

Introduction to PSC

Pittsburgh Supercomputing Center

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Thanks to an uncredited student of Prof. Bhiksha for helping with PSC and the slides

ACCESS Signup

- Make sure to use your Andrew ID Email. If you have an XSEDE account, select Register with an existing identity.

- Link to sign up up:

<https://identity.access-ci.org/new-user>

2. Be sure to complete the email verification. You will receive an email from registry@cilogon.org containing a URL that you need to open to complete your registration. If you don't receive the email in your inbox, please check your spam folder. If you fail to complete the email verification, you'll need to [contact us](#) for assistance.

3. Copy the email registration URL from your email client to open in your trusted web browser. Do not open the URL directly in your email client, because that may use a "lightweight web browser" that will fail to complete your registration.

Two Options for New User Registration

If you don't already have an XSEDE or ACCESS account, there are two registration options:

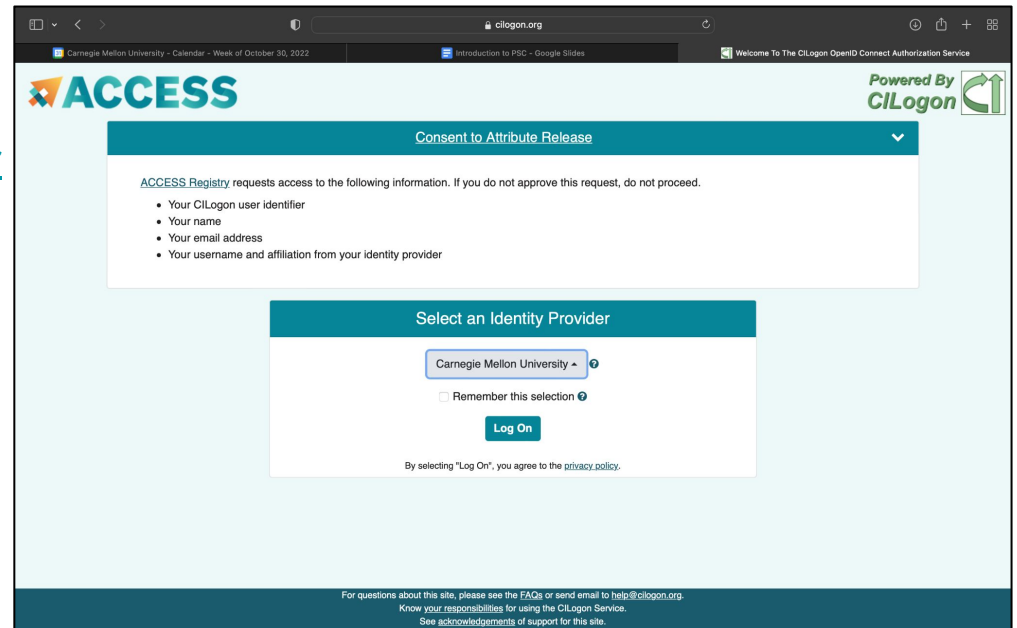
1. **Register with an existing identity:** Using an existing University account when registering with ACCESS simplifies the sign-up process and enables you to log in to ACCESS using that existing account. With this option, creating an ACCESS-specific password is optional during registration, and you will also have the option to create an ACCESS-specific password later if needed.
 - If your University is not included in the listing or you have trouble logging in with your University account, please use the other registration option.
2. **Register without an existing identity:** With this option, you'll be prompted to enter all your registration info and select an ACCESS-specific password. You can [link](#) a GitHub, Google, Microsoft, ORCID, or University account later if desired.

Three Ways to Access ACCESS

GOT XSEDE?	REGISTER AN ACCOUNT

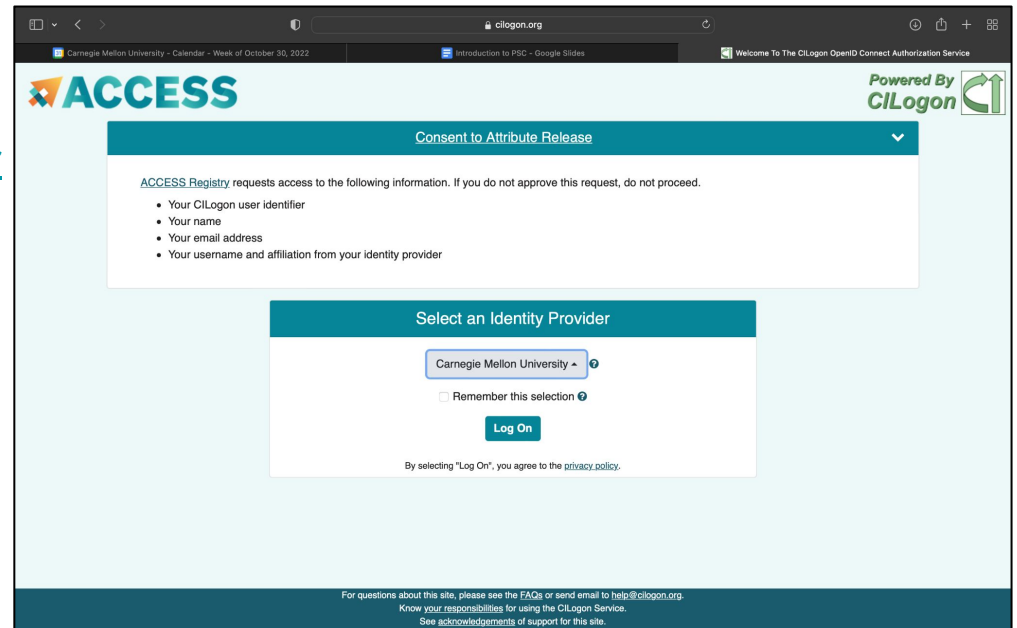
ACCESS Signup

- Make sure to use your Andrew ID Email. If you have an XSEDE account, select Register with an existing identity.
- Link to sign up:
<https://identity.access-ci.org/new-user>
- Use your andrew account details
- Log on and finish signing up



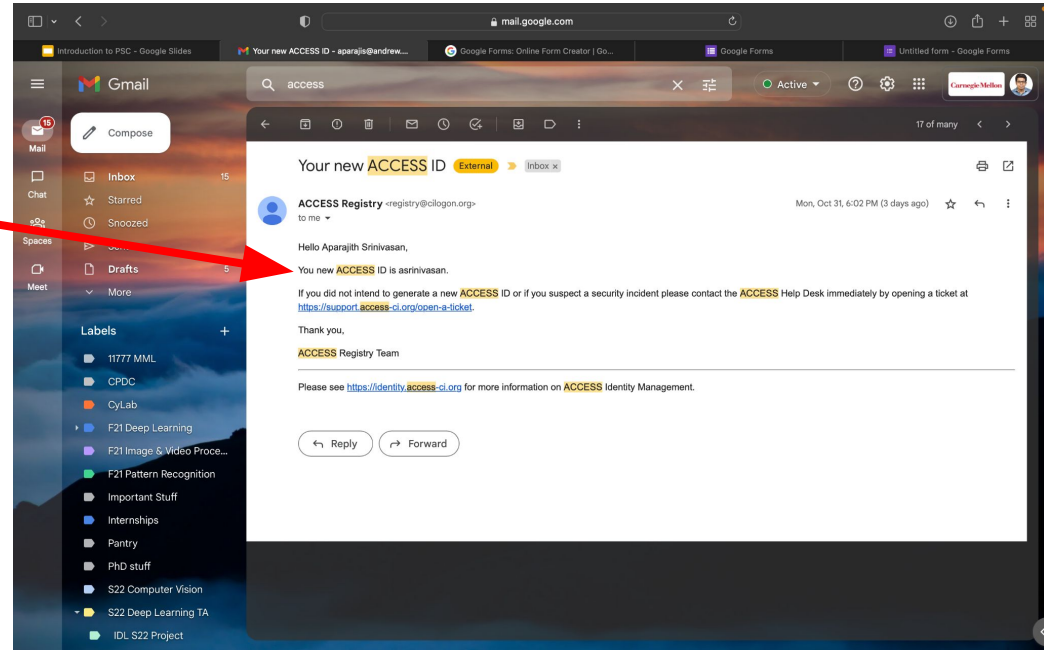
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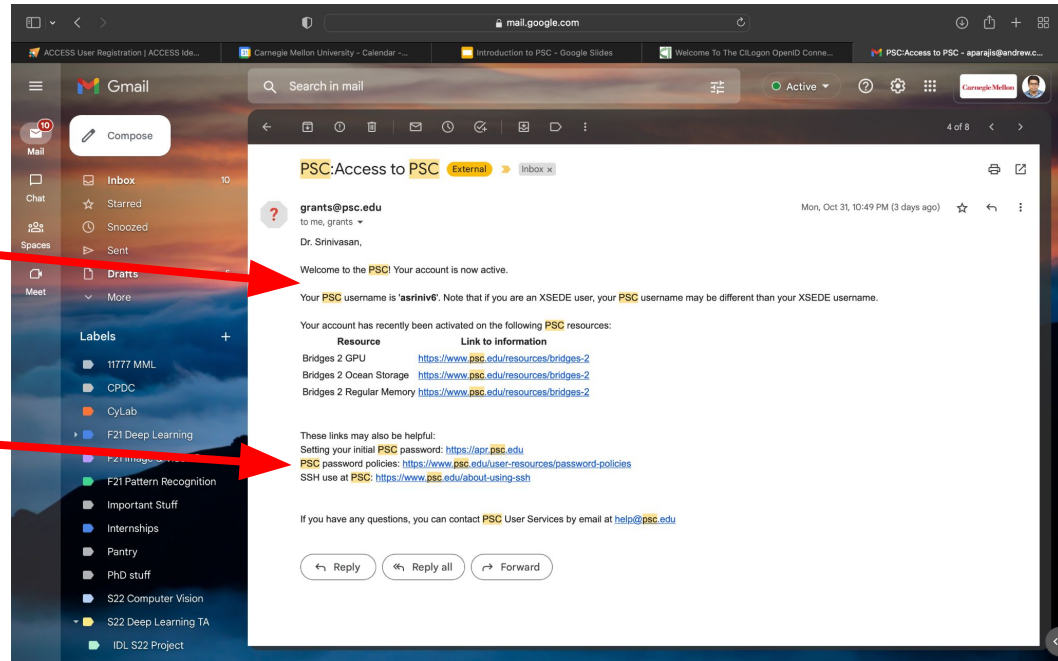
ACCESS Signup

- After Log on, you will receive an email with your ACCESS ID
- Make a note of this ACCESS ID and fill this form with the same
- https://forms.gle/7qnewdPyVSdyb_mHj7
- You get **1 BONUS** point for doing this



ACCESS Signup

- After a few hours, you will get a mail from grants@psc.edu with your PSC username
- Make a note of this username
- Set your initial password following this link
- Both these info will be required to connect to a GPU in PSC



PSC and Bridges 2

Bridges-2 is a High Performance Computing platform provided under the NSF ACCESS program by the Pittsburgh Supercomputing Center (PSC). Bridges-2 has:

1. Login nodes that you can launch jobs on, check status of existing jobs and job queues. These nodes are login011,login012,login013 or login014
2. GPU nodes are where you will launch your training or inference or feature extraction jobs. These nodes are called gpu0xx

DO NOT RUN ANY CODE ON THE LOGIN NODE

Login to PSC with ssh

- Use this command from your terminal

ssh <username>@bridges2.psc.edu

- Enter your password when prompted
- To enable passwordless SSH login, you can try [this](#) after creating RSA keys using ssh-keygen (`ssh-keygen -t rsa -b 4096`)
- You can login to individual login nodes by doing:

ssh <username>@br012.ib.bridges2.psc.edu

Login to PSC with ssh

ssh

```
US F1 Visa — asriniv6@br012:~ — ssh asriniv6@bridges2.psc.edu — 126x42
(base) aparajiths-air:US F1 Visa aparajith$ ssh asriniv6@bridges2.psc.edu
[asriniv6@bridges2.psc.edu's password:
***** W A R N I N G *****
You have connected to br012.ib.bridges2.psc.edu, a login node of Bridges 2.

This computing resource is the property of the Pittsburgh Supercomputing Center.
It is for authorized use only. By using this system, all users acknowledge
notice of, and agree to comply with, PSC policies including the Resource Use
Policy, available at http://www.psc.edu/index.php/policies. Unauthorized or
improper use of this system may result in administrative disciplinary action,
civil charges/criminal penalties, and/or other sanctions as set forth in PSC
policies. By continuing to use this system you indicate your awareness of and
consent to these terms and conditions of use.

LOG OFF IMMEDIATELY if you do not agree to the conditions stated in this warning

***** W A R N I N G *****

For documentation on Bridges 2, please see www.psc.edu/resources/bridges-2/user-guide/
Please contact help@psc.edu with any comments/concerns.
Last failed login: Thu Nov  3 20:14:06 EDT 2022 from cmu-secure-128-237-82-21.nat.cmu.net on ssh:notty
There were 2 failed login attempts since the last successful login.

Projects
-----
Project: cis220078p PI: Bhiksha Ramakrishnan
  GPU                6,700 SU remain of 6,700 SU      Active: Yes
Ocean /ocean/projects/cis220078p 20k used of 1.953T

Project: tra220029p [Default charging account] PI: Shinji Watanabe
  GPU                782 SU remain of 1,000 SU      Active: Yes
  Regular Memory     900 SU remain of 1,000 SU      Active: Yes
Ocean /ocean/projects/tra220029p 417G used of 1000G

[asriniv6@bridges2-login012 ~]$
```

Password

Inside

*** You are at the login node now**

Login to PSC with ssh

- Use TMux or Screen to make sure that you can have background execution
- After logging into with your login node, you need to create a screen session and then request a compute node
- Do all your experiments inside a screen so that your progress does not get deleted when your laptop dies
- TMux is a similar thing which people use with Mac but screen is the most predominantly used.
- Just open a screen with

screen -S <name>

- Can exit a screen with ***exit***
- Take a look at all the other screen commands. You can run multiple screens too
- **Note down your login node**

Login to PSC with ssh

```
US F1 Visa — asriniv6@br012:~ — ssh asriniv6@bridges2.psc.edu — 126x42
(base) aparajiths-air:US F1 Visa aparajith$ ssh asriniv6@bridges2.psc.edu
asriniv6@bridges2.psc.edu's password:
***** W A R N I N G *****
You have connected to br012.ib.bridges2.psc.edu, a login node of Bridges 2.

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It is for authorized use only. By using this system, all users acknowledge
notice of, and agree to comply with, PSC policies including the Resource Use
Policy, available at http://www.psc.edu/index.php/policies. Unauthorized or
improper use of this system may result in administrative disciplinary action,
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Project: tra220029p [Default charging account] PI: Shinji Watanabe
GPU          782 SU remain of 1,000 SU      Active: Yes
Regular Memory 900 SU remain of 1,000 SU      Active: Yes
Ocean /ocean/projects/tra220029p 417G used of 1000G

[asriniv6@bridges2-login012 ~]$ screen -S Aparascreen
```

screen

Changing Directories

- By default you are logged in to the HOME directory. This is shared by everyone and don't upload large files here
- If you do ***pwd***, you get this ***/jet/home/<username>***
- Change to the project directory with ***cd \$PROJECT***
- Now, if you do ***pwd***, you will get ***/ocean/projects/<project_id>/<username>***

Changing Directories

```
Others — [screen 0: asriniv6@br012:/ocean/projects/tra220029p/asriniv6] — ssh asriniv6@bridges2.ps...

Projects
-----
Project: cis220078p PI: Bhiksha Ramakrishnan
GPU          6,700 SU remain of 6,700 SU      Active: Yes
Ocean /ocean/projects/cis220078p 20k used of 1.953T

Project: tra220029p [Default charging account] PI: Shinji Watanabe
GPU          775 SU remain of 1,000 SU      Active: Yes
Regular Memory 900 SU remain of 1,000 SU      Active: Yes
Ocean /ocean/projects/tra220029p 418.8G used of 1000G

[asriniv6@bridges2-login012 ~]$ pwd
/jet/home/asriniv6
[asriniv6@bridges2-login012 ~]$ cd $PROJECT
[asriniv6@bridges2-login012 asriniv6]$ pwd
/ocean/projects/tra220029p/asriniv6
[asriniv6@bridges2-login012 asriniv6]$
```

**My output here is
inside a screen**

Requesting GPU Nodes

- You can request nodes in an interactive manner (where you are able to access the bash shell directly and run commands), or using sbatch (where your code runs in the background)
- ***interact*** is used when you want a single GPU to test code for ≤ 8 hrs
- ***srun*** is used when you want an interactive shell on upto 8 GPUs for ≤ 48 hrs
- ***sbatch*** is used when you want to run code in the background on upto 8 GPUs for ≤ 48 hrs

Requesting GPU Nodes: Interactive Allocations

interact

interact -gpu -t 08:00:00

Requests a single GPU node for 8 hrs

srun

srun -p GPU-small --gres=gpu:v100-32:2 -t 8:00:00 --pty bash (upto 2 GPUs for upto 8 hrs)

srun -p GPU-shared --gres=gpu:v100-32:4 -t 48:00:00 --pty bash (upto 4 GPUs for upto 48 hrs)

srun -p GPU --gres=gpu:v100-32:8 -t 48:00:00 --pty bash (upto 8 GPUs for upto 48 hrs)

Requesting GPU Nodes: sbatch Allocations

sbatch

sbatch -p GPU-small --gres=gpu:v100-32:2 -t 8:00:00 --job-name <name>

./run.sh (upto 2 GPUs for upto 8 hrs)

sbatch -p GPU-shared --gres=gpu:v100-32:4 -t 48:00:00 --job-name <name>

./run.sh (upto 4 GPUs for upto 48 hrs)

sbatch -p GPU --gres=gpu:v100-32:8 -t 48:00:00 --job-name <name> ./run.sh

(upto 8 GPUs for upto 48 hrs)

Script run.sh must be written by you as a bash script

Other commands

- ***nvidia-smi*** - Tells you about the GPU usage.
 - Make sure that you use the complete GPU. If you have a 32GB GPU, you need to be using almost everything. Try increasing the batchsize until you get this.
- ***htop*** - Tells you about the processes, CPU Usage and RAM
 - If your job crashes, you need to request for more RAM

Requesting GPU Nodes

```
Others — [screen 0: asrinv6@v002:/ocean/projects/tra220029p/asrinv6] — ssh asrinv6@bridges2.psc.edu — 139x46
-----
Project: cis220078p PI: Bhiksha Ramakrishnan
GPU          6,700 SU remain of 6,700 SU      Active: Yes
Ocean /ocean/projects/cis220078p 20k used of 1.953T

Project: tra220029p [Default charging account] PI: Shinji Watanabe
GPU          775 SU remain of 1,000 SU      Active: Yes
Regular Memory 900 SU remain of 1,000 SU    Active: Yes
Ocean /ocean/projects/tra220029p 418.8G used of 1000G

[asrinv6@bridges2-login012 ~]$ pwd
/jet/home/asrinv6
[asrinv6@bridges2-login012 ~]$ cd $PROJECT
[asrinv6@bridges2-login012 asrinv6]$ pwd
/ocean/projects/tra220029p/asrinv6
[asrinv6@bridges2-login012 asrinv6]$ ls
[asrinv6@bridges2-login012 asrinv6]$ interact -gpu -t 08:00:00
perl: warning: Setting locale failed.
perl: warning: Please check that your locale settings:
    LANGUAGE = (unset),
    LC_ALL = (unset),
    LC_CTYPE = "UTF-8",
    LANG = (unset)
are supported and installed on your system.
perl: warning: Falling back to the standard locale ("C").
perl: warning: Setting locale failed.
perl: warning: Please check that your locale settings:
    LANGUAGE = (unset),
    LC_ALL = (unset),
    LC_CTYPE = "UTF-8",
    LANG = (unset)
are supported and installed on your system.
perl: warning: Falling back to the standard locale ("C").

A command prompt will appear when your session begins
"Ctrl+d" or "exit" will end your session

--partition=GPU-small,GPU-shared --gpus=v100:1 --time=08:00:00
salloc -J Interact --partition=GPU-small,GPU-shared --gpus=v100:1 --time=08:00:00
salloc: Pending job allocation 12813552
salloc: job 12813552 queued and waiting for resources
salloc: job 12813552 has been allocated resources
salloc: Granted job allocation 12813552
salloc: Waiting for resource configuration
salloc: Nodes v002 are ready for job
[asrinv6@v002 asrinv6]$
```

interact

Don't see login now

Uploading your files

- Use the command to upload your files

```
scp <filename> <username>@bridges2.psc.edu:<project_dir>
```

- Enter password when prompted
- If you don't specify **<project_dir>**, the file will be uploaded into your home directory

Creating venv

- Python3 is installed by default
- Create a virtual environment with **venv** and activate it

<https://docs.python.org/3/tutorial/venv.html>

- Then do a **pip3** install to install all your libraries

The run.sh script

```
#!/bin/bash
```

```
python train.py
```