Things to do while you are waiting

- Course slides are available at: https://hprc.tamu.edu/training/applying.html

- Read the information at: https://hprc.tamu.edu/policies/allocations.html
Applying for Allocations on HPRC Clusters

HPRC Training
February 16, 2024

High Performance Research Computing
DIVISION OF RESEARCH
Outline

- Introduction to terms, clusters, and application levels
- Basic applications
- Startup Applications
- Research Applications
- ACCESS ID and ACES Allocations
Who Uses HPRC?

- Student: 777
- Faculty: 130
- Research Associate: 48
- Post-doc: 31
- Research Scientist: 25
- Staff: 13

High Performance Research Computing | hprc.tamu.edu
What kinds of Accounts?

Total: 1024

- Basic: 897
- Small: 93
- Large: 34
### Definitions of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allocation</td>
<td>An amount of SUs assigned to a specific user.</td>
</tr>
<tr>
<td>Fiscal Year (FY)</td>
<td>A time period that starts on September 1, and ends on August 31 next year.</td>
</tr>
<tr>
<td>HPRC</td>
<td>High Performance Research Computing at TAMU.</td>
</tr>
<tr>
<td>Principal Investigator (PI)</td>
<td>A faculty member or research staff qualified to apply for allocations.</td>
</tr>
<tr>
<td>Project Account</td>
<td>A 12-digit number used by users to submit jobs on machines.</td>
</tr>
<tr>
<td>Service Unit (SU)</td>
<td>The equivalent of 1 hour of wall clock time running on one processing core.</td>
</tr>
<tr>
<td>User</td>
<td>Someone with a login account on one or more of the resources.</td>
</tr>
</tbody>
</table>
Principal Investigator (PI) Eligibility

Only active faculty members and permanent research staff (subject to allocation committee review and approval) of Texas A&M System Members headquartered in Brazos County can serve as a Principle Investigator (PI).

Adjunct and Visiting Professors do not qualify independently but can use HPRC resources as part of an eligible PI’s research group.

Note that:

- A researcher can work on more than one project and with more than one PI

www.hprc.tamu.edu/policies/allocations.html
Current Clusters Available

- ACES
- FASTER
- Grace
- Terra
- Lonestar6 (located at the University of Texas)
Basic, Startup, and Research Allocation Applications

Terra, Grace, FASTER, and Lonestar6

https://hprc.tamu.edu/apply
Three Types/Levels of Allocations

Basic allocations

Users can apply for an account with basic allocations at any time, subject to approval of their PI. Basic allocations are approved by HPRC staff. A user can have only one basic allocation per fiscal year.

Startup allocations

Startup allocations support low intensity projects (e.g., small scale analyses used for teaching, benchmarking to assess the SU needs for a future research allocation). Startup allocations are approved by HPRC staff.

Research allocations

Research allocations are for medium to high intensity projects. PIs can have more than one research allocation, but are limited by the per-machine SU cap per fiscal year.

Accounts expire at the end of the fiscal year.
   All users must apply each fiscal year.
## Allocation Availability on Machines

<table>
<thead>
<tr>
<th>Machines</th>
<th>Basic Allocation</th>
<th>Startup Allocation</th>
<th>Research Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grace</td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>Terra</td>
<td>Available</td>
<td>Available</td>
<td>Available</td>
</tr>
<tr>
<td>FASTER</td>
<td>Available</td>
<td>Available</td>
<td>Not Available</td>
</tr>
<tr>
<td>Lonestar6</td>
<td>Not Available</td>
<td>Available</td>
<td>Available</td>
</tr>
</tbody>
</table>
Basic Allocation Applications

Applications for Basic Allocations must include the following:

- Eligible Principal Investigator (PI) - Choose someone who knows you and meets the criteria (see previous slide); be sure to ask your graduate advisor or research professor first.
- Summary of your research, including the purpose of your research, how the allocation will be used, and the software you will use in your work.

Note: Basic allocation applications are reviewed daily. You can expect a response within 24 hours. Once the allocation is set up, it takes about an hour to finish processing before you can use it.
# Basic Applications

<table>
<thead>
<tr>
<th>Allocation Type</th>
<th>Who can apply?</th>
<th>Minimum SUs per Allocation per Machine</th>
<th>Maximum SUs per Allocation per Machine</th>
<th>Maximum Total SUs per Machine</th>
<th>Maximum Number of Allocations per Machine</th>
<th>Reviewed and approved by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic</td>
<td>Faculty, Research Scientists, Post-Docs*, Research Associates*, Students*, Visiting Scholars/Students*, Qualified Staff†</td>
<td>20,000</td>
<td>20,000</td>
<td>20,000</td>
<td>1</td>
<td>HPRC Staff</td>
</tr>
</tbody>
</table>

* Requires a PI
† PI required if not PI Eligible
Research Summary Example

I will be conducting geothermal energy systems simulations using TOUGH+ code (fortran language). The simulations use very fine discretization (100,000+ elements/gridblocks), therefore solving more than 300,000 equations for transport in porous media. The work being performed is fully implicit, using Jacobian matrices and Newton-Raphson iterations with high degree of accuracy, requiring high computational effort.
Research Summary Example

For a course* - Account access is requested in order to participate in the course STAT 624: Computing Tools for Data Science. Activities will consist of uploading small datasets, developing Python scripts and Jupyter notebooks, and using SLURM with shell scripts to execute simple Python scripts that require basic parallel processing.

* Ask your professor if you do not know what to write for the research summary.
# Application Example

<table>
<thead>
<tr>
<th>SUBMISSION DATE</th>
<th>STATUS</th>
<th>VERSION</th>
<th>APPLICATION ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023-08-01 16:48:16</td>
<td>approved</td>
<td>current</td>
<td>35820</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>APPROVAL DATE</th>
<th>APPROVED BY</th>
<th>FISCAL YEAR</th>
<th>ORIGINAL APPLICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023-08-01 17:45:37</td>
<td>stebenre</td>
<td>2024</td>
<td>This is the original application</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAME</th>
<th>NET ID</th>
<th>USER TYPE</th>
<th>APPLICATION TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandra Nite</td>
<td>s-nite</td>
<td>r-scientist</td>
<td>Basic</td>
</tr>
</tbody>
</table>

**CONTACT INFO.**

<table>
<thead>
<tr>
<th>Official Name</th>
<th>Nite, Sandra Bonorden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daytime Phone</td>
<td>(979) 248-0653</td>
</tr>
<tr>
<td>Official Email</td>
<td><a href="mailto:s-nite@tamu.edu">s-nite@tamu.edu</a></td>
</tr>
<tr>
<td>Alternate Email</td>
<td><a href="mailto:signite@gmail.com">signite@gmail.com</a></td>
</tr>
<tr>
<td>Department</td>
<td>HPRC</td>
</tr>
</tbody>
</table>

**ALLOCATION REQUESTED**

<table>
<thead>
<tr>
<th>COURSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>terra (20,000 SUs)</td>
</tr>
<tr>
<td>grace (20,000 SUs)</td>
</tr>
<tr>
<td>faster (20,000 SUs)</td>
</tr>
</tbody>
</table>

**PI NET ID**

<table>
<thead>
<tr>
<th>PI NAME</th>
<th>PI PHONE</th>
<th>PI EMAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>s-nite</td>
<td>(979) 248-0653</td>
<td><a href="mailto:s-nite@tamu.edu">s-nite@tamu.edu</a></td>
</tr>
</tbody>
</table>

**RESEARCH DESCRIPTION**

Using the system for HPRC functions.
Startup Allocation Applications

Startup applications are useful for two main purposes:

1. Research or class activities require more computing time than the basic allocation provides. Eligible PIs can apply for a startup allocation to provide more SUs for your research. PIs can request students be added to the account(s). Then the PI or HPRC staff (through a help ticket - help@hprc.tamu.edu) can transfer SUs to a student account.

2. Eligible PI needs a research allocation for a significant number of SUs. A Startup allocation is a great tool for benchmarking to calculate the SUs needed for the section of the research application that requires those calculations.

Note: Startup allocation applications are reviewed on weekdays. You can expect a response within 24 hours. After the allocation is set up, it takes about an hour for it to finish processing and be available for use.
Startup Allocation Applications

Applications for Startup Allocations must include the following:

1. Research description
2. Justification for the machines requested
3. Justification for the service units (SUs) requested
4. Additional researchers to whom SUs will be allocated (optional)
5. Funding (if any) sponsor and annual amount

NOTE: Startup accounts are commonly used for PIs to learn about the number of SUs required for tasks they perform so that the justification for a Research Account will be accurate and reasonable to the research allocation committee.
# Startup Allocations

<table>
<thead>
<tr>
<th>Allocation Type</th>
<th>Who can apply?</th>
<th>Minimum SUs per Allocation per Machine</th>
<th>Maximum SUs per Allocation per Machine</th>
<th>Maximum Total SUs per Machine</th>
<th>Maximum Number of Allocations per Machine</th>
<th>Reviewed and approved by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Startup</td>
<td>Faculty, Research Scientists, Qualified Staff‡</td>
<td>20,000</td>
<td>200,000</td>
<td>400,000</td>
<td>2</td>
<td>HPRC Staff or Executive Director</td>
</tr>
</tbody>
</table>

‡ Subject to PI Eligibility
### Example

<table>
<thead>
<tr>
<th>PI NET ID</th>
<th>PI NAME</th>
<th>PI PHONE</th>
<th>PI EMAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>s-nite</td>
<td>Nite, Sandra Bonorden</td>
<td>979 458 8415</td>
<td><a href="mailto:s-nite@tamu.edu">s-nite@tamu.edu</a></td>
</tr>
</tbody>
</table>

#### RESEARCH DESCRIPTION

I am studying the sequences of DNA in bird flu to search for solutions to the current bird flu epidemic. I will be using Python-based machine learning classification tools.

#### JUSTIFICATION (for machines requested)

Grace has OpenFoam capabilities that I need to process the xxx.

#### JUSTIFICATION (for hours requested)

I plan to run 2000-4000 sequences that require 20-40 SUs each.

#### ADDITIONAL RESEARCHERS

<table>
<thead>
<tr>
<th>Name</th>
<th>Hrs</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jane Doe Grace</td>
<td>20000</td>
<td><a href="mailto:jane.doe@tamu.edu">jane.doe@tamu.edu</a></td>
</tr>
</tbody>
</table>

#### FUNDING

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Annual amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSF</td>
<td>400,468</td>
</tr>
</tbody>
</table>
Research Allocation Applications

The High Performance Research Computing Resource Allocation Committee (HPRC-RAC) reviews all proposals for allocations exceeding 200K SUs/academic year. The merit criteria to evaluate each proposal is based on the scientific rationale for the proposed work, the proposed methodology and research plan, the careful analysis of the computational needs as well as prior (if relevant) performance, including actual usage, agreement to acknowledge the High Performance Research Computing (HPRC) group in publications and other vehicles for scientific dissemination.

Note: It usually takes 2-3 weeks for the committee review to be completed.
# Research Allocations

<table>
<thead>
<tr>
<th>Allocation Type</th>
<th>Who can apply?</th>
<th>Minimum SUs per Allocation per Machine</th>
<th>Maximum SUs per Allocation per Machine</th>
<th>Maximum Total SUs per Machine</th>
<th>Maximum Number of Allocations per Machine</th>
<th>Reviewed and approved by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research (Terra)</td>
<td>Faculty, Research Scientists, Qualified Staff‡</td>
<td>300,000</td>
<td>5,000,000</td>
<td>5,000,000</td>
<td></td>
<td>HPRC-RAC</td>
</tr>
<tr>
<td>Research (Grace)</td>
<td>Faculty, Research Scientists, Qualified Staff‡</td>
<td>300,000</td>
<td>10,000,000</td>
<td>10,000,000</td>
<td></td>
<td>HPRC-RAC</td>
</tr>
<tr>
<td>Research (Lonestar6)</td>
<td>Faculty, Research Scientists, Qualified Staff‡</td>
<td>300,000</td>
<td>2,000,000</td>
<td>2,000,000</td>
<td></td>
<td>HPRC-RAC</td>
</tr>
</tbody>
</table>

‡ Subject to PI Eligibility
Research Allocation Applications

Applications for Research Allocations must include a PDF project description with the following:

1. **Problem Statement** – up to 1 page, describing the desired outcomes of the project.
   
   Be sure to put the title of the project at the top of the page. Describe the research, including any research questions you have.

2. **Background** – up to 1 page, describing how resources will be used.
   
   Give some information about the research, what is known about the topic, and how your research will add to the field of knowledge.

3. **Methodology** – up to 1 page, describing the computational methodology & applications.
   
   In this section, explain how you will use the clusters and any software to complete specific tasks for the project.
Research Allocation Applications

Applications for Research Allocations must include a PDF project description with the following:

4. Research Plan – up to 1 page, describing the research schedule, with expenditure of resources. If allocations are not used uniformly over the year, an estimate by quarters is required.

   Give the steps to be completed as you enact the research and where the use of high performance computing is integrated into the project.

5. Requirements Analysis - up to 2 pages, detailing the basis for the requested computer time. Large allocations must exhibit an understanding of application efficiency, scaling, and provide accurate estimations of time requirements.

   Show details of the calculation of how many SUs you need on each cluster, showing the tasks to be performed, how many runs are needed, and how many SUs are needed per run to reach your total request.

The total length of the project description should be up to 5 pages, excluding required reports of results of prior support (required for renewals), references, and attachments.
Common Application Errors

What will cause my application to be rejected?

**Basic Applications**
- An ineligible sponsoring PI
- Poor research description
- PI not identified

**Startup Applications**
- Applicant is not an eligible PI
- Poor research description
- No justification for machines or hours requested

**Research Applications**
- Insufficient justification for hours requested
- No report filed for prior allocation(s)
The Lonestar6 system is a result of a collaboration between University of Texas, Texas Tech University, the University of North Texas, Texas A&M University, and several research centers.

The account setup process is different and managed by the Texas Advanced Computing Center (TACC).

The Lonestar system supports researchers across Texas.
Lonestar6 Additional Instructions

- The Lonestar6 startup and research allocation application is the same as that for Grace, Terra, and FASTER
- HPRC does not manage these allocations independently.
- Watch your email for additional instructions after being awarded SUs on Lonestar6
# HPRC Premium Service Packages

<table>
<thead>
<tr>
<th>User Category</th>
<th>Computing Time (SU, core-hour)</th>
<th>Computer Storage (TB)</th>
<th>Staff Consultant (Hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAMU System Users (TAMU/TAMUS/FED Rate)</td>
<td>$0.03</td>
<td>$35</td>
<td>$75</td>
</tr>
<tr>
<td>Non-TAMU System Users (External or Outside Academic)</td>
<td>$0.04</td>
<td>$45</td>
<td>$90</td>
</tr>
<tr>
<td>Other Users (Commercial/Business)</td>
<td>$0.05</td>
<td>$55</td>
<td>$115</td>
</tr>
</tbody>
</table>
ACES Allocation Applications

ACES is our newest computing platform and is available to national researchers, not just Texas A&M University researchers. You can learn more about what it has to offer here:
https://hrpc.tamu.edu/resources/

An ACCESS ID is required to obtain SUs on ACES. ACCESS ID application can be found here:
https://operations.access-ci.org/identity/new-user

More information about the ACCESS application process can be found here:
https://allocations.access-ci.org
ACCESS Allocation Levels

There are three levels of allocations for ACES available through ACCESS:

- **Explore** - for small resource amounts to try out resources, run benchmarks; assign small-scale classroom activities; develop or port codes; conduct thesis or dissertation work

- **Discover** - for modest-scale research and other resource needs

- **Accelerate** - for more substantial resource amounts for research

[https://allocations.access-ci.org/project-types](https://allocations.access-ci.org/project-types)
Explore ACCESS Request

Applicants must submit:

- A public overview of the research and details on how ACCESS resources will support the research
- NSF biosketch, CV or Resume for PI and co-PIs (pdf)
- Active funding, if applicable
- Letter of collaboration (for graduate students)
- Data fields:
  - Title of project
  - Research keywords
  - Field of science

https://allocations.access-ci.org/prepare-requests
Discover ACCESS Request

Applicants must submit:

- One-page description of proposed use of ACCESS resources
  - Project Information
    - Title of project
    - Title of supporting grant, if funded
    - Agency and funding award number
    - Name & institution of project lead
  - Research or Education Objectives (e.g., research questions, classroom exercises, gateway operations) and how cyberinfrastructure resources will assist
  - Description of resource needs
- Public Abstract to paste into online form (may be posted on web page)
- CVs or resumes of lead investigators

https://allocations.access-ci.org/prepare-requests
Accelerate ACCESS Request

Applicants must submit:

- Project Information (see previous slide)
- Public Abstract - summary of science questions; summary of computational plan
- Science Objectives - align with funded projects
- Title of supporting grant, Agency and award number
- Estimate of Compute, Storage, and Other Resources
- Software & Specialized Needs
- Team and Team Preparedness (team qualifications and readiness)
- CV’s for PI and co-PIs or NSF- or NIH-formatted biosketches

[https://allocations.access-ci.org/prepare-requests](https://allocations.access-ci.org/prepare-requests)
Quick Links to Resources

- Resource Allocation Policies
- Account Information/Requirements
- Cluster Information
- Cluster Account Application (Terra, Grace, FASTER, Lonestar6)
- ACCESS Application (ACES & FASTER)
- HPRC Knowledge Base
- HPRC YouTube Channel
Thank you

Contact: help@hprc.tamu.edu