# National and Regional Computing Resources

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Rocky Mountain Advanced Computing Consortium

Campus Champion

# Recent Changes

- XSEDE program replaced by ACCESS program effective September 1, 2022
  - access-ci.org new website, replacing xsede.org
  - Advanced Cyberinfrastructure Coordination Ecosystem: Services & Support
  - Lead institutions are Carnegie Mellon University, University of Colorado Boulder, University of Illinois at Urbana-Champaign, and State University of New York at Buffalo
  - ACCESS Services include Allocations, Support, Operations and Metrics, along with a Coordination Office
  - https://access-ci.atlassian.net/wiki/spaces/ACCESSdocumentation/overview main documentation site

- Compute resources have stayed the same, but support, allocaitons and access to resources have changed

# NSF ACCESS Program Structure


ACCESS Coordination Office

# Outline

- Description of ACCESS Components
  - Operations
  - Allocations
  - Metrics
  - Support
- ACCESS Portal
- Computing Resources
- People Resources
- Training

# ACCESS Operations

https://operations.access-ci.org/

- Tie together the different efforts of the ACCESS program

# OpenCI ACCESS Coordination Office

PI: John Towns (NCSA/Illinois)
co-PIs: Lizanne DeStefano (CEISMIC/Georgia Tech); Shawn Strande (SDSC/UCSD)

- Deep knowledge of XSEDE
- Emphasis on seamless transition

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- Facilitate shared governance via EC and EAB
- Collaboration tools to support inter-track communications
- Branding
- Coordinate outreach, DEI, and evaluation efforts across the program
- Stakeholder communications on ACCESS impact & opportunities
- Informal co-advisors from 5 large programs


ACCESS Coordination Office

# ACCESS Communications & Outreach Coordination

- Establish a **unified brand and experience** for internal and external communications
- Establish and maintain **ACCESS main website**, facilitating access to service-area subsites
- Collaborate on and amplify service areas' **news and science stories**
- Enable **cross-service communications**
- Facilitate **reporting**

ACCESS Coordination Office

# ACCESS Community Building & Engagement Coordination

- Community Building across nation's CI ecosystem with the following goals:
  - Expand participation to new and underserved communities
  - Deep participation by existing communities
  - Represent the broad ACCESS program
- OpenCI is forming a virtual community building and engagement team
  - Representative from each ACCESS Service tracks
  - OpenCI representative
  - Computational Science Support Network (CSSN) representative

ACCESS Coordination Office

# ACCESS Community Building & Engagement Coordination

- Virtual community building and engagement team spinning up
  - Initial foci
    - defining communities and opportunities
    - define kinds of relationships we seek with our communities
    - look for mechanisms to expand participation to new and underserved communities
    - look to deep participation from community members already engaged with ACCESS
  - This will all drive a living ACCESS community building and engagement plan
    - shared messaging
    - shared promotion of community building and engagement efforts
    - ensure all ACCESS components are aware of the full set of community building and engagement efforts

ACCESS Coordination Office

# ACCESS Evaluation Coordination

- Establishing regular meeting schedule for Evaluation POCs (perhaps a formal working group)
- Working with Gulbrandsen, PIs and Evaluation POCs to formalize evaluation plans and reporting (PEPs, quarterly reports, annual reports, and panel review)
- Identifying common data needs in KPIs and metrics and developing a strategy for data sharing
- Developing a coordinated schedule for data collection to reduce redundancy and minimize burden on respondents
- Building capacity to track users over time and across tracks, assess collective impact, and continuously improve

ACCESS Coordination Office

# ACCESS Program Internal Collaboration Support

- Providing collaboration tools
  - Confluence wiki
  - Jira
  - Google Workspace: shared drive, email lists, etc.
  - all of these are in place now; some further configuration still under way

- Facilitating cross-award collaboration
  - establishing risk management process
  - establishing project change control

- Still figuring out
  - how to best “support NSF management and oversight of Service Track awards.”

ACCESS Coordination Office

# ACCESS Allocations

https://allocations.access-ci.org/

- If you have a current XSEDE Allocation – it will transition to an ACCESS allocation

# Allocation Eligibility

https://allocations.access-ci.org/access-allocations-policies#eligibility

- Available to any researcher or educator as US academic, non-profit research, or educational institution.
- Can be in any official position including adjunct or instructional
- Postdoctoral researchers can be a PI of any project type
- Graduate students can lead a “Explore” ACCESS allocation under their advirsor’s guidance
- NSF Graduate Fellows and Honoable mentions can apply for “Discover” allocations
- One project is allowed per funded grant -- though awards for unfunded projects are allowed.  Note that for collaborative grants between institutions the PI/coPIs must submit a single allocation request

# ACCESS Allocations Objectives

- Create an open, inviting, and democratized allocations marketplace
- Ensure equitable access across disciplines, institutions, and demographic groups
- Align the proposal-writing effort with level of resource need
  - Adjust review panel effort in anticipation of increasing volumes
  - Ensure Allocations staff within ACCESS and RP staff can keep up with steady stream of requests

→

- Standardized Allocation Tiers
- ACCESS Credits
- RP Engagement

SELECT OPPORTUNITY

REQUEST ALLOCATION

RECEIVE CREDITS

EXCHANGE CREDITS

ACCESS Allocations

NSF

# Standardized Allocation Opportunities (Tiers)

**Four Allocation Opportunities** to suit a variety of needs (*credit thresholds)*:

- ***Explore (400,000)***
  - Best-suited for endeavors with light resource requirements
    - Grad students can be PIs
- ***Discover (1,500,000)***
  - Minimal effort to start production research activities
    - Potential best-fit for **Campus Champion Allocations**
- ***Accelerate (3,000,000)***
  - More substantial resource requirements
    - Multi-grant research, Gateways, etc.
- ***Maximize (No upper limit)***
  - For large-scale research projects with extreme resource needs
    - Will largely resemble XRAC process

**Quick FAQs:**

- Except for *Maximize*, opportunities are available for request at any time.
  - *Maximize* will follow the XRAC schedule and policies until March 2023 meeting
    - Bi-annual opportunities will then be available.
- Multiple allocations can be requested
  - For multiple grants
  - Or for substantially different needs
- Allocations can be upgraded to the next tier when resource demand increases

ACCESS Allocations

NSF

# Opportunity Comparison

| | Explore | Discover | Accelerate | Maximize |
|---|---|---|---|---|
| **Possible purposes** | Evaluation, courses, development, exploration | Small-scale research, Campus Champions, growing gateways | Mid-scale needs, consolidating related grants, collaborations | Largest-scale research activities |
| **Credit threshold** | 400,000 Credits | 1,500,000 Credits | 3,000,000 Credits | No upper limit |
| **Duration** | Grant duration or 12 months | Grant duration or 12 months | Grant duration or 12 months | 12 months |
| **Number per PI** | Multiple | Multiple | One (some exceptions) | One (limited exceptions) |
| **Accepted** | Continuously | Continuously | Continuously | Semi-annually |
| **Proposal length** | Abstract | 1 page | 3 pages | 10 pages |
| **Review** | Eligibility | Advisory review requestable | Rolling panel review | Panel review |

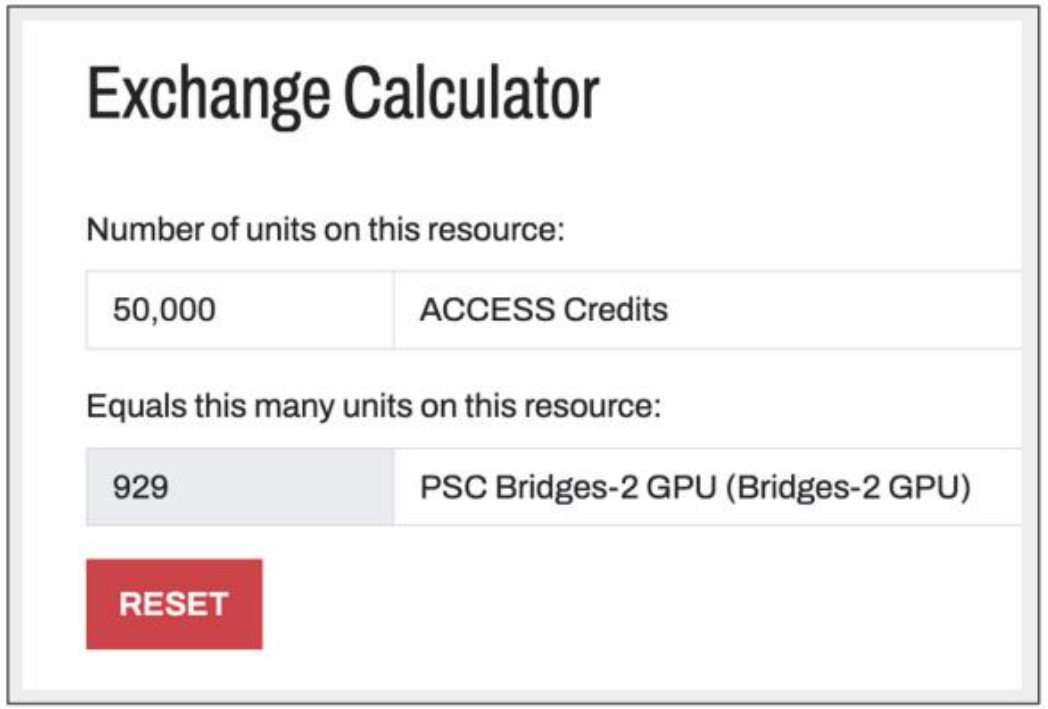
ACCESS Allocations NSF

# ACCESS Credits

- A “currency” that researchers can exchange for available resources
- Allocations for the **first three (3) opportunities** will be awarded in credits
  - Requestors will then exchange credits for resource-specific units (SUs)
- Credits are issued in two increments
  - Half initially an half after a progress report
- ACCESS Credits are based on longstanding normalized units

1 ACCESS Credit = 1 Expanse core hour

Conversion Calculator to streamline exchange




https://allocations.access-ci.org/exchange_calculator

ACCESS Allocations

# Resource Provider Engagement

- Resource Providers (RPs) will review credit exchange requests
- RPs will be able to set their exchange rates for ACCESS Credits
- More RP controls will allow for additional resource types to be handled via allocations processes
  - E.g. Review criteria for SDSC Voyager resource may be different from SDSC Expanse CPU
  - E.g. Allocating telescopes or large instruments may have considerations not typical of research computing resources

## Available Resources

| |
|---|
| Johns Hopkins University (Rockfish - Regular Memory) |
| Kentucky Research Informatics Cloud (KyRIC) Large Memory Nodes |
| NCSA Delta CPU (Delta CPU) |
| NCSA Delta GPU (Delta GPU) |
| NCSA Delta Storage (Delta Storage) |
| Open Science Grid (OSG) |
| Open Storage Network (OSN) |
| PSC Bridges-2 Extreme Memory (Bridges-2) |
| PSC Bridges-2 GPU (Bridges-2 GPU) |

ACCESS Allocations

# Transitioning to a New Process


What **won't** be changing:

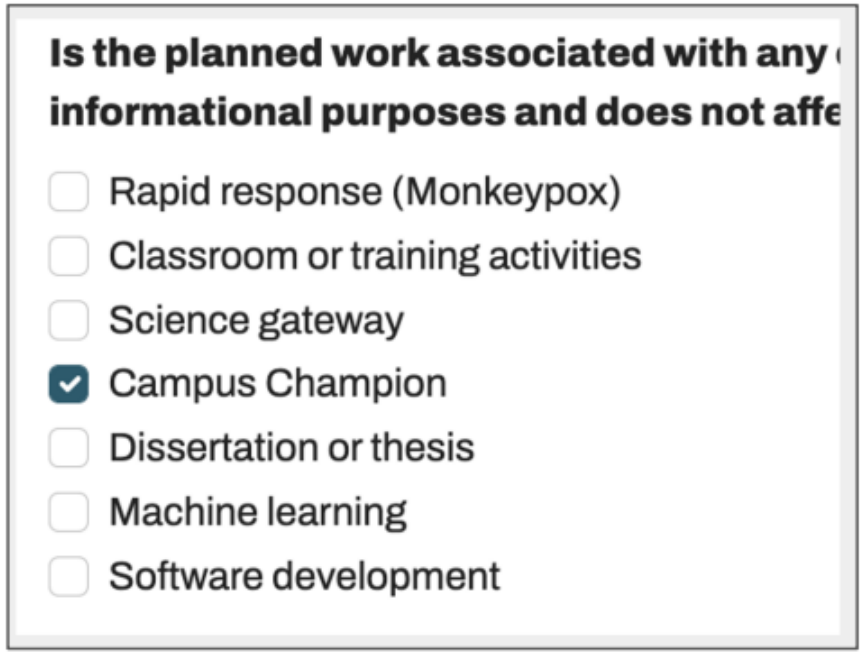
- XSEDE processes will be honored for existing allocations (until renewal)
  - E.g. supplements, transfers, extensions will continued to be accepted
- Campus Champion allocations will continue to be accepted, tagged/tracked, and expedited
- CCs can work directly with researchers in their area to identify the resources best-suited for the proposed endeavors

ACCESS Allocations NSF

# Allocation Points for Campus Champions

- Proceed with “business-as-usual”
  - Continue to leverage existing and active allocations
  - Request necessary supplements and transfers, if needed
- When it’s time to renew…
  - Align with one of the new opportunities that best suits the needs of your current and expected community
- As new Champions are onboarded…
  - Please continue to email: Ken hackworth@psc.edu and Brandon brandonp@psc.edu about new members
  - Please continue to update:
    - Current Champions list

XRAS Submission UI




ACCESS Allocations

# Where to Find Us

- Allocations Webpage
  - Allocations.access-ci.org
- Help Ticket
  - Contact us through the Support Ticket Form
- Feedback Form
  - Have a suggestion for how we can improve our web presence, practices, policies, or other aspect of our project?
    - Let us know!

ACCESS Allocations

# ACCESS Metrics

https://metrics.access-ci.org/

- Transitioning the XSEDE XDMoD (Metrics on Demand) to ACCESS
- See https://xdmod.access-ci.org

xdmod.access-ci.org

Anita Orendt - Outl... one. ougl

XDMoD Hello, Sign In to view personalized information.

About Roadmap Contact Us Help

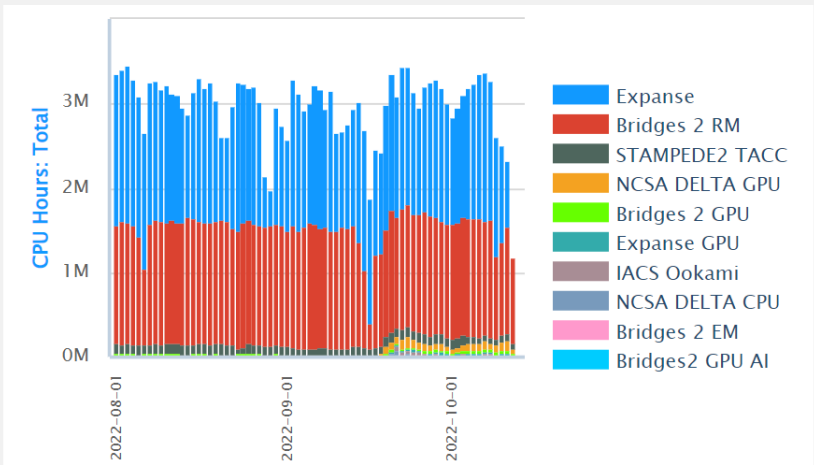
Summary | Usage | About

Duration: User Defined Start: 2022-08-01 End: 2022-10-13 Refresh

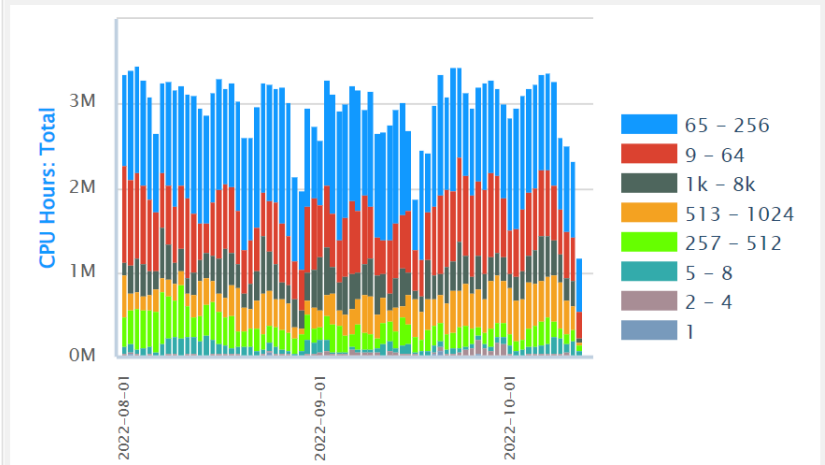
Quick Filters

| Activity | | | | Jobs | | Service (XD SU) | | CPU Time (h) | | Wait Time (h) | Wall Time (h) | | Processors | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Users: | PIs: | Allocations: | Institutions: | Total: | Gateway: | Total: | Avg (Per Job): | Total: | Avg (Per Job): | Avg (Per Job): | Total: | Avg (Per Job): | Max: | Avg (Per Job): |
| 2,945 | 1,093 | 1,145 | 423 | 3,888,921 | 197,736 | 3,124,647,737.0 | 803.40 | 214,771,397.2 | 55.22 | 13.32 | 5,779,592.4 | 1.49 | 6,400 | 16 |

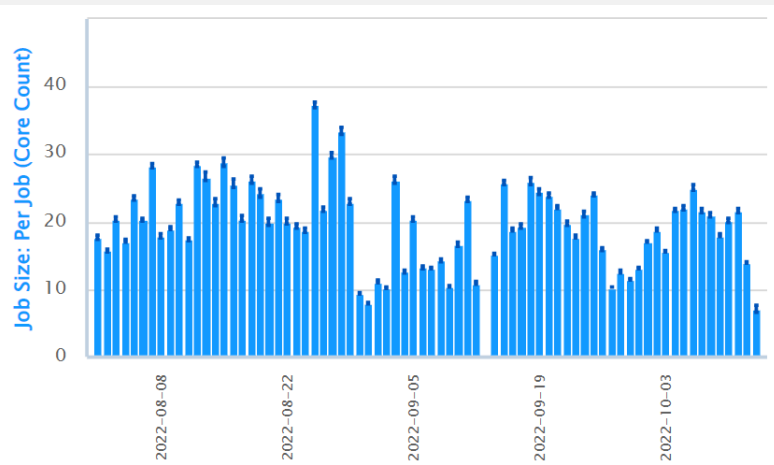
**Total CPU Hours By Resource (Top 10)**



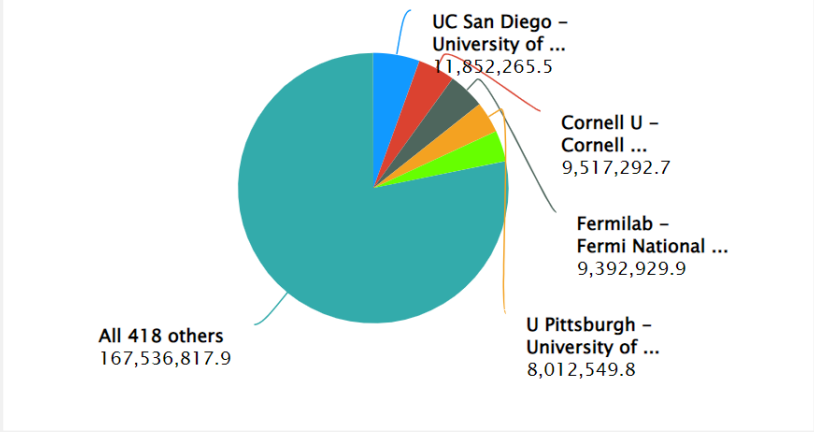

**Total CPU Hours by Job Size**



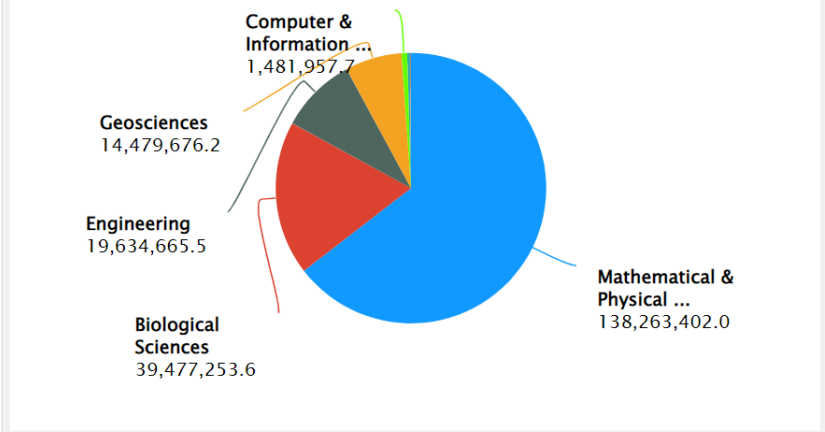

**Avg Job Size (Core Count)**



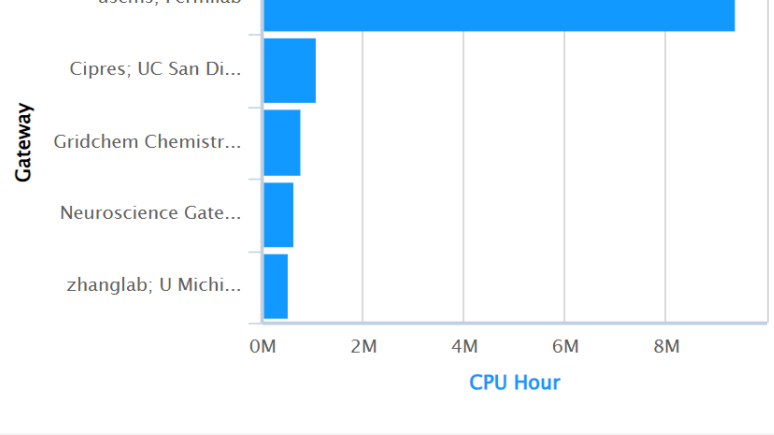

**Total CPU Hours by User Institution (Top 5)**




**Total CPU Hours by NSF Directorate**




**Total CPU Hours by Gateway (Top 5)**

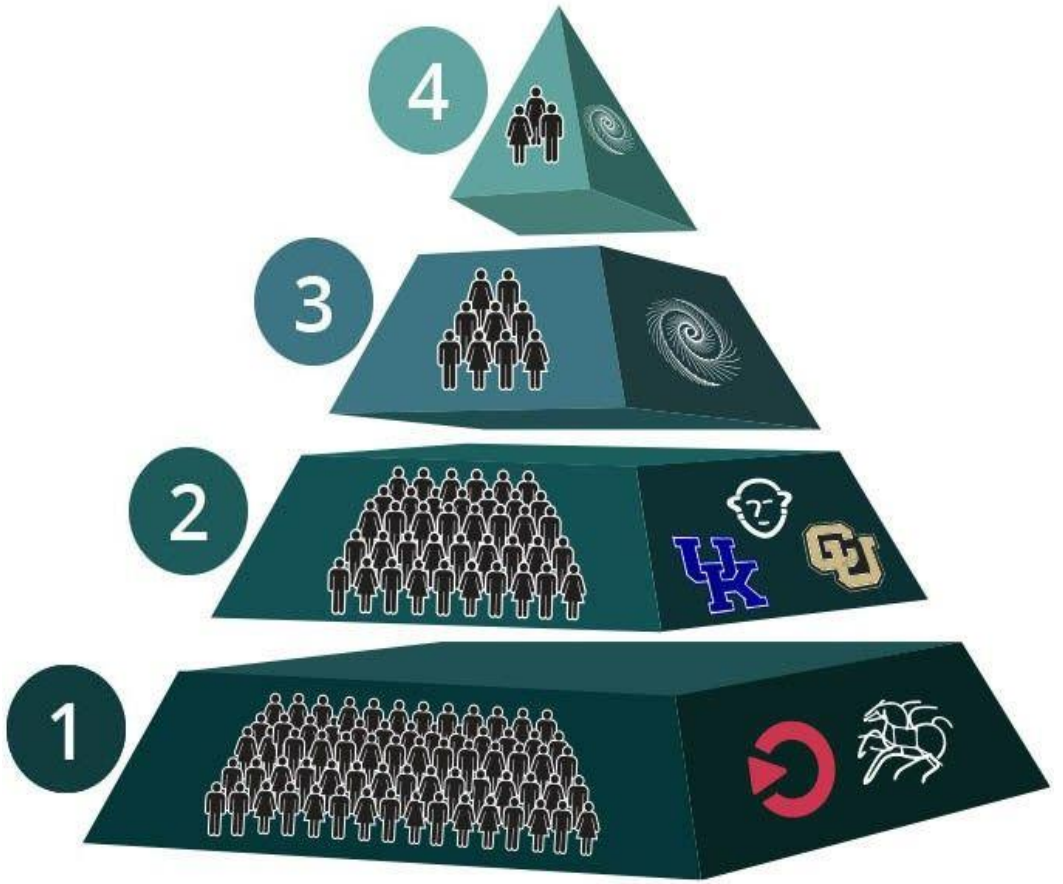


# ACCESS Support

https://support.access-ci.org/

- Match -- Multi-tier Assistance, Training, and Computational Help
  - *1- easy-to-use tools and services*
  - *2 - self-help knowledge base*
  - *3 - short-term support engagements*
  - *4 - longer-term connections to specialized expertise*

- https://support.access-ci.org/resources provides info and links to both resources provider guides as well as other useful websites including training sites, tutorials, and other learning resources



# MATCH – Tier 1

- Tier 1 support takes the form of **easy-to-use tools that allow researchers to quickly get started using complex computing systems**.
  - By reducing the learning curve, the Tier 1 tools and services enable users to quickly start computational jobs with minimal effort.
- initial focus has been on deploying Open-On-Demand instance for launching jobs at RPs, Pegasus for creating workflows across RP resources, Science Gateways that simplified access to certain types of workloads, and XdMod to help track jobs and possibly identify issues.

# MATCH – Tier 2

- Tier 2 support focuses on **self-help resources** designed to get users to answers quickly.
- Tier 2 resources include
  - Documentation describing ACCESS and its associated resource providers (RPs),
  - Question and Answer (Q&A) forums where users can post questions to the ACCESS community and search for answers,
  - Community-generated documentation and training materials that help users learn to effectively use ACCESS,
  - Affinity Groups where user with similar interests can exchange information and experiences, and a
  - Ticket system where users can submit questions to ACCESS and RP staff.

# MATCH – Tier 3

- Tier 3 support, also known as MATCHPlus
  - No cost
  - Limited Scope
  - Provides direct support to researchers by establishing short-term (3-6 months) engagements that pair a student facilitator with an experienced mentor to address an immediate research need.
  - Each mentor/student team will help a researcher move their science forward through concrete and contained computational improvements such as expanding existing code functionality, transitioning from lab computers to HPC, or introducing new technologies.
  - Mentors are ACCESS Computational Science and Support Network (CSSN) experts with subject matter expertise and professional facilitation skills relevant to the engagement.

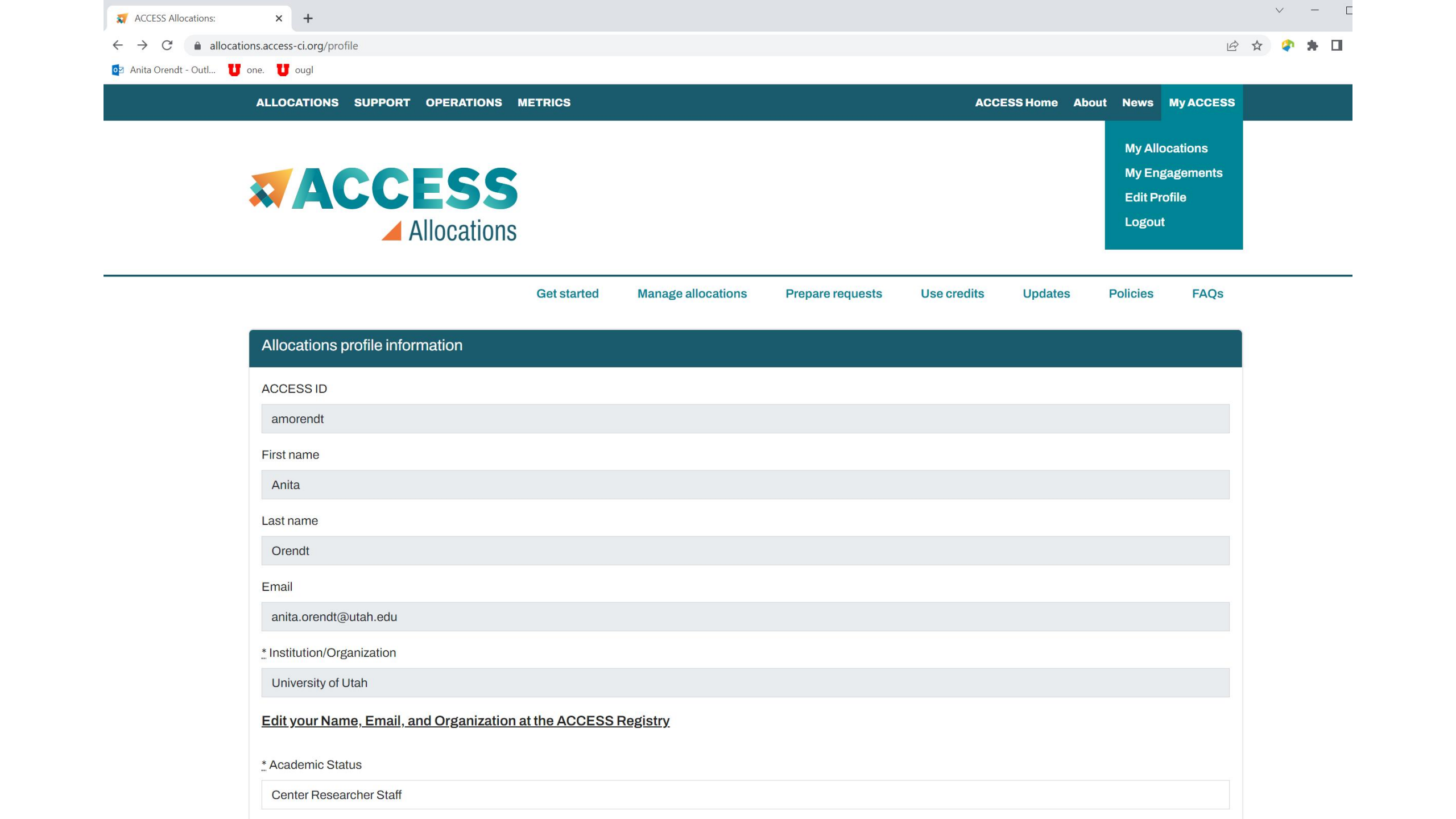
# MATCH – Tier 4

- Tier 4 support, also known as MATCHPremier
  - Researched funded, pre-planned consultant coordination
  - Provides embedded support by pairing one or more MATCHPremier Consultants with a research team for a period of engagement typically ranging from 12 - 18 months.
  - Engagements must be requested at least six months in advance.
  - MATCHPremier Consultants are selected from the Computational Science and Support Network (CSSN) depending on the researcher's needs - they may be facilitators, research software engineers, or other types of appropriate support personnel.

# Getting access ACCESS portal

https://identity.access-ci.org/

- If you had a XSEDE portal account (portal.xsede.org) then use this – it will walk you through steps to link/transition this XSEDE identity to an ACCESS identity
- Otherwise – register for an ACCESS ID at https://identity.access-ci.org/new-user
- Process also described at https://access-ci.atlassian.net/wiki/spaces/ACCESSdocumentation/pages/76743107/Login+Information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SUPPORT
OPERATIONS
METRICS
ACCESS Home
About
News
My ACCESS
My Allocations
My Engagements
Edit Profile
Logout
ACCESS
Allocations
Get started
Manage allocations
Prepare requests
Use credits
Updates
Policies
FAQs
Allocations profile information
ACCESS ID
amorendt
First name
Anita
Last name
Orendt
Email
anita.orendt@utah.edu
* Institution/Organization
University of Utah
Edit your Name, Email, and Organization at the ACCESS Registry
* Academic Status
Center Researcher Staff

# Allocations Usage

## University of Utah campus champion allocation - TRA110026

**PRINCIPAL INVESTIGATOR: ANITA M ORENDT**

TOGGLE INACTIVE AWARDS

| Resource | Active Until | Used |
|---|---|---|
| PSC Bridges-2 Storage (Ocean) | 2023-08-13 | 0.0 / 1000.0 GB Show Details |
| Indiana Jetstream2 Storage | 2023-08-13 | 0.0 / 1000.0 GB Show Details |
| PSC Bridges-2 GPU (Bridges-2 GPU) | 2023-08-13 | 0.0 / 2500.0 GPU Hours Show Details |
| Johns Hopkins University (Rockfish - Large Memory) | 2023-08-13 | 0.0 / 1000.0 Core-hours Show Details |
| Purdue Anvil CPU | 2023-08-13 | 0.0 / 100000.0 SUs Show Details |
| Johns Hopkins University (Rockfish - Regular Memory) | 2023-08-13 | 0.0 / 20000.0 Core-hours Show Details |
| UD DARWIN Storage (DARWIN Storage) | 2023-08-13 | 0.0 / 1000.0 GB Show Details |

# Running Jobs on Resources

- ACCESS Open OnDemand
  - https://access-ci.atlassian.net/wiki/spaces/ACCESSdocumentation/pages/76744257/ACCESS+Open+OnDemand
  - Can be used for SDSC Expanse, Purdue Anvil at this time
- ACCESS Pegasus -- https://access.pegasus.isi.edu
  - https://access-ci.atlassian.net/wiki/spaces/ACCESSdocumentation/pages/76744296/ACCESS+Pegasus
- From there you can open up a ssh session
- Access to other resources via portals coming
- For direct ssh to the different resources – see details on ACCESS resource pages https://access-ci.atlassian.net/wiki/spaces/ACCESSdocumentation/pages/76744989/Resource+Providers
  - Some will require request for a local account on the resource

# Computing Resources

# National HPC Computing Resources via ACCESS

https://access-ci.atlassian.net/wiki/spaces/ACCESSdocumentation/pages/76744989/Resource+Providers

- ACES (Texas A&M)
- Anvil (Purdue)
- Bridges-2 (PSC)
- DARWIN (Delaware)
- Delta (NCSA)
- Expanse (SDSC)
- FASTER (Texas A&M)
- Jetstream2 (IU)
- OOKAMI (Stonybrook)
- KyRIC (Kentucky)
- Rockfish (JHU)
- Stampede-2 (TACC)
- RANCH (TACC)
- Open Science Grid (OSG)
- Open Storage Network (OSN)

**TACC Stampede2** intended for large scale runs (tens of thousands cores) as well as general throughput computing

**PSC Bridges2** Integrating new technologies for converged, scalable HPC, machine learning and data; prioritizing researcher productivity and ease of use; and providing an extensible architecture for interoperation with complementary data-intensive projects, campus resources, and clouds.

**SDSC Expanse** 'Computing without Boundaries' capacity and performance for thousands of users of batch-oriented and science gateway computing; providing new capabilities that will enable research increasingly dependent upon heterogeneous and distributed resources composed into integrated and highly usable cyberinfrastructure.

**IU Jetstream** Cloud Computing resource; in process of transitioning between Jetstream and Jetstream2

# Other systems

- FASTER – Texas A&M
  - FASTER - CPUs, GPUs, with NVMe based storage in a composable environment
  - ACES - Accelerating Computing for Emerging Sciences, an innovative advanced computational prototype FPGA, Graphcore IPU designed for prototyping AI/ML workflows
- OOKAMI – Stony Brook University
  - Testbed based on the A64FX processor developed by Riken and Fujitsu
- Anvil – Purdue University
  - AMD Milan 1000 nodes with 128 processor cores, 256 GB and 32 nodes with 1 TB
  - 16 nodes with 4x Nvidia A100 GPUs
- Delta – NCSA
  - AMD Milan systems including many GPUs -- A100, A40, AMD MI100 -- nodes
- Rockfish – Johns Hopkins University
  - Intel processor based, some larger memory, some GPU A110
- Darwin – Univiversity of Delaware
  - Regular/large memory and GPU nodes, 20% time via XSEDE allocations
- KyRIC – University of Kentucky
  - Informatics Cloud
  - Limited number of large memory (3TB) intel processor based nodes


SCIENCE GATEWAYS COMMUNITY INSTITUTE: CONNECTING PEOPLE AND RESOURCES TO ACCELERATE DISCOVERY BY EMPOWERING THE SCIENCE GATEWAY COMMUNITY

Science Gateways simplify access to computing resources by **hiding infrastructure complexities**.

Science Gateways provide **higher level user interface** for XSEDE resources that are tailored to specific scientific communities.

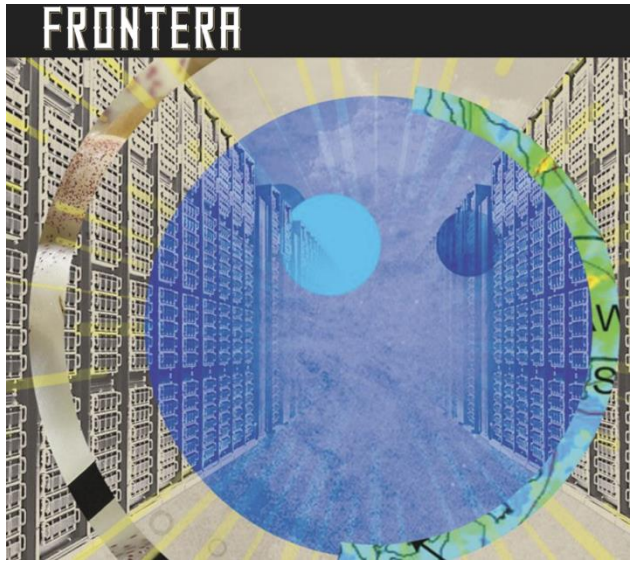
A Science Gateway is a community-developed set of tools, applications, and data that are **integrated via a portal** or a suite of applications, usually in a graphical user interface, that is further customized to meet the needs of a specific community.

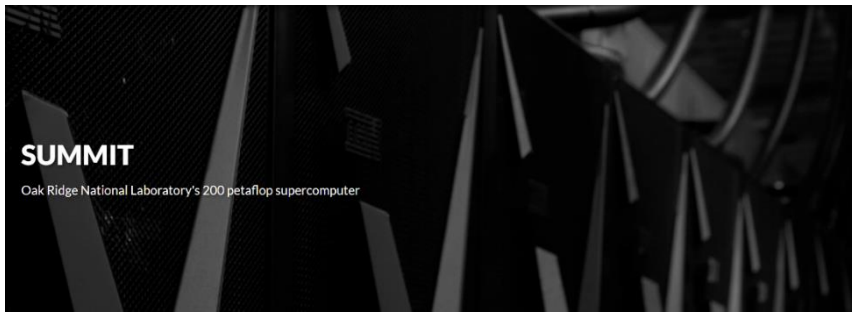
# Other National Computing Resources

- Open Science Grid
- Frontera (TACC)
- Summit / Frontier (OakRidge LCF)
- Aurora/Polaris/Theta/AI Testbed (Argonne LCF)
- Perlmutter/Cori (NERSC)
- Cheyenne / Derecho (2023) (NCAR)


Open Science Grid





# RMACC Computing Resources

http://rmacc.org/accessingsummit

https://www.colorado.edu/rc/

RMACC-Summit funded by a MRI grant by CU Boulder and CSU -- 10% cycles for institutions in RMACC region, especially institutions without own compute resources

- General compute
  - Haswell 24 cores/node, 128GB RAM
- High memory
  - 48 cores/node 2TB
- GPU nodes
  - 24 cores, 2 K80s/node
- KNL Xeon Phi
- Now can access with XSEDE login credentials via SSOHub

New system in 2022 – Aspen – access by RMACC TBD


# RMACC-Summit Access

https://curc.readthedocs.io/en/latest/access/rmacc.html

After you have ACCESS login:

- send request from your institutional email address to rc-help@colorado.edu
- Will access via RMACC ondemand portal
  - https://ondemand-rmacc.rc.colorado.edu
- Allocations
  - Can run without allocation for smaller needs
  - https://www.colorado.edu/rc/userservices/allocations
- For RMACC training
  - https://www.colorado.edu/rc/userservices/training

# People  Resources

# Campus Champions -- NSF funded program to connect People with CyberInfrastructure

- HPC
- Visualization
- Data Analysis
- Storage
- Training
- Education
- Subject Matter Experts


- Funded ended with XSEDE, proceeding independently

# Campus Engagement Mission Statement

The Campus Engagement program promotes and facilitates the effective participation of a diverse national community of campuses in the application of advanced digital resources and services to accelerate scientific discovery and scholarly achievement.

# Who are the champions?

- 780+ champions at 350+ institutions
- Includes
  - HPC Directors
  - System Administrators
  - User Support specialists
  - Faculty evangelists
  - Central IT staff
  - Non-academic organization staff, e.g. USGS, Idaho National Labs

# What do champions do?

- Facilitate computing- and data-intensive research and education
- Help their local researchers and educators to find and use the advanced digital services that best meet their needs
- Share CI challenges and solutions at all levels:
  workgroup, institutional, regional, national, and international
- Increase scalable, sustainable institutional uptake of advanced digital services from providers at all levels;
- Foster a broader, deeper, more agile, more sustainable and more diverse nationwide cyberinfrastructure ecosystem
- Cultivate inter-institutional interchange of resources, expertise and support

# Ask.CI

- https://ask.cyberinfrastructure.org/
- Q&A site for people who do research computing
- platform for
  - sharing frequently asked questions
  - comparing solutions
  - leveraging each other's work pertaining to research computing

# RMACC HPC Center Staff and Web Sites

- https://www.colorado.edu/rc/
- www.chpc.utah.edu
- http://inside.mines.edu/HPC-Home

# Training

# PSC HPC Workshop Series

https://www.psc.edu/resources/training/hpc-workshop-series/

- The XSEDE HPC Workshop Series held monthly by the Pittsburgh Supercomputing Center (PSC) will be continuing under ACCESS
- Now the ACCESS Workshop Series
- Moving back to the telecast model to multiple satellite sites versus the use of zoom using since covid
- First workshop: GPU Programming Using OpenACC on November 7, 2022 – watch for an announcement with details and registration information

# Other Training for Using HPC

- The carpentries
  - Software Carpentry – https://software-carpentry.org/
  - Data Carpentry – https://datacarpentry.org/
  - HPC Carpentry – being developed -- https://hpc-carpentry.github.io/hpc-intro/

- Other
  - https://cvw.cac.cornell.edu/default