Using Matlab on ACES

Research Computing Symposium

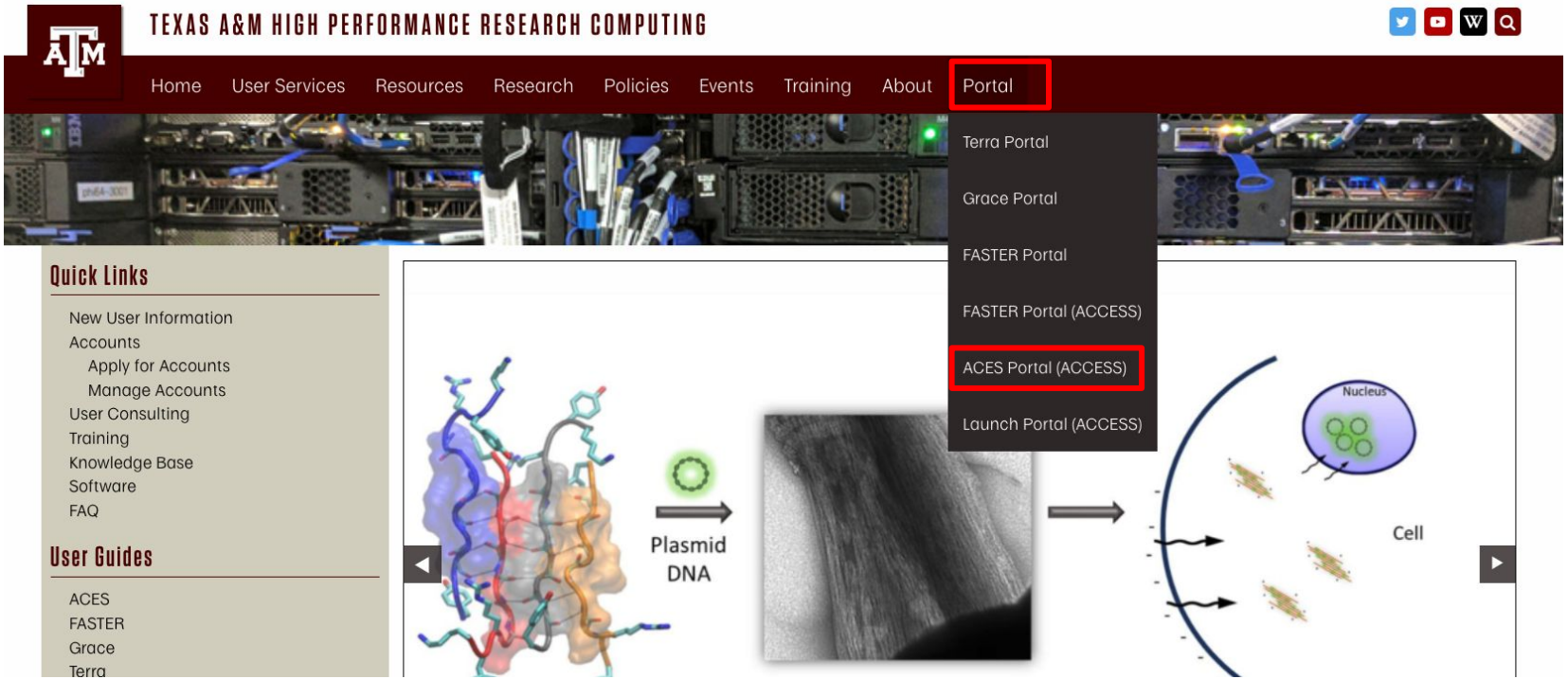
May 14, 2025

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)

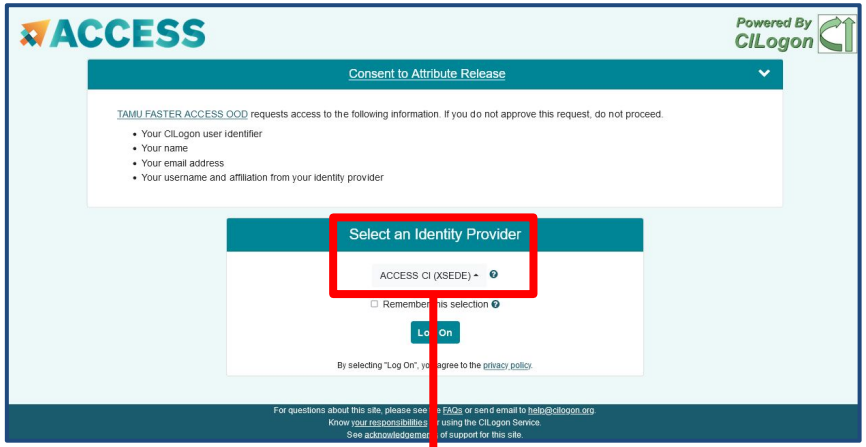
Accessing the ACES Portal

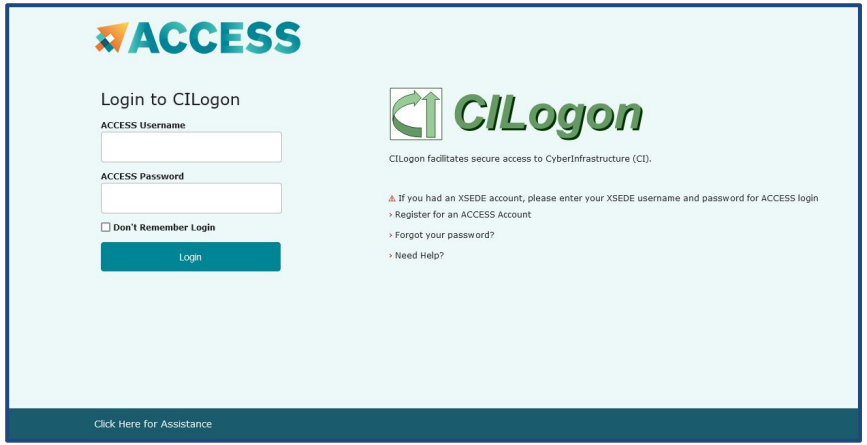


HPRC webpage: hprc.tamu.edu

Login to ACES through ACCESS

Log-in using your ACCESS credentials.

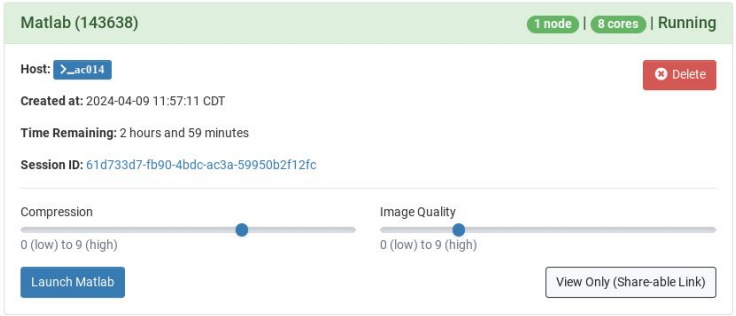


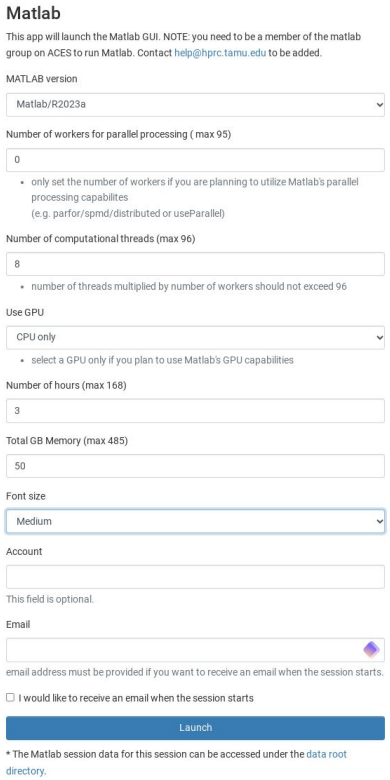


Select the Identity Provider appropriate for your account.

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”





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 sesion 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

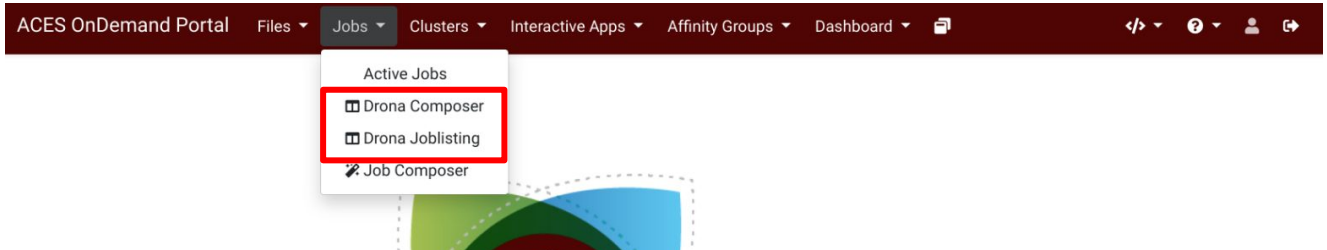
Back to the live script

(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



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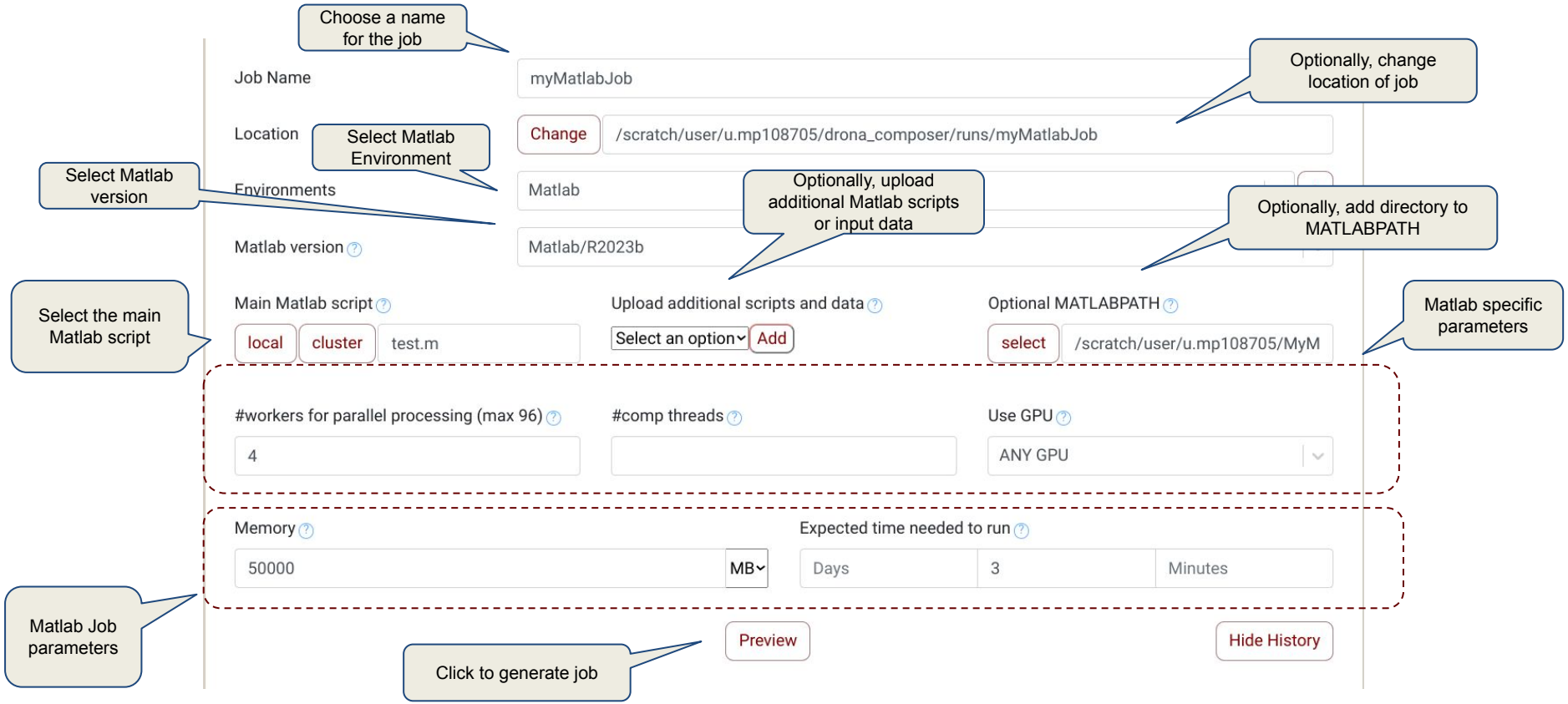
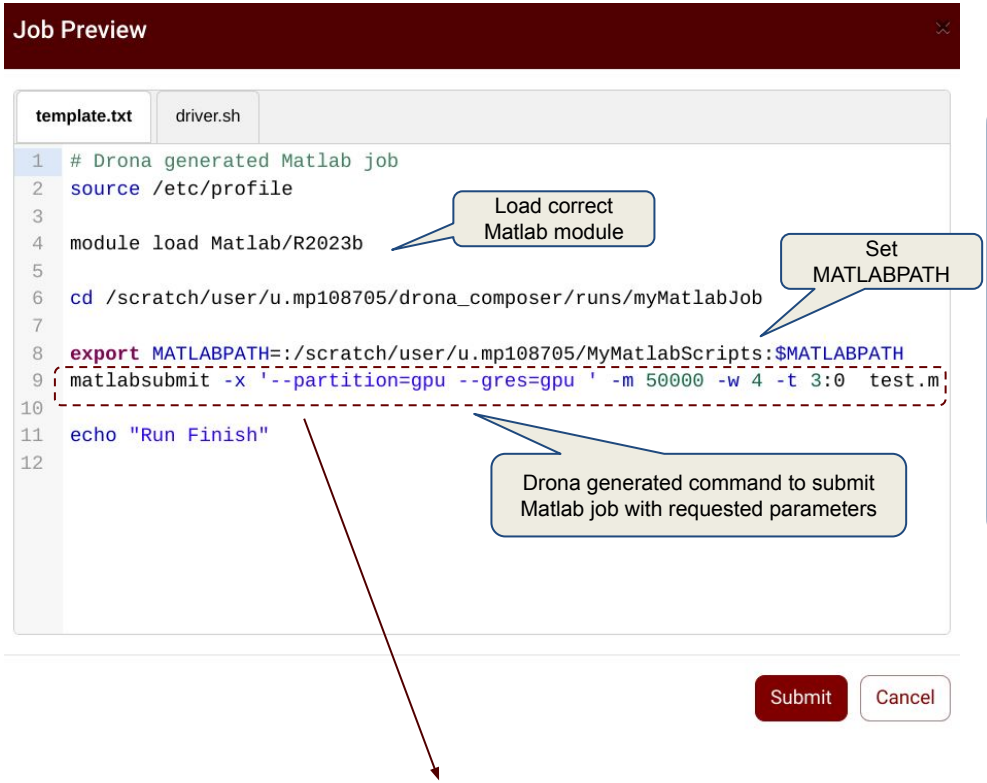
Drona Matlab Environment





- 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?