Log On" button. At the bottom, there is a link to the privacy policy.

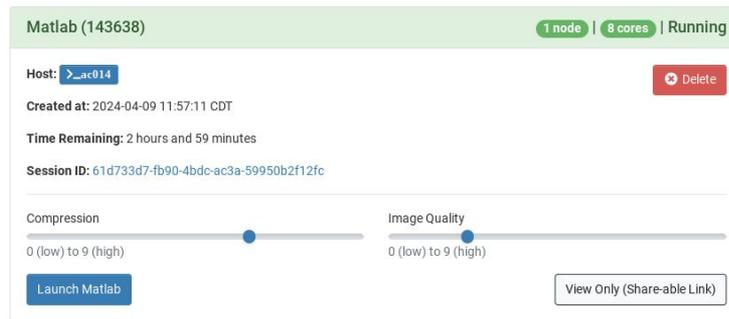
The screenshot shows the CILogon login interface. At the top left is the ACCESS logo, and at the top right is the CILogon logo. Below the logo is the text "Login to CILogon". There are two input fields: "ACCESS Username" and "ACCESS Password". Below the password field is a checkbox for "Don't Remember Login" and a teal "Login" button. To the right of the login fields is a list of links: "If you had an XSEDE account, please enter your XSEDE username and password for ACCESS login", "Register for an ACCESS Account", "Forgot your password?", and "Need Help?". At the bottom, there is a link for "Click Here for Assistance".

This is a close-up of the "Select an Identity Provider" dropdown menu. The dropdown is open, showing the option "ACCESS CI (XSEDE)" with a question mark icon to its right. The entire dropdown area is highlighted with a red border.

Select the Identity Provider appropriate for your account.

Running Matlab on the Portal

1. Click on “Interactive Apps”
2. Select “Matlab_training”
3. Fill out the Form
 - Set time to 3 hours, threads to 8, memory 50GB,gpu
4. Click Launch
5. Once Matlab Job is running click on “Launch Matlab”



Matlab (143638) 1 node | 8 cores | Running

Host: ac014 Delete

Created at: 2024-04-09 11:57:11 CDT

Time Remaining: 2 hours and 59 minutes

Session ID: 61d733d7-fb90-4bdc-ac3a-59950b2f12fc

Compression 0 (low) to 9 (high)

Image Quality 0 (low) to 9 (high)

Launch Matlab View Only (Share-able Link)

Matlab

This app will launch the Matlab GUI. NOTE you need to be a member of the matlab group on ACES to run Matlab. Contact help@hprc.tamu.edu to be added.

MATLAB version

Matlab/R2023a

Number of workers for parallel processing (max 95)

0

- only set the number of workers if you are planning to utilize Matlab's parallel processing capabilities (e.g. parfor/spmd/distributed or useParallel)

Number of computational threads (max 96)

8

- number of threads multiplied by number of workers should not exceed 96

Use GPU

CPU only

- select a GPU only if you plan to use Matlab's GPU capabilities

Number of hours (max 168)

3

Total GB Memory (max 485)

50

Font size

Medium

Account

This field is optional.

Email

email address must be provided if you want to receive an email when the session starts.

I would like to receive an email when the session starts

Launch

* The Matlab session data for this session can be accessed under the data root directory.

Demo Time

(Let's visit the portal and start the Matlab GUI)

Matlab Parallel processing on ACES

Now we know to run Matlab on ACES, let's do some parallel programming

1. Let's go back to the Interactive Matlab session we just created
 - if the session was closed for some reason, click "Launch Matlab" again
2. Open the live script "matlab_aces_rcs25.mlx"
 - Upload file to ACES
 - Copy from directory /scratch/training/Matlab/matlab_aces_rcs25.mlx
3. We will use the live script to explain and practice
 - parallel processing using multi threading
 - discover parallel profiles
 - local profile
 - cluster profile (briefly discuss later)
 - parallel pools / parallel concepts
 - GPU

Back to the live script

(time to do some parallel processing)

Drona Composer

For non-interactive jobs, user has to create a batch script specifying the resources and the commands to run. To simplify this task, HPRC developed Drona Composer: a framework to create any kind of workflows. Here, we will show the Matlab environment to generate and submit a Matlab job

Accessing the Drona Composer



Drona Matlab Environment

Choose a name for the job

Job Name

Location Change Optional, change location of job

Environments Select Matlab Environment

Matlab version Optional, upload additional Matlab scripts or input data

Main Matlab script local cluster Select the main Matlab script

Upload additional scripts and data Add

Optional MATLABPATH Optional, add directory to MATLABPATH

Matlab specific parameters

#workers for parallel processing (max 96)

#comp threads

Use GPU

Memory MB

Expected time needed to run Days

Click to generate job Preview Hide History

Matlab Job parameters



Job Preview

```
template.txt  driver.sh
1 # Drona generated Matlab job
2 source /etc/profile
3
4 module load Matlab/R2023b
5
6 cd /scratch/user/u.mp108705/drona_composer/runs/myMatlabJob
7
8 export MATLABPATH=:/scratch/user/u.mp108705/MyMatlabScripts:$MATLABPATH
9 matlabsubmit -x '--partition=gpu --gres=gpu' -m 50000 -w 4 -t 3:0 test.m
10
11 echo "Run Finish"
12
```

Load correct Matlab module

Set MATLABPATH

Drona generated command to submit Matlab job with requested parameters

Submit Cancel

- **batch_job_id-XXX**
 - file containing the Slurm batch id (mostly for convenience)
- **matlabsubmit_wrapper.m**
 - boilerplate matlab code to set up environment and call to the main Matlab script provided by user
- **slurm.out**
 - redirected output from the script
- **submission_script**
 - the generated Slurm batch script

matlabsubmit, command-line tool developed by HPRC, will create a directory, named **MatlabSubmitLOG<N>** where all generated files and redirected output will be stored (*<N> is the matlabsubmit job ID*)

Demo Time

(let's create and submit a job using Drona)

Case Study

(time permitted, you will compute Pi using Monte Carlo method. using parfor, spmd, distributed, and gpu)



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Thank you.

Any questions?