Resources and Funding for Researchers and Educators

OAC supports computing, data, networking and cybersecurity infrastructure and expertise for broad Science and Engineering communities

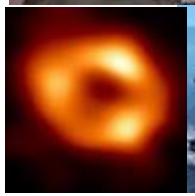
CloudBank

Computing, data infrastructure, regional networking


Community building, training and user support

>25,000 researchers and students supported by OAC resources





Cybersecurity, networking and data lifecycle Support for NSF's Major Facilities

nanoHUB

Software Frameworks and Gateways

OAC provides many resources and services!

Examples include:

National Computing, Data, and AI Resources

ACCESS Advancing Innovation
ALLOCATIONS SUPPORT OPERATIONS METRICS

PATh PARTNERSHIP to ADVANCE THROUGHPUT COMPUTING

Throughput Computing, Data, and Support

NRP NATIONAL RESEARCH PLATFORM

SGX3

Science Gateways

NAIRR Pilot National Artificial Intelligence Research Resource Pilot

Training, Workshops, and More

- https://support.access-ci.org/events
- https://portal.osg-htc.org/documentation/support_and_training/training/materials/
- https://nairrpilot.org/pilotevents
- https://www.nrp.ai/training/

Community and Workforce Development

ms-cc.org in partnership with Internet2

Minority Serving CI Consortium
www.ms-cc.org

CaRCC Campus Research Computing Consortium

Campus Research Computing Consortium
www.carcc.org

TRUSTED CI
THE NSF CYBERSECURITY CENTER OF EXCELLENCE

Portals

- **ACCESS: https://access-ci.org/**
- **PATh: https://path-cc.io/**
- **NAIRR Pilot: https://nairrpilot.org**
- **CaRCC: https://carcc.org/**
- SGX3: https://sciencegateways.org/
- LCCF: https://lccf.tacc.utexas.edu/
- MSCC: https://www.ms-cc.org/
- Trusted CI: https://www.trustedci.org/

NSF

National AI Research Resource (NAIRR) Pilot

Infrastructure to drive US AI innovation, discovery, and competitiveness. We are in **NAIRR Pilot Year 2**.

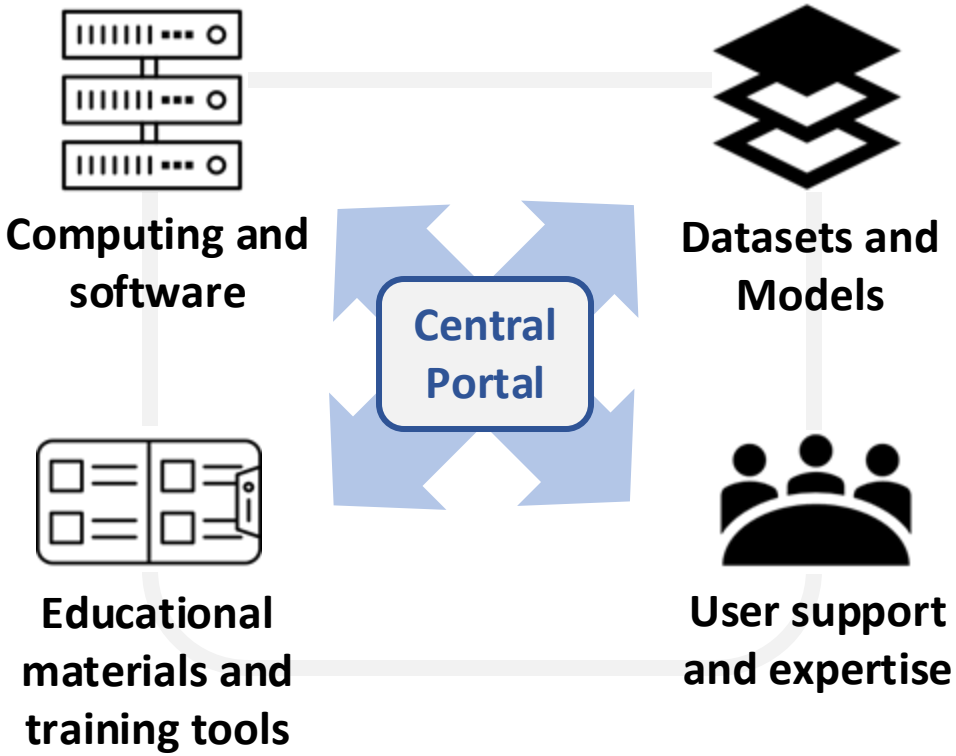
The challenge: To accelerate US global AI leadership and unlock the enormous AI opportunity across society we need 1) a skilled AI workforce and 2) to continue driving fundamental innovations.

- Access to computing, data, models, software and expertise is a key enabling factor.
- Industry investments alone will not be sufficient

The opportunity: Build a competitive AI ecosystem by enabling researchers and educators across the country to:

- Drive national and regional AI innovation across sectors to spark new solutions, products, businesses and jobs
- Train the AI workforce of the future

Envisioned NAIRR Architecture



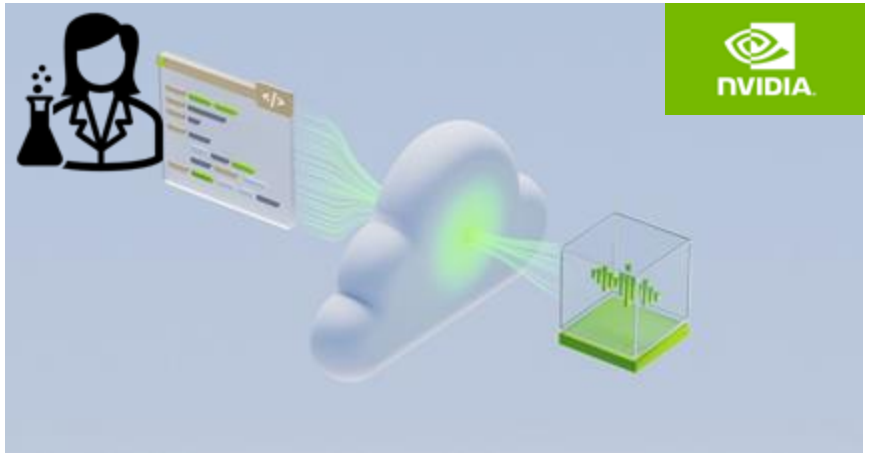
NAIRR Pilot
nairrpilot.org

Power of partnerships: Public-private partnerships can assure US leadership in AI

- Research community powers the flywheel innovation seeding ideas decades before they come to market fruition.
- Maturing applications where industry does not have a market incentive to invest
- Training the next generation of talent industry needs
- On an operational level, industry often sees value in supporting the research community, but has neither the incentive or internal capacity to conduct reviews, manage allocations or on-board researchers

Example Partnership: NVIDIA and NSF

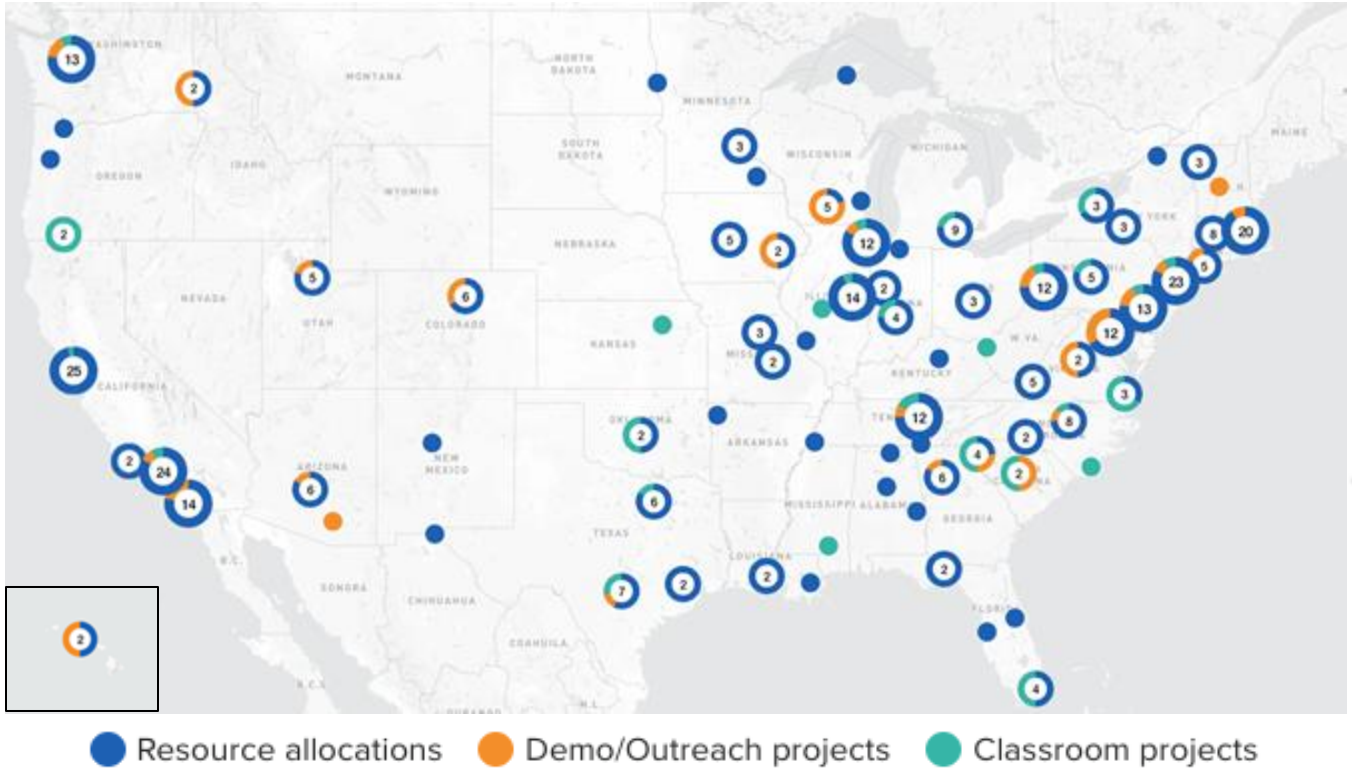
UC San Diego



NSF provided a small grant to UC San Diego to provide front end system configuration and user environment management for researchers to access NVIDIA's DGX Cloud contributed infrastructure.

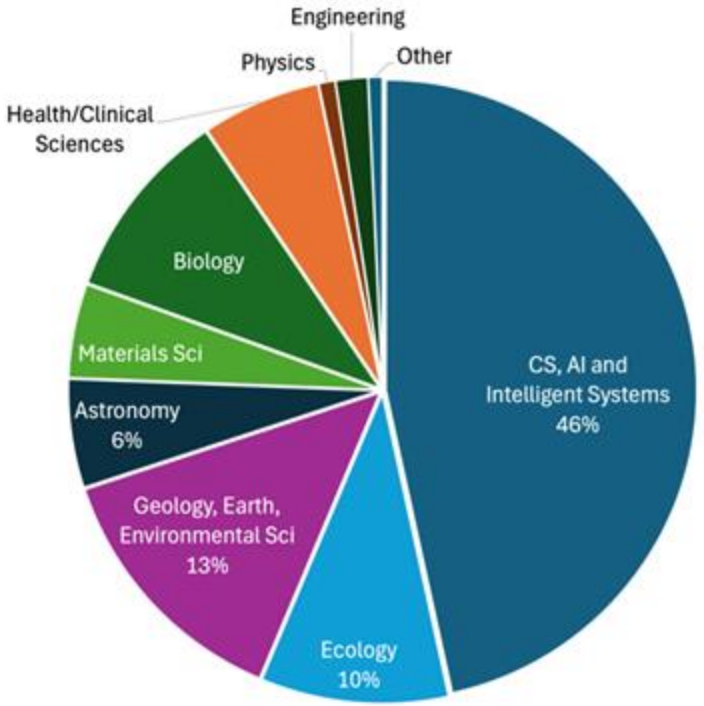
Researchers across the country are investigating fundamental AI and applied AI for science topics

500+ Research projects supported across 49 states + DC



NAIRR Pilot Allocations by Science Category

(A100 GPU hours equiv)



	#of Projects
Agency Supported	266
Industry Supported	172

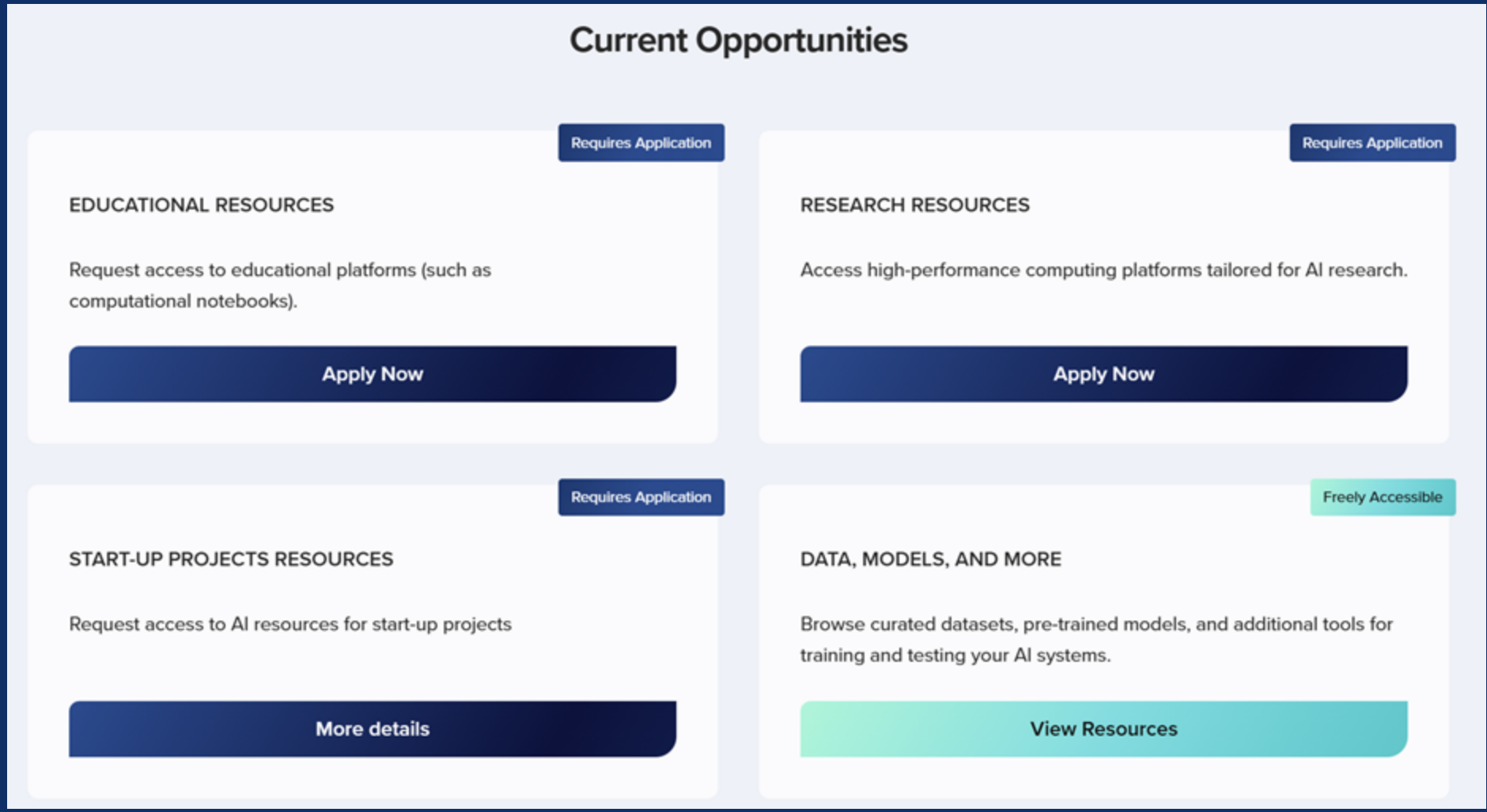
Note: Some projects are granted access to multiple resources

Researchers must be at a US based institution. Researchers come with funding support from 11 different agencies including NSF, NIH, NOAA, DOE, DOD, DARPA, ONR, ARO, NASA, USDA and VA as well as foundation and non-profit funding.

NAIRR Pilot

https://nairrpilot.org

Researchers and educators apply for resources



Many agency datasets are available through the pilot

National COVID Cohort Collaborative

ImmPort
Bioinformatics For The Future Of Immunology

NOAA
National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Tropical Cyclone Dataset

NASA

Earth science datasets and models

UNITED STATES PATENT AND TRADEMARK OFFICE
uspto

USPTO Research Dataset

USGS

Lake Michigan Substrate Prediction Dataset

Agriculture Counts

US Census of Agriculture

NAIRR Pilot Resources now available for request

Frontera – UT Austin

Anvil – Purdue

Expanse/Voyager UCSD

Delta – U. Of Illinois

Bridges 2 – U. Pittsburgh/CMU

Neocortex

Jetstream 2 – Indiana U

ACES - Texas A&M University

Summit – Oak Ridge National Lab (retired Nov 2024)

AI Testbed – Argonne NL

CloudLab

Office of Science

Vocareum

Google Cloud

OpenMined

Hugging Face

cerebras

OpenAI

SambaNova SYSTEMS

ANTHROP\C

NAIRR Pilot Resource Three-Page Proposals

- Proposals must include descriptions of real ongoing or proposed projects
- Can be **Education** or **Research**
- **See nairrpilot.org for details on eligibility, available resources, review criteria, and project expectations!**
  - Education projects require details of the course description
  - Research projects require alignment with NAIRR Pilot focus area and research justification, including a description of the technical approach
- **IMPORTANT**: Provide an estimate of the resources that the science needs to be successful
  - Measure and justify this – don't just say, "We need 10 GPUs" but give runtimes and runtime requirements that must be met for success of the project. (*Justification is expected for all OAC proposals for resources*!)

Request review and matching

How the pilot handles ~40-50 submissions that come in per month

Researcher submits 3-page resource request through NAIRR Pilot Portal.

NAIRR Pilot

Portal

Validation check
Spam, Eligibility, Completion, etc.

Independent Peer Review
Alignment with NAIRR Pilot assessed.

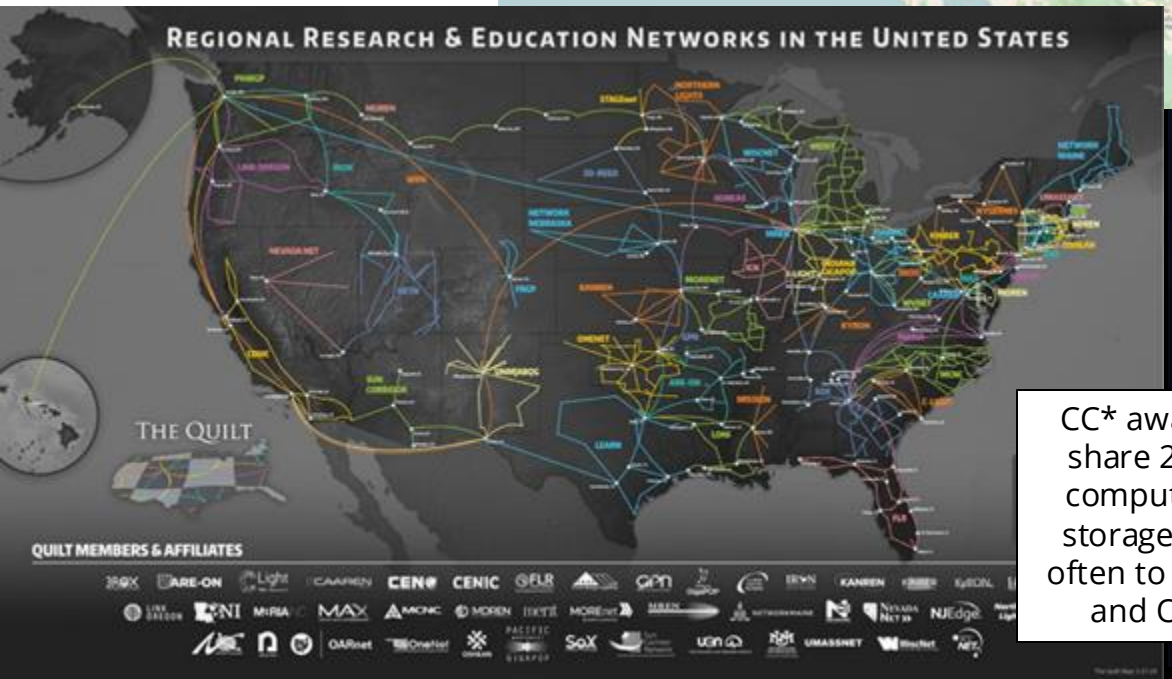
Matching Committee (include agency and private sector part
Researcher requests specific resources, but may be matched to a different one based on availability & resource provider interest.

Researcher is notified and connected with their awarded resource.

PATh

PARTNERSHIP to ADVANCE THROUGHPUT COMPUTING

Campus computing and data resources shared onto the US national cyberinfrastructure via OSG
https://path-cc.io/



CC* awardess share 20% of compute and storage, most often to OSPool and OSDF

Active and Historical CC* awardee and subawardee institutions
Not shown: Hawaii, Guam, Puerto Rico, Virgin Islands; 416 (sub)awards

Distributed shared resources to accelerate research and education

https://nrp.ai/

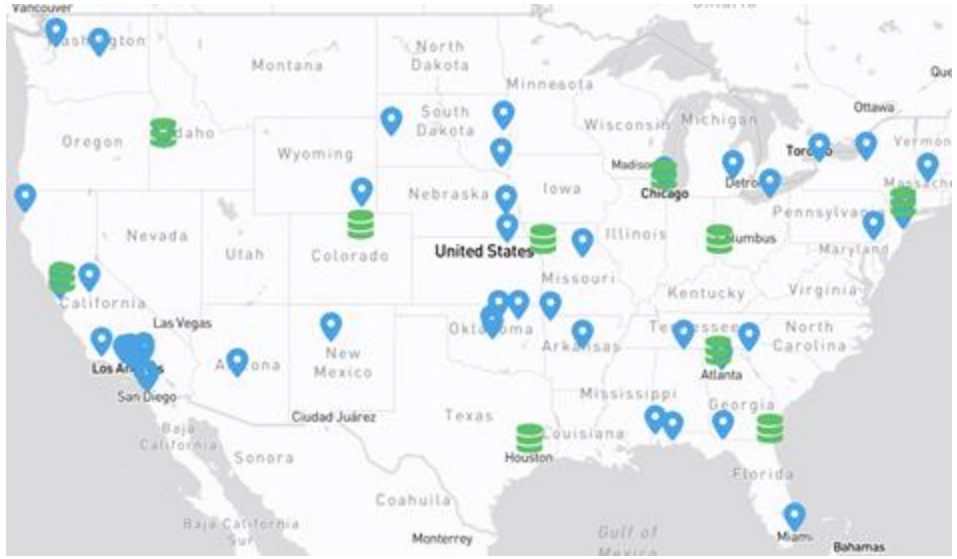
NRP provides access to cutting-edge technologies in AI, high-performance computing, data storage, and networking.

Artificial Intelligence	Conduct AI research, education, classes, and workshops empowered with GPUs, FPGAs, and specialized hardware for advanced AI projects.
Resources for the Classroom	Access GPUs, CPUs, and storage via convenient interfaces like JupyterHub, Coder & LLM service
Advancing AI Infrastructure Ownership	NRP aggregates system & cybersecurity management, and research & educational computing support for non-R1 institutions
Large Data Pools	Share and access your data on NRP's nodes across the world for experiments.

NRP users are students, educators, and researchers from 2-yr and 4-yr institutions, museums, libraries, and healthcare centers,

NRP offers to operate your AI equipment in your data center, thus reducing your TCO of your AI Infrastructure investment

Led by UC San Diego, the U Nebraska-Lincoln, and the Massachusetts Green High Performance Computing Center. Supported by NSF with resource contributions from over 50 institutions.



439 NRP nodes at 84 organizations, including 21 Points of Presence and 6 international sites, representing over 1,400 GPUs and 20PB of storage.

To learn more, check out our training series 9/2 – 9/30
https://nrp.ai/training/

NAIRR Pilot Classrooms

NRP NATIONAL RESEARCH PLATFORM

NRP is a platform for collaborative innovation

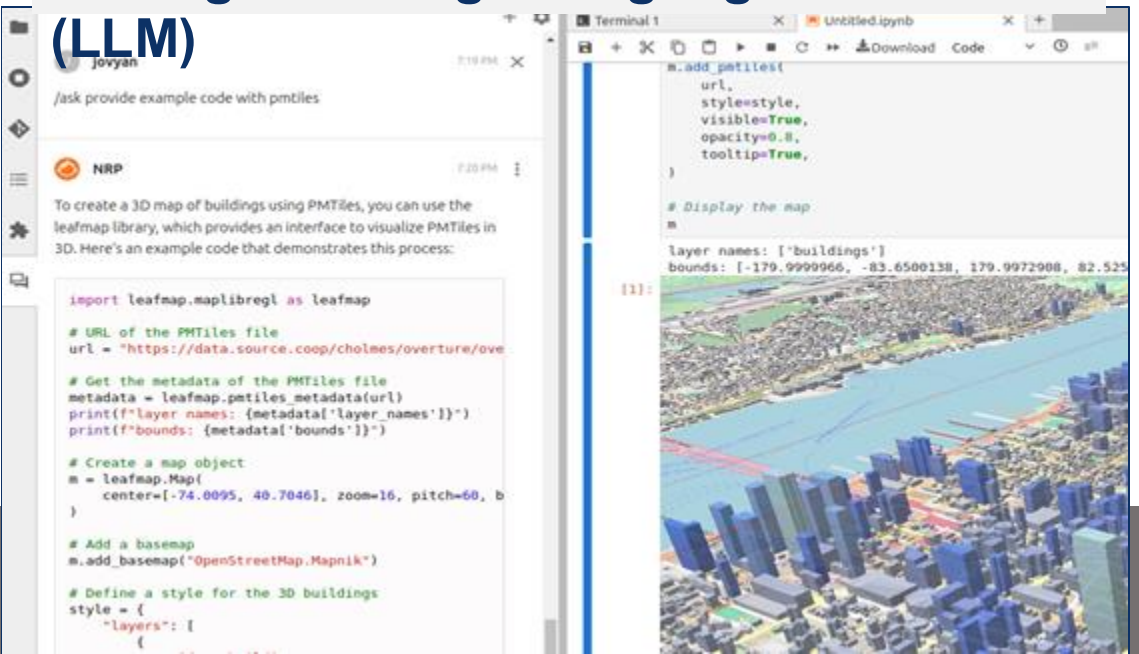
- **Shared** hardware, software and models
- ❑ Students use Jupyter notebooks
- ❑ Wide variety of GPUs □ suitable for classrooms

Supporting
15 NAIRR Pilot Classrooms

Classroom of **Carl Boettiger**
University of California, Berkeley

- 122 students
- Active learning classroom (NAIRR240249)

Coding with Large Language Models (LLM)



Preparing students for the AI-driven future

- Hosting open LLM models locally
  - □ ensures data security and privacy
- Integrated AI with Jupyter notebook
  - □ code assistant
- Enables students and researchers to easily build applications using LLMs

CA 30x30 Planning & Assessment Prototype using NRP LLMs
https://huggingface.co/spaces/boettiger-lab/ca-30x30

UC San Diego

CC* Planning: South Florida Regional Data Science Cyberinfrastructure

- Regional Partnerships for science and cyberinfrastructure engagement
- Shared Resources across Common Goals
- Future Expertise building
- Economic Innovation
- Repurposed Tools and Knowledgebase

NSF OAC Award #2346318

NV-DICE: Nevada Vision for a co-Developed Impactful Cyberinfrastructure Ecosystem

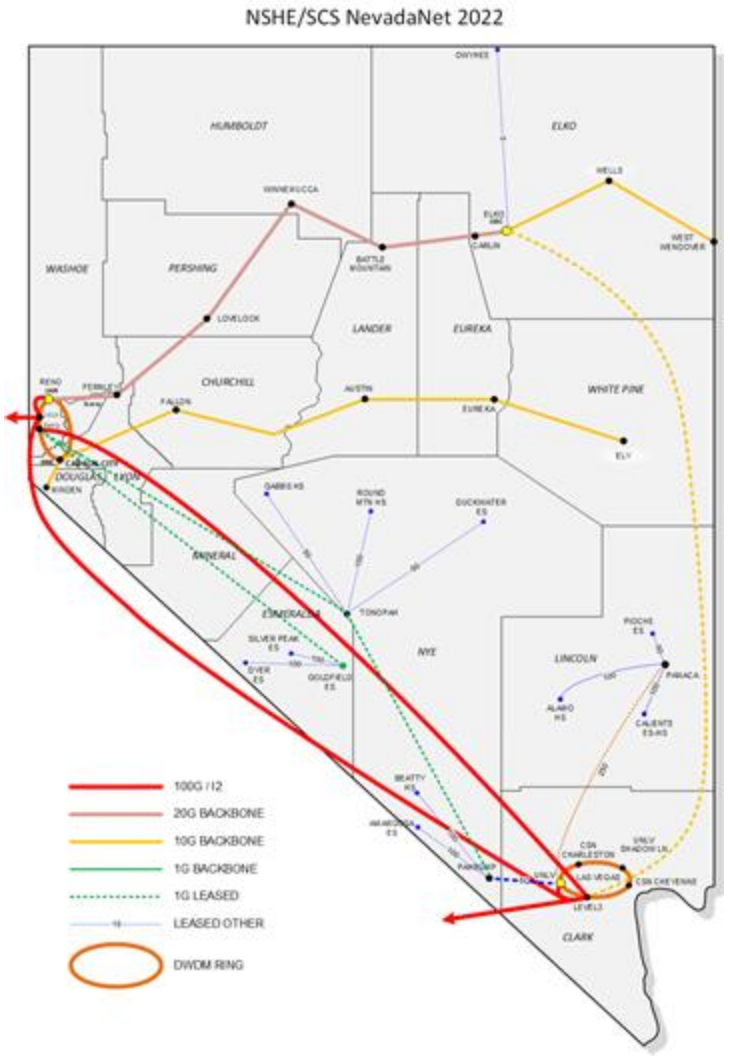
Challenge Project Seeks to Address:
Planning Research IT for Nevada

- One System, several Institutions
- Historical lack of IT investments
- Leveraging the REN as neutral territory
- Need for RCD community of practice
- Need to assess needs & capabilities

Solution(s) or Deliverables:
Strategic framework

- Statewide RCD professional Office Hours
- Planning workshops
- Institutional reviews/surveys
- Institutional CI Plans
- State CI Plan
- Pilot cooperative technology (IAM, research network, dev environments)

Scientific Impact and Broader Impact: *Focus on Team Science*



NSF OAC Award #2346263

CC* Regional Computing: CENVAL-ARC: Central Valley Accessible Research and Computational Hub

Challenge Project Seeks to Address:

Empowering researchers and students from underserved Institutions in California's Central Valley by providing cutting-edge computational resources and expertise.

Solution(s) or Deliverables:

- Adding compute capacity
- CENVAL-ARC symposium

NSF OAC Award # 2346744

UCMERCED
CENVAL-ARC
Central Valley Accessible Research and Computational Hub

When it all works together…

Dynamic CI discovery pathways at scale

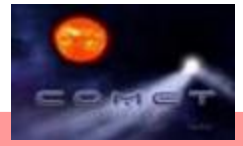
Gravitational wave detection enabled by NSF investments across the CI ecosystem

einstein toolkit

Pegasus

globus

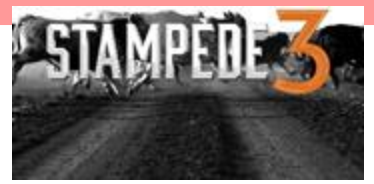
ACCESS Advancing Innovation
ALLOCATIONS SUPPORT OPERATIONS METRICS



PATh PARTNERSHIP to ADVANCE THROUGHPUT COMPUTING

NRP NATIONAL RESEARCH PLATFORM

Jetstream2



Open Science Data Federation OSDF

INTERNET2

✓**Researcher access to sustained Advanced Computing resources**

- New intensive simulations of relativity and magnetohydrodynamics. Massive, parallel event searches and validation (100,000 models).
- Advanced computing resources and services sponsored by NSF, DOE, and commercial cloud services.

✓**Interoperable Networking, Data Transfer, & Workflow Systems**

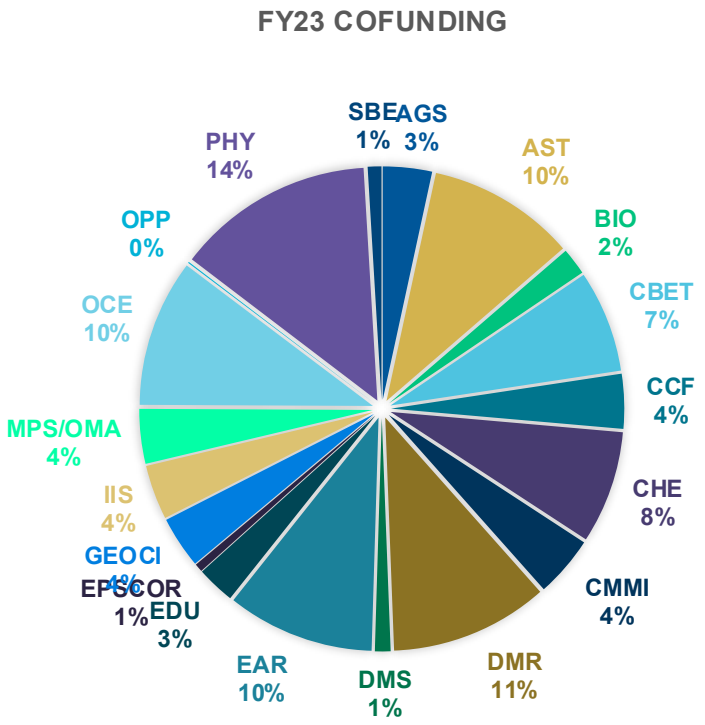
- Pegasus, HTCondor software on PATh/OSG, Globus workflow and data transfer management
- NSF CC* funded 100 Gbps upgrades enabled huge throughput gains.

✓**Software Infrastructure**

- Computational science advances embodied in Software Infrastructure, for simulations, visualizations, workflows and data flows

Cyberinfrastructure for Sustained Scientific Innovation (CSSI)

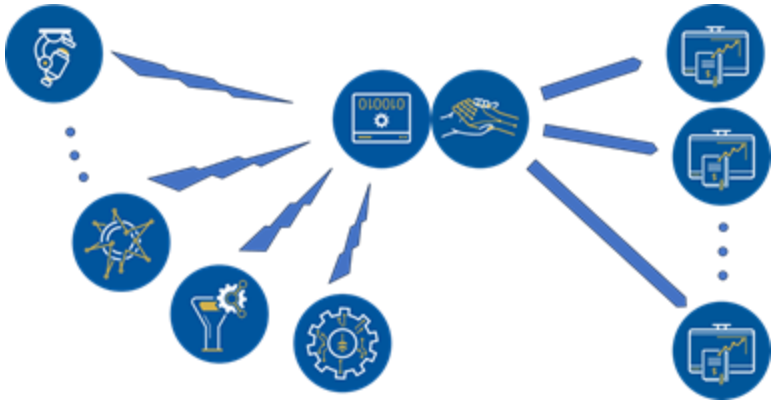
- Development and deployment of robust, reliable and sustainable **data and software** cyberinfrastructure
- Innovative capabilities towards sustained scientific innovation and discovery in **one or more areas of science and engineering**.
- Provides a **cross-directorate** opportunity to advance common approaches to sustain and innovate research cyberinfrastructures
- Deadline December 1, 2025



Project Class	Description
Elements	Small groups. (Awards <= $600K, up to 3 years)
Framework Implementations	Larger, interdisciplinary teams, resulting in a sustainable community framework. (Awards between $600K - $5 Million, between 3-5 years)
Transition to Sustainability	A well-defined sustainability plan for long-term impact. (Awards <= $1M, <2 years)

NSF Integrated Data Systems & Services (IDSS)

Support for operations-level national scale systems and services that advance and facilitate open, data intensive, and artificial intelligence-driven science and engineering research, innovation, and education.



- Connect data sources with AI/analytic environments and data-intensive workflows
- Manage the data lifecycle at a national scale
- Does not support permanent long-term storage, curation of research data, or projects that focus on a single science domain or application

Category I: National-scale systems and services ($10M to $30M for up to 5 years)

Category II: Transition of regional/pilot to national-scale ($9M for up to 3 years)

Category III: Planning grants ($500,000 for up to 2 years).

Deadline December 4, 2025

- The National Artificial Intelligence Research Resource (NAIRR) Pilot is a pioneering public-private initiative to catalyze a competitive national AI ecosystem
- NAIRR-OC will serve as a lean and sustainable operations capability
- NAIRR-OC will be the focal point for operational transition from the current Pilot
- Goals: build organizational leadership; build NAIRR capabilities and community; and interface with Pilot operations
- One award up to $35M 5 years; LOI due Dec. 15, 2025; Proposal Feb 4, 2026
- **Webinar 9/23 – https://www.nsf.gov/events/nsf-nairr-oc-solicitation-webinar**

- Single class of projects with a maximum budget of up to $1M and up to 4 years
- Target dates only – no deadline
- A broad set of areas
- More information via email
- See the solicitation for area details and email addresses: Google “nsf cise future core” or “nsf 25-543”

Cybersecurity Innovation for CyberInfrastructure (CICI)

Mission:

support trustworthy scientific discovery and innovation by enhancing the

security and privacy of *scientific cyberinfrastructure*.

CICI cybersecurity innovations should be tailored for scientific cyberinfrastructure and enable trustworthy reproducible science

Four Program Tracks

- Usable and Collaborative Security for Science (UCSS)
- Reference Scientific Security Datasets (RSSD)
- Transition to Cyberinfrastructure Resilience (TCR)
- Integrity, Provenance, and Authenticity for Artificial Intelligence Ready Data (IPAAI)

Program Solicitation NSF 25-531
Next Deadline: January 21, 2026
Third Wednesday in January, Annually Thereafter

- Prepare, nurture, and grow the national scientific *research* workforce for *creating and utilizing* advanced cyberinfrastructure
- Deadline third Thursday in January annually

Contributors who develop new capabilities

Users who are Researchers and Educators who exploit new capabilities

Findable Accessible Interoperable Reusable Open Science (FAIROS) Program Solicitation (NSF 25-533)

Supports sustainable open science and data management by advancing research, education and cyberinfrastructure while encouraging collaboration and reducing barriers to data sharing.

- Advance sustainable multi-disciplinary research data management (RDM) and open science ecosystem.
- Advance FAIR data portals, metadata standards, research data commons, and RDM in advancing open science.
- Lower barriers to accessing, managing, sharing, and storing data within and across multiple disciplinary domains, irrespective of data size.

Includes two research tracks of focus: 1. *Disciplinary Improvements* or 2. *Cross-Cutting Improvements*

Supported by multiple NSF Directorates

Award size: up to $600k for up to 3 years
Deadline: April 8, 2026, Second Wednesday in April, Annually Thereafter
https://www.nsf.gov/funding/opportunities/fairos-findable-accessible-interoperable-reusable-open-science

Questions and Discussion