

Exploring High-Performance Computing Resources for Particle Physics: A Comprehensive Overview

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Particle Physics on the Plains

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October 14, 2023



WICHITA STATE
UNIVERSITY

Outline

Introduction

Regional HPC systems
that are FREE

- Pete Supercomputer, BeoCat, BeoShock

Advanced
Cyberinfrastructure
Coordination Ecosystem:
Services & Support
(ACCESS)

Open Science Grid (OSG)

National Research
Platform (NRP)

Conclusions

Introduction



This talk is from the perspective of a lone wolf theoretical physicist.



Building a small research program is not easy. However, the National Science Foundation has made it a lot easier with supporting a number of projects in this region that have improved access to advanced cyber-infrastructure resources. Thanks!



It now easier than ever to obtain the needed to computational resources for FREE.



In this talk I will discuss research computing environments I have experience with.

Most problems in physics need computing resources and software tools.

- Laptops can do quite a lot. However, to really push the boundaries you need more.
- What do computational physicists need ?
 - Plotting tools
 - Coding tools, compilers
 - A place to run their open-source software tools (CPUs and GPUs)
 - Storage
- Physics offers many use cases.

Regional HPC Systems that are FREE

- [Pete Supercomputer](#)
- [WSU's BeoShock](#)
- [K-State's BeoCat](#)



It's better I take you to the sign-up pages.
So, let the tour begin.

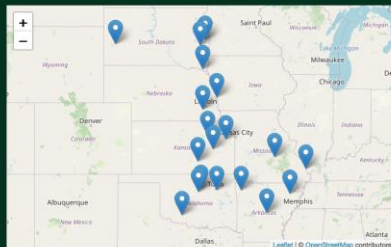


Open Science Grid

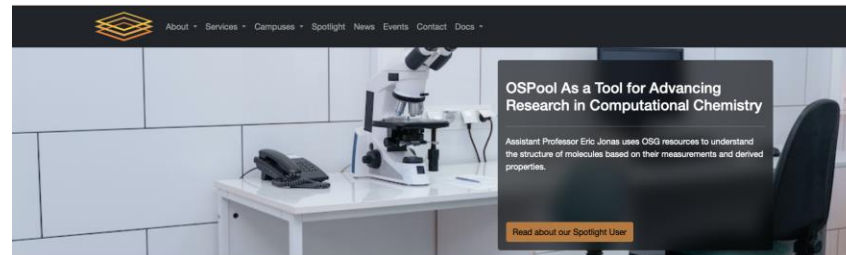
GP-ARGO

The Great Plains Augmented Regional Gateway to the Open Science Grid

GP-ARGO creates a regional distributed [Open Science Grid \(OSG\)](#) Gateway led by the [Great Plains Network \(GPN\)](#) to support computational and data-intensive research across the region through the development of specialized CI resources, workforce training, and cross-support methodologies and agreements.



<https://osg-htc.org>



The OSG Consortium

Established in 2005, the OSG Consortium operates a fabric of distributed High Throughput Computing (dHTC) services in support of the National Science & Engineering community. The research collaborations, campuses, national laboratories, and software providers that form the consortium are unified in their commitment to advance open science via these services.

Open Science Pool

Any researcher performing Open Science in the US can become an OSPool user. The OSPool provides its users with fair-share access (no allocation needed) to processing and storage capacity contributed by university campuses, government-supported supercomputing institutions and research collaborations. Using state-of-the-art distributed computing technologies the OSPool is designed to support High Throughput workloads that consist of large ensembles of independent computations.

Open Science Data Federation (OSDF)

The Open Science Data Federation (OSDF) enables users and institutions to share data files and storage capacity, making them both accessible in dHTC environments such as the OSPool.

- Provides campuses and researchers with the ability to manage their data files, input and output, in support of running their dHTC workloads.
- Improves file access performance, resource consumption and reliability.
- OSG-Operated Access Points provide researchers with a default of 500GB of storage space on the OSDF.

News

The CHTC Philosophy of High Throughput Computing – A Talk by Greg Train
April 24, 2023

Get To Know Student Communications Specialist Hannah Cheren
April 24, 2023

Get To Know Todd Tammenbaum
January 23, 2023

Open Science Grid and GP-ARGO

Resources contributed to the [Open Science Grid](#)

Core Hours Contributed

19,461,055

↑~37k/day



OSG Projects

84



Institutions Supported

58



Collaborating Campuses

Arkansas State University

Cameron University

Creighton University

Dakota State University

Doane University

Emporia State University

Kansas State University

Langston University

Missouri S&T

Oklahoma State University

Bioinformatics

464,419

University of Pittsburgh
ID: *BiomedInfo*

Astronomy

411,083

University of Arizona
ID: *eht*

Nuclear Physics

390,667

Jefferson Lab
ID: *CLAS12*

Astrophysics

348,145

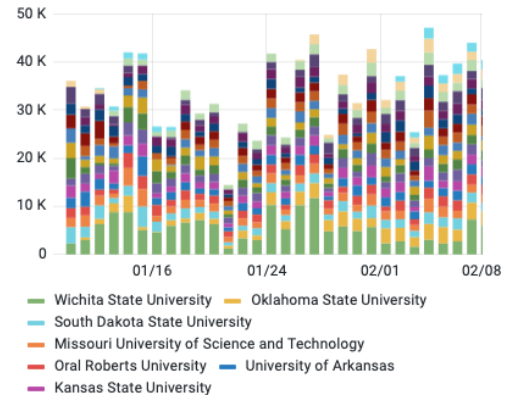
University of Utah
ID: *TelescopeArray*

Evolutionary Biology

347,329

Arizona State University
ID: *DemoSims*

Core Hours By Facility



National Research Platform

NRP NATIONAL RESEARCH PLATFORM

NEWS ▾ GRANTS ▾ TECHNOLOGY ▾ COMMUNITY ▾ JOIN / CONTACT ▾

Designed for Growth and Inclusion

The National Research Platform (NRP) is a partnership of more than 50 institutions, led by researchers and cyberinfrastructure professionals at UC San Diego, supported in part by awards from the National Science Foundation.

THE NRP IS NOW THE NATIONAL RESEARCH PLATFORM (NRP)

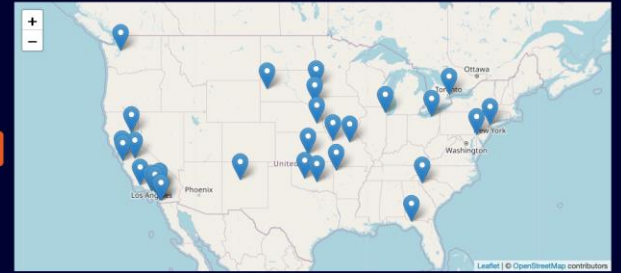
NRP

National Research Platform

The National Research Platform is a partnership of more than 50 institutions, led by researchers at UC San Diego, University of Nebraska-Lincoln, and UC Berkeley and includes the National Science Foundation, Department of Energy, and multiple research universities in the US and around the world.

Get Access

Add a server to the NRP



GPUs Allocated

860

Running Pods

10484

Active Research Groups

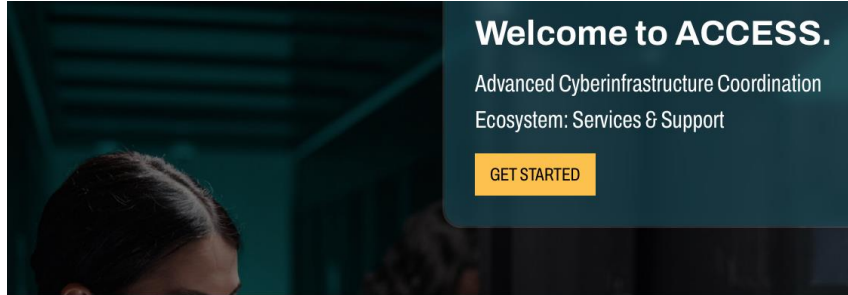
264

JupyterHub Service

<https://nationalresearchplatform.org>

<https://docs.pacificresearchplatform.org/us/erdocs/jupyter/jupyterhub-service/>

ACCESS and Getting Help

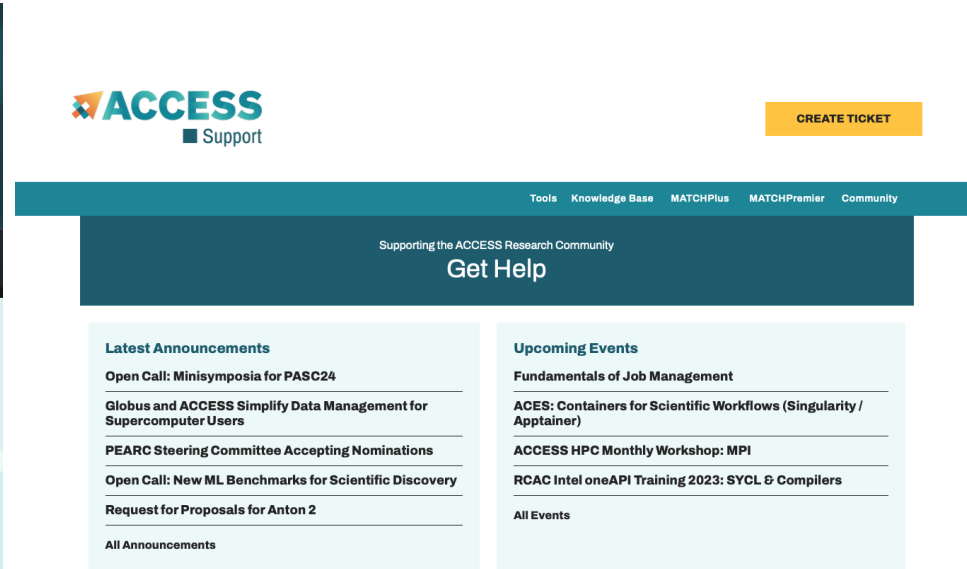


ACCESS is a program established and funded by the National Science Foundation to help researchers and educators, with or without supporting grants, to utilize the nation's advanced computing systems and services – **at no cost**.

Whether you're looking for advanced computational resources – and outstanding cyberinfrastructure – to take your research to the next level, to explore a career in advanced CI or just to experience the amazing scientific discoveries enabled by supercomputers, you're in the right place.

Below are questions you might have and the links to take you where you need to go within the ACCESS program.

<https://access-ci.org/about/>



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

Conclusions

- Today I promoted a few computing resources that I have allowed me to get work done.
- The impact of FREE computing has been transformational and is so valuable.