# 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 Short Course
September 13, 2024

High Performance
Research Computing
DIVISION OF RESEARCH

# Outline

- Introduction to terms and clusters
- Basic Allocation Application
- Startup Allocation Application
- Research Allocation Application
- ACCESS Allocations for ACES, FASTER and Launch

# Definitions of Terms

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

# Principal Investigator (PI) Eligibility

Only active faculty members and permanent research staff of Texas A&M University System members ***headquartered*** in Brazos County can serve as a *Principal 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.
- PIs can have more than one allocation.

www.hprc.tamu.edu/policies/allocations.html

# Current Clusters Available

https://hprc.tamu.edu/resources/

- ACES
- FASTER
- Grace
- Launch
- ViDaL
- Lonestar6 - hosted at TACC (Texas Advanced Computing Center)

Basic, Startup, and Research

Allocation Applications

Grace, FASTER, and Lonestar6

https://hprc.tamu.edu/apply

# Three Types/Levels of Allocations

## Basic allocations

Users can apply for basic allocations at any time, subject to approval of their PI. Basic allocations applications are approved by HPRC staff. A researcher 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 allocation applications 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. The HPRC Resource Allocation Committee, consisting of experienced faculty users, approves these applications.

Accounts expire at the end of the fiscal year.
All users must apply each fiscal year.

# Allocation Availability (Grace, FASTER, Lonestar6)

| Machines | Basic Allocation | Startup Allocation | Research Allocation |
|---|---|---|---|
| Grace | Available | Available | Available |
| FASTER | Available | Available | Not Available* |
| Lonestar6 | Not Available | Available | Available |

* Research level allocations on FASTER are available through ACCESS

# Basic Allocation Applications

Applications for Basic Allocations must include the following:

- HPRC Eligible Principal Investigator (PI)
  - Choose someone who knows you and meets the criteria (see previous slide)
  - be sure to ask your HPRC Eligible PI (graduate advisor, research professor, etc) before applying
- Summary of your research, Include:
  - the purpose of your research
  - how the allocation will be used
  - the software you will use in your work
  - the course in which you will use the allocation, if applicable.

Note: Basic allocation applications are reviewed Monday - Friday. You can generally expect a response within 3 business days. Once an allocation is approved, it takes an hour before you can use it.

# Basic Allocation

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

* Requires a PI
† PI required if not PI Eligible

# Example: Research Summary

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

# Example: Summary 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 summary.

* Professors should submit a class roster to HPRC

# Application Example

| SUBMISSION DATE | STATUS | VERSION | APPLICATION ID |
|---|---|---|---|
| 2024-08-01 13:51:22 | approved | current | 40180 |
| **APPROVAL DATE** | **APPROVED BY** | **FISCAL YEAR** | **ORIGINAL APPLICATION** |
| 2024-08-01 15:19:59 | stebenne | 2025 | This is the original application |
| **NAME** | **NET ID** | **USER TYPE** | **APPLICATION TYPE** |
| Sandra Nite | s-nite | r-scientist | Basic |
| **CONTACT INFO.** | | **ALLOCATION REQUESTED** | **UIN** |
| Official Name Nite, Sandra Bonorden<br>Form Name Nite, Sandra<br>Daytime Phone 979 862 3931<br>Official Email s-nite@tamu.edu<br>Alternate Email<br>Department HPRC/<br>College | | grace (20,000 SUs)<br>faster (20,000 SUs) | **COURSE** |
| **PI NET ID** | **PI NAME** | **PI PHONE** | **PI EMAIL** |
| s-nite | Nite, Sandra Bonorden | (979) 862-3931 | s-nite@tamu.edu |
| **RESEARCH DESCRIPTION** | | | |

# Startup Allocations

- Startup Allocations are used for research, benchmarking applications, or coursework when a Basic allocation is not sufficient. They can provide up to 400,000 SUs on each machine.
- PIs can request researchers to be added to the accounts and SUs transferred by submitting a help ticket (help@hprc.tamu.edu). Alternately, after researchers are added, the PI can transfer the SUs at https://hprc.tamu.edu/ams/
- Startup allocation applications are reviewed daily, Monday - Friday. You can generally expect a response within 3 business days. Once the application is approved, it takes about an hour to finish processing before you can use it.

# Applying for a Startup Allocation

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
    a. Startup allocations are commonly used for PIs to benchmark their code to provide the SU request justification for a Research allocation.
4. Funding sponsor (if any) and annual amount

Additional researchers to whom SUs will be allocated can be listed.

https://hprc.tamu.edu/apply/

# Startup Allocations

| Allocation Type | Who can apply? | Minimum SUs per Allocation per Machine | Maximum SUs per Allocation per Machine | Maximum Total SUs per Machine | Maximum Number of Allocations per Machine | Reviewed and approved by |
|---|---|---|---|---|---|---|
| Startup | Faculty, Research Scientists, Qualified Staff‡ | 20,000 | 200,000 | 400,000 | 2 | HPRC Staff or Executive Director |

‡ Subject to PI Eligibility

# Example

| PI NET ID | PI NAME | PI PHONE | PI EMAIL |
|---|---|---|---|
| s-nite | Nite, Sandra Bonorden | (979) 862-3931 | s-nite@tamu.edu |

**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 the xxx capabilities that I need to process the xxx.

**JUSTIFICATION (for hours requested)**

I plan to run 2000-5000 sequences that require 20-40 SUs each

**ADDITIONAL RESEARCHERS**

| Name | Hrs | Email |
|---|---|---|
| Jane Doe | 200,000 | jane.doe@tamu.edu |

**FUNDING**

| Sponsor | Annual amount |
|---|---|
| NSF | 400,468 |

# Research Allocations

The High Performance Research Computing Resource Allocation Committee (**HPRC-RAC**) reviews all proposals of allocations for 300K SUs or more. 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 HPRC in publications and other vehicles for scientific dissemination.

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

# Research Allocations

| Allocation Type | Who can apply? | Minimum SUs per Allocation per Machine | Maximum SUs per Allocation per Machine | Maximum Total SUs per Machine | Maximum Number of Allocations per Machine | Reviewed and approved by |
|---|---|---|---|---|---|---|
| Research (Grace) | Faculty, Research Scientists, Qualified Staff‡ | 300,000 | 10,000,000 | 10,000,000 | Determined by HPRC-RAC | HPRC-RAC |
| Research (Lonestar6) | Faculty, Research Scientists, Qualified Staff‡ | 300,000 | 2,000,000 | 2,000,000 | Determined by HPRC-RAC | HPRC-RAC |

‡ Subject to PI Eligibility

# Research Allocation Applications

Applications for Research Allocations must include a PDF **project description,** no more than 5 pages in length**,** with the following:

1. Research Statement – up to 1 page, describing the desired outcomes of the project.
2. Background – up to 1 page, describing how resources will be used.
3. Methodology – up to 1 page, describing the computational methodology & applications.
4. Research Plan – up to 1 page, describing the research schedule, with expenditure of resources.
5. Requirements Analysis - up to 2 pages, detailing the basis for the requested computer time.

# Research Application Project Description

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

1. Research Statement – 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 – 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 – In this section, explain how you will use the clusters and any software to complete specific tasks for the project.

# Research Allocation Project Description (cont.)

1. Research plan - 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.

2. Requirements Analysis - 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 needs, and how many SUs are needed per run to reach your total request.

# Common Application Errors

What will cause my application to be rejected?

## Basic Applications

- An ineligible sponsoring PI
- Incomplete research description
- PI not identified


## Startup Applications

- Applicant is not an eligible PI
- Inadequate research description
- No justification for machines or hours requested

## Research Applications

- Insufficient justification for hours requested
- No report filed for prior allocation(s)

# ViDaL Application

- Virtual Data Library (ViDaL, vidal.tamu.edu ) provides secure and compliant computing facilities to conduct research projects involving analysis of sensitive or proprietary data (e.g., HIPAA, Texas HB 300, NDA).
- Application for an account on ViDaL is available at https://u.tamu.edu/vidal-registration

# Lonestar6 Allocation Application

- 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 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

| | Computing Time (SU, core-hour) | Computer Storage (TB) | Staff Consultant (Hour) |
|---|---|---|---|
| TAMU System Users (TAMU/TAMUS/FED Rate) | $0.03 | $35 | $75 |
| Non-TAMU System Users (External or Outside Academic) | $0.04 | $45 | $90 |
| Other Users (Commercial/Business) | $0.05 | $55 | $115 |

# Computing Allocated via NSF ACCESS

Advanced Cyberinfrastructure Coordination Ecosystem: Services and Support (ACCESS) is a system supported by the National Science Foundation for researchers to access national high performance compute resources. TAMU has three such resources:

- ACES is one of our newer computing platform available to national researchers. You can learn more about the specialty hardware and software it has to offer here: https://hrpc.tamu.edu/resources/
- FASTER can be accessed similarly to Grace for TAMU researchers, but can also be accessed through ACCESS.
- Launch is our newest cluster especially for under-resourced MSIs, that prioritizes schools in the Texas A&M University System.

# ACCESS Allocation Application


- The ACCESS ID application can be found here: https://access-ci.org/about/get-started/

- More information about ACCESS can be found here: https://access-ci.org/

- An ACCESS ID is needed to use the  ACES and Launch clusters. An ACCESS ID is also required for researchers that have an allocation on FASTER through ACCESS.

# ACCESS Allocation Levels

There are four levels of allocations for ACES and FASTER 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
- **Maximize** - The choice for large-scale research activities that need more resources than the limit for Accelerate ACCESS projects

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

# 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

# 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

# Maximize ACCESS Request

Maximize allocations are for large-scale research projects that are beyond the scope of an Accelerate allocation.

Maximize requests are open for submission on a semi-annual basis

Please visit: https://allocations.access-ci.org/prepare-requests for submission windows and instructions to submit a successful Maximize ACCESS request.

# Quick Links to Resources

- Resource Allocation Policies
- Account Information/Requirements
- Resource (Cluster) Information
- Applications:
  - TAMU Allocation Application (Grace, FASTER, Lonestar6)
  - Launch Application
  - ViDaL Application
  - ACCESS Allocation Application (ACES & FASTER)
- HPRC Knowledge Base
- HPRC YouTube Channel

# Launch Application

- Launch cluster is for use by Texas A&M System and select partner institutions.
- Application for an account on Launch is available at https://u.tamu.edu/launch-registration

# Thank you

Contact: help@hprc.tamu.edu

*Please give us feedback on the class with this survey: https://u.tamu.edu/hprc_shortcourse_survey*