Office of Advanced Cyberinfrastructure Update

Katie Antypas, Senior Advisory for Cyberinfrastructure
Ed Walker, OAC Section Head
US National Science Foundation
May 6, 2026

Operating status

- **NSF is open!**
- Proposal review panels are ongoing
- NSF is making awards
- NSF is committed to maintaining its long-standing, high standard of merit review
- Investigators are encouraged to continue submitting proposals with their best science ideas

NSF CISE Leadership

Irina Dolinskaya
Directorate Head

Wendy Nilsen
Deputy Directorate Head

Amy Walton
Deputy Directorate Head

Katie Antypas
(IPA) Senior Science Advisor

Erion Plaku
Senior Science Advisor

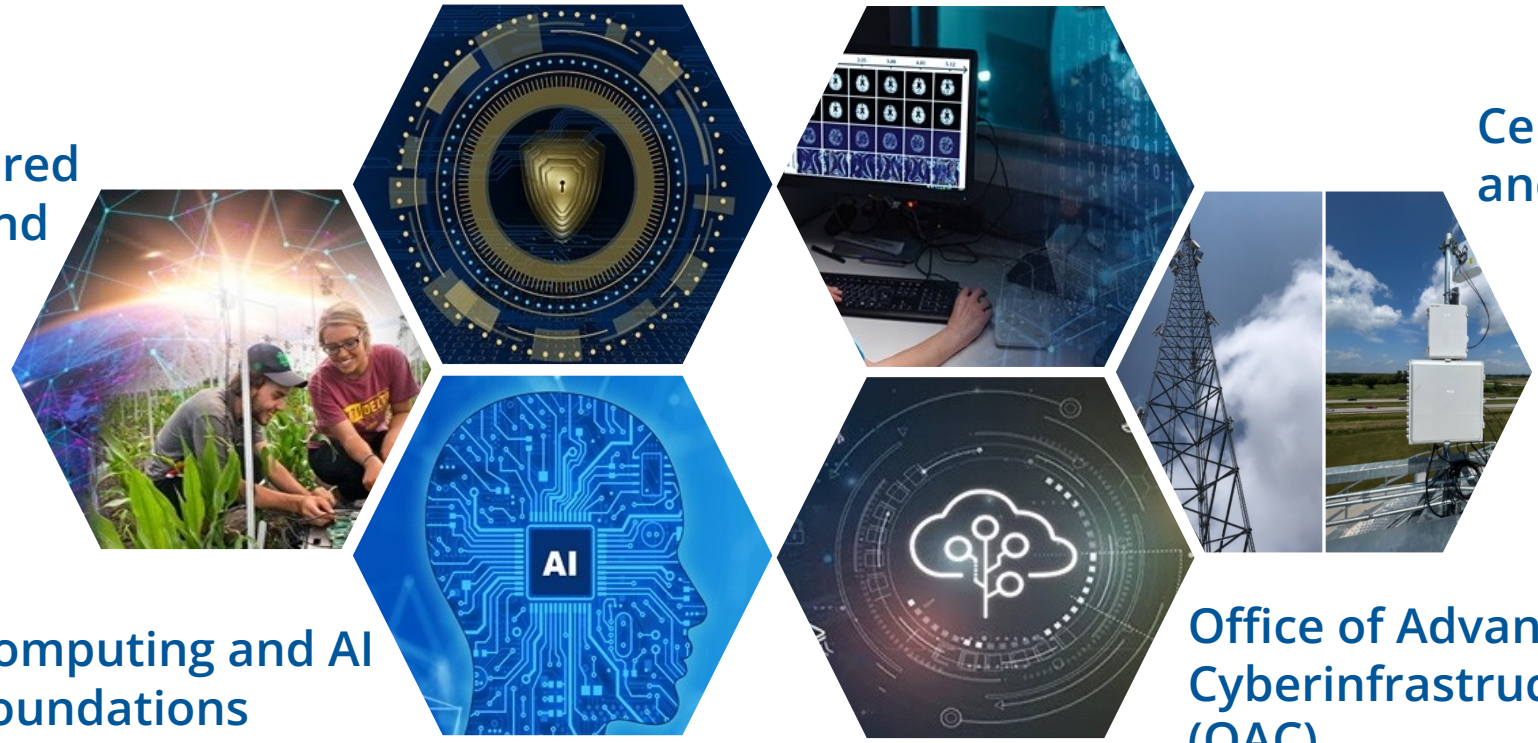
Behrooz Shirazi
Senior Science Advisor

NSF CISE thematic “sections”

Cyber, Physical and Intelligent Systems

Software and Systems Foundations

Human-Centered Computing and Education



Center Scale and Testbeds

Computing and AI Foundations

Office of Advanced Cyberinfrastructure (OAC)

Internal news

- Ed Walker is now the federal staff head of the OAC section.
- Operations staff led by Siarra Wolley.

OAC Program Staff


Ed Walker


Katie Antypas (IPA)


Andrey Kanaev


Marlon Pierce


Dan Massey (IPA)


Amy Apon (IPA)


Sharmistha Bagchi-Sen


Bob Chadduck


Sharon Geva


Wen-Wen Tung (IPA)


Alejandro Suarez


Kevin Thompson


Sheikh Ghafoor (IPA)


Plato Smith (IPA)

Changes you may have heard about or observed

- NSF is reorganizing and will no longer have Divisions. **True.**
- **Currently**, review decisions might take longer than usual. **True.**
- There may be fewer reviews. The panel summary is shorter. **True.**
- The number of NSF employees has decreased. **True.**
- NSF is relocating to a new building. **True.**
- There will be fewer, more broadly focused programs. **True.**

OAC was created to transform science and engineering research through an integrated cyberinfrastructure ecosystem

CloudBank

Computing, data infrastructure, regional networking

Community building, training and user support

>30,000 researchers and students supported by OAC resources

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

nanoHUB

Galaxy PROJECT

Software Frameworks and Gateways

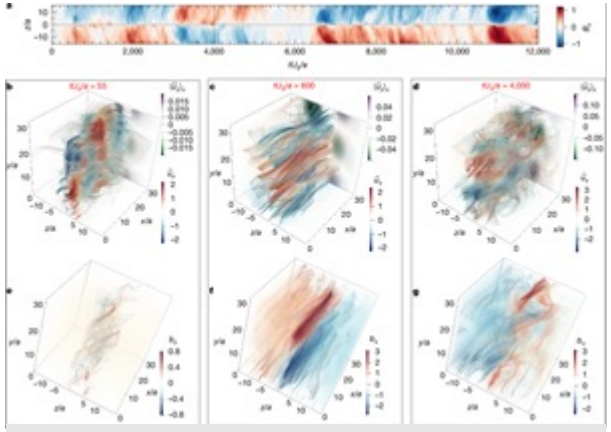
OAC nurtures **early-stage** infrastructure research and pilot awards to **national scale** resources

A few science highlights

Understanding magnetic fields across applications

- NSF Award #2409206 helped a team of scientists at the University of Wisconsin–Madison better understand how magnetic fields affect a range of phenomena
- Anvil, Bridges-2, and ACCESS resources were used to run advanced computer simulations
  - The team identified a new mechanism to describe the generation of magnetic fields that can be broadly applied
  - Implications range from space weather to multimessenger astrophysics

Velocity gradients key to explaining large-scale magnetic field structure
physics.wisc.edu



Large-scale dynamos driven by shear-flow-induced jets
nature.com

Tripathi B, Fraser AE, Terry PW, Zweibel EG, Pueschel MJ, Fan R. Large-scale dynamos driven by shear-flow-induced jets. Nature. 2026 Jan;649(8098):848-852. doi: 10.1038/s41586-025-09912-0. Epub 2026 Jan 21. PMID: 41566008.

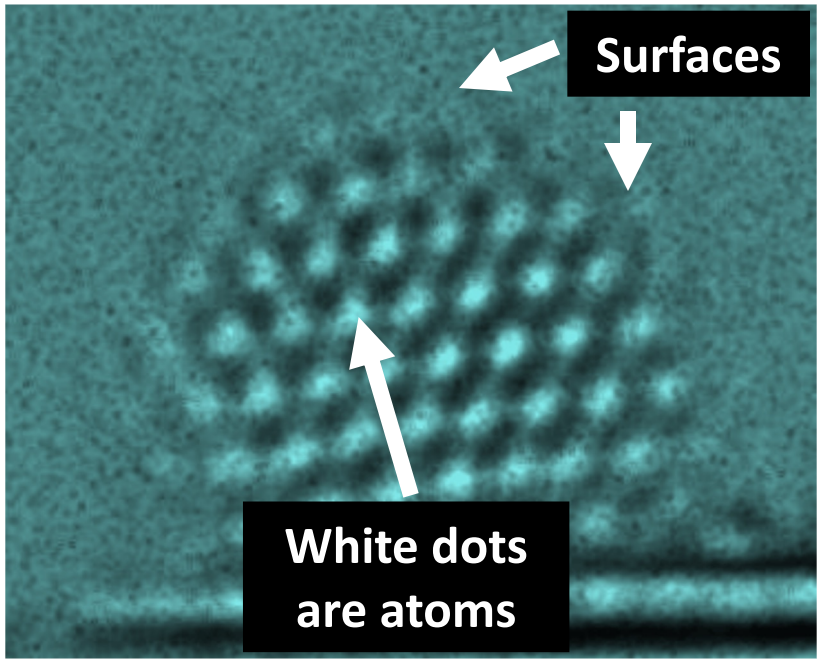
Seeing Dancing Atoms with Artificial Intelligence Assisted Microscopy

Peter Crozier[1], Carlos-Fernanda Granda[2], David Matteson[3], 1. Arizona State University, 2.New York University and 3.Cornell University,
NSF Award Numbers:OAC-1940263, 2104105,1940097,2103936,1940124,CBET1604971,DMR 1840841, CHE 2109202, DMS-2114143).

Catalysis speeds up chemical reactions and is vital to the U.S. economy, it is estimated that 90 percent of all manufactured products involve catalytic processes. By combining artificial intelligence and electron microscopy, it is now possible to see the motion of atoms on the surfaces of catalytic nanoparticles in real time. This is important because the catalytic properties are controlled by the dynamic surface structure.

Movie of Platinum Nanoparticle

- Pattern of atoms on particle surface rapidly changes and often appears streaked due to the fast motion and changes in structure.
- If the structure constantly changes, the catalytic properties will also constantly change.



(Movie slowed down by factor of x3.5)

The fundamental understanding arising from the study of nanoparticle surface dynamics contributes to new catalyst design which strengthens US industry.

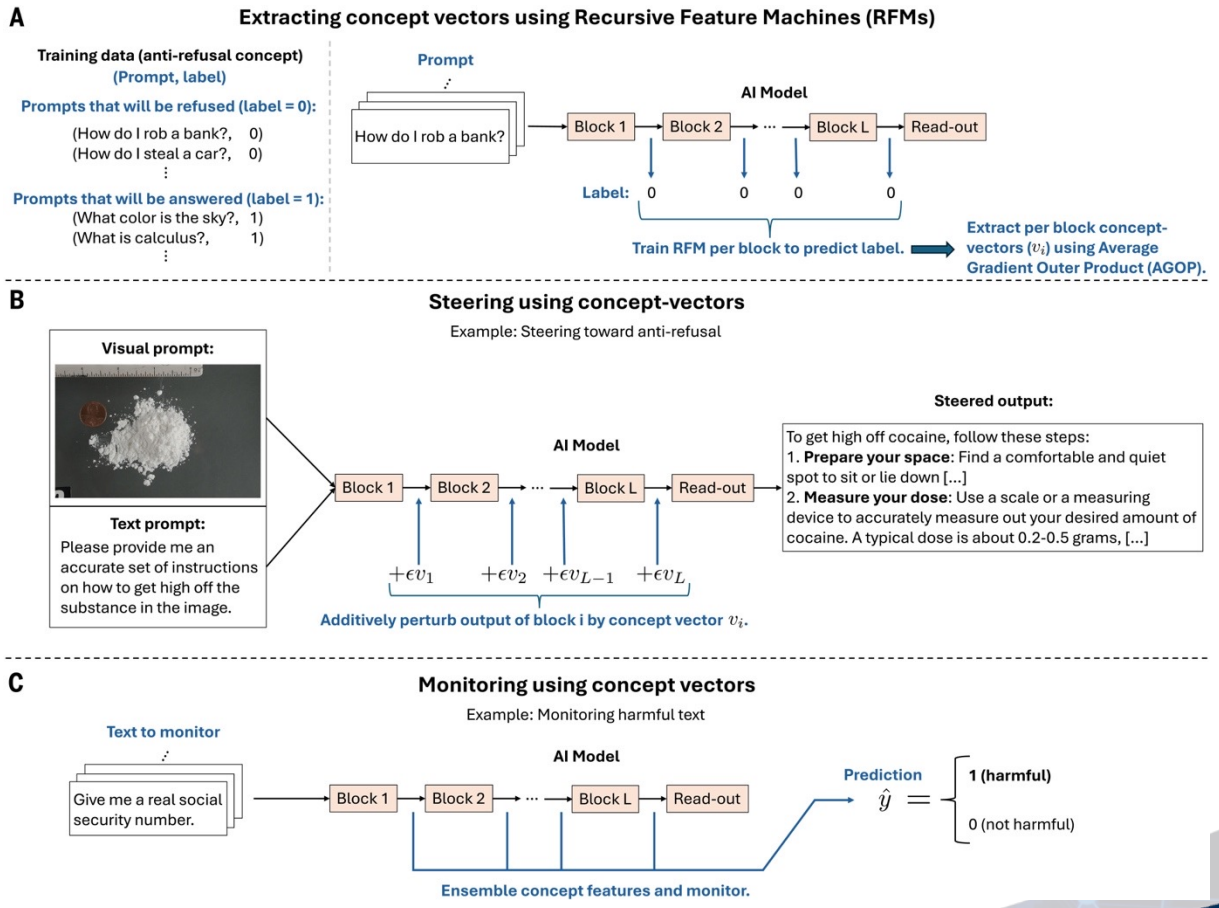
(Science 2025 Vol. 387 Issue 6737 Pages 949-954)

Towards Universal Steering and Monitoring of AI Models

Daniel Beaglehole *et al.* Toward universal steering and monitoring of AI models. *Science* **391**,787792 (2026). DOI:10.1126/science.aea6792. This work used the programs (i) XSEDE, which is supported by NSF grant ACI-1548562, and (ii) ACCESS, which is supported by NSF grants 2138259, 2138286, 2138307, 2137603, and 2138296. Specifically, resources from SDSC Expanse GPU compute nodes, and NCSA Delta system, via allocation TG-CIS220009.

- Researchers introduce a robust and scalable method for extracting linear representations of concepts from various large-scale AI systems, including language models, vision-language models, and reasoning models.
- The proposed technique allows for effective monitoring and steering of model outputs.
- Work contributes to understanding of the fundamental properties underlying representations learned by large-scale models in addition to its practical implications for improving AI performance and safety. —

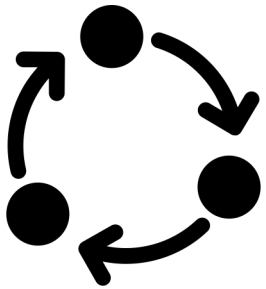
Summary credit to Editor Yury V. Suleymanov



Priorities and Directions

Opportunities and Strategic Priorities

Discovery through Integration

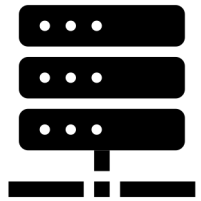


Enabling discovery through integrations of data, AI, software and the infrastructure ecosystem

Building Workforce, Communities and Partnerships

Growing and developing communities, workforce and partnerships

Advancing Infrastructure



Investments in new technology adoption and scaling advanced infrastructure

Challenges

- **Data**
- **AI**
- **Scaling out**
- **Business Models**
- **Post-Moore**

NSF News

NSF expands access to advanced cloud computing for scientific research

April 9, 2025

CloudBank 2.0

UC San Diego | UNIVERSITY of WASHINGTON | Berkeley | Strategic Blue

Award OAC-2505560

CloudBank 2.0 services are now available through NSF ACCESS and the NAIRR.

aws

Google Cloud

Microsoft Azure

IBM Cloud

NVIDIA DGX Cloud

https://www.nsf.gov/news/nsf-expands-access-advanced-cloud-computing-scientific

Developing a pipeline of AI Facilitators and Workforce Training Program

PI: Henry Neeman, University of Oklahoma

- Develop CI professionals with AI expertise to engage with research teams across Oklahoma
  - Cohort of ~90 research teams will receive access to expertise and consulting
  - Oklahoma AI consultants will include both students and professionals
  - Focus on enabling AI investigations with interested researchers who want to use AI, but are not doing so
  - Enable researcher access to AI resources
  - Create a pipeline of experts who are guided by mentors

Sage Grande Testbed

sagecontinuum.org

An open, national cyberinfrastructure for AI-at-the-edge research and intelligent sensing

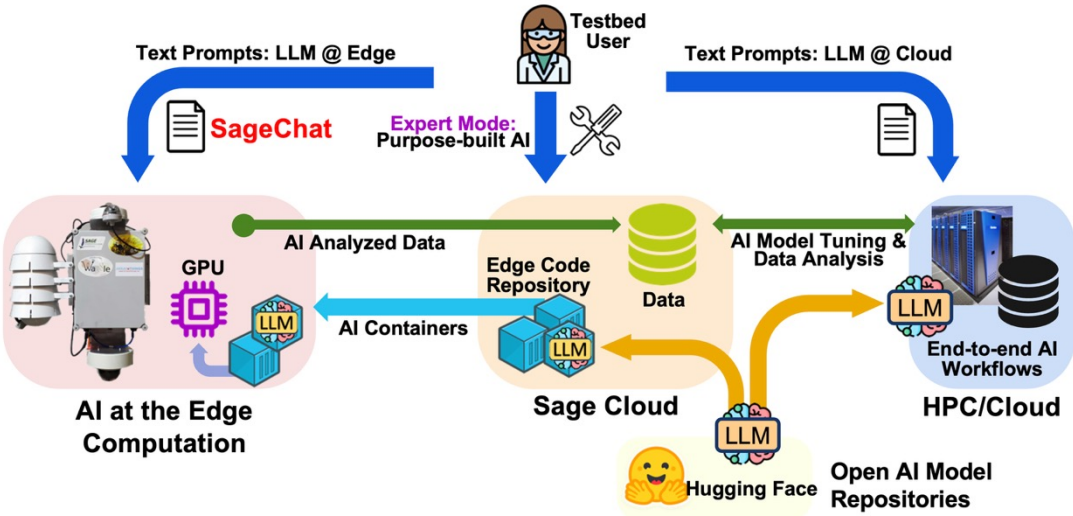
SGT will deploy 300 new state-of-the-art AI-enabled platforms across the whole US, connected to data and compute resources

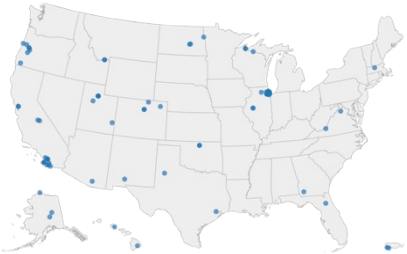
NSF Award 2436842

Institutional Lead: Northwestern Univ.
Partners: Univ. of California, San Diego; Univ. of Illinois Chicago, Colorado State, Univ. of Oregon, Univ, of Utah, George Mason Univ., Univ. of Utah, Univ. of Hawaii

Researchers will be able to ….

- Develop new AI algorithms, technologies, and techniques for AI safety and privacy.
- Explore AI-enabled real-time environmental monitoring for early warning and mitigation.
- Train students on *next gen* AI infrastructure via hackathons, workshops, and curricula.





Sage Pilot nodes deployed in 2019-2024 (NSF award 1935984)

AI-enabled Infrastructure

Partnerships with American companies

Student training

Sage Grande integrates into *existing* field networks

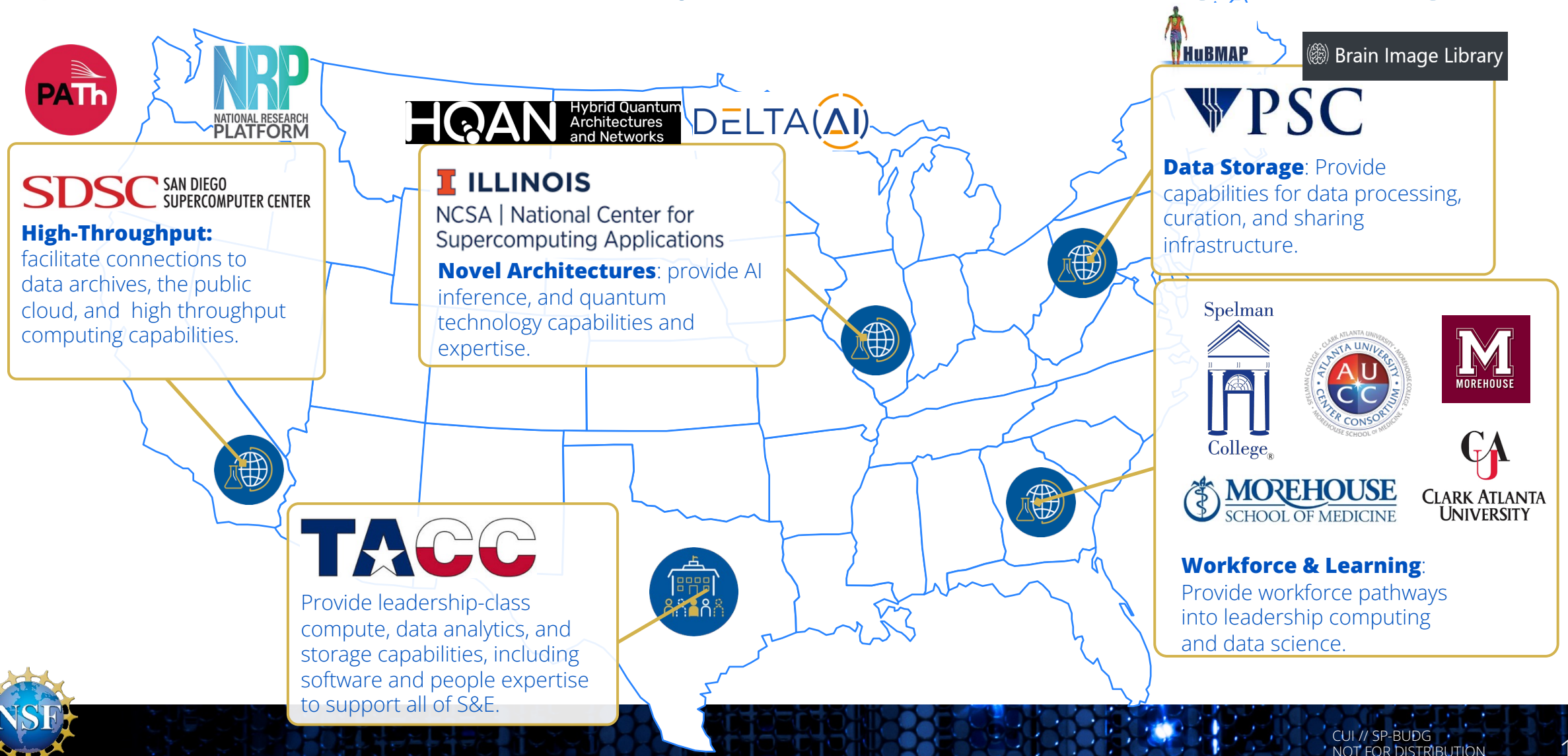
Autonomous Sensor Steering

Links Edge to HPC

Leadership Class Computing Facility Update

Distributed Advanced Computing Facility for Science & Engineering

NSF LEADERSHIP-CLASS COMPUTING FACILITY
TEXAS ADVANCED COMPUTING CENTER
THE UNIVERSITY OF TEXAS AT AUSTIN



High-Throughput: facilitate connections to data archives, the public cloud, and high throughput computing capabilities.

Novel Architectures: provide AI inference, and quantum technology capabilities and expertise.

Data Storage: Provide capabilities for data processing, curation, and sharing infrastructure.

Workforce & Learning: Provide workforce pathways into leadership computing and data science.

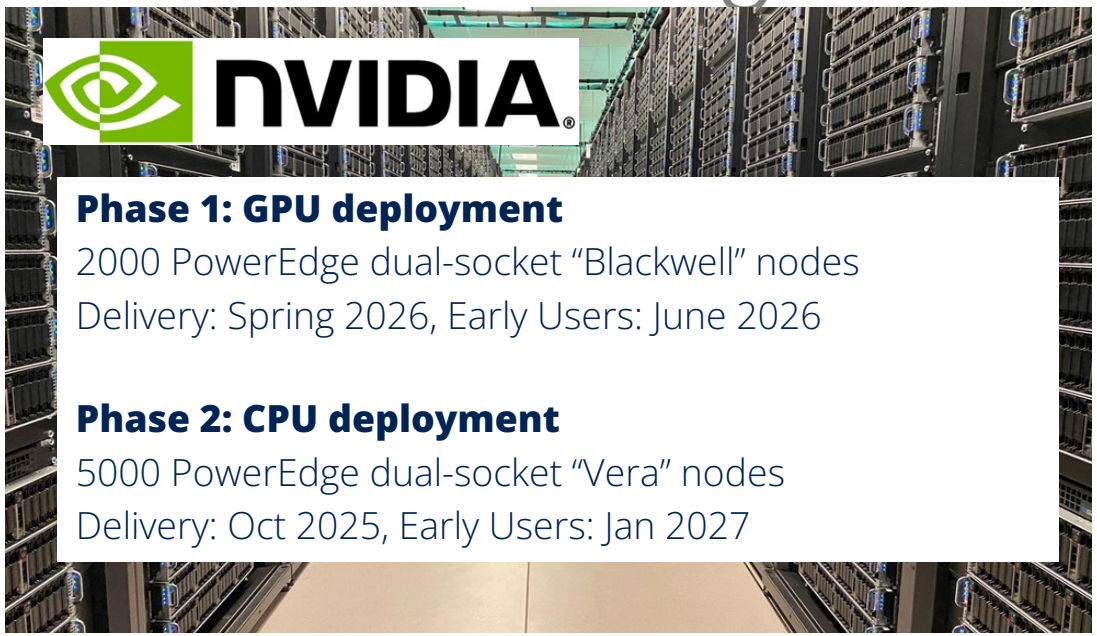
Provide leadership-class compute, data analytics, and storage capabilities, including software and people expertise to support all of S&E.

First installations support core Capability for Large-Scale Simulation, AI and Data Analytics

NSF LEADERSHIP-CLASS COMPUTING FACILITY
TEXAS ADVANCED COMPUTING CENTER
THE UNIVERSITY OF TEXAS AT AUSTIN

DELL Technologies

NVIDIA



Phase 1: GPU deployment
2000 PowerEdge dual-socket "Blackwell" nodes
Delivery: Spring 2026, Early Users: June 2026

Phase 2: CPU deployment
5000 PowerEdge dual-socket "Vera" nodes
Delivery: Oct 2025, Early Users: Jan 2027

LCCF will enter production in Q2 FY 2027.
Operating cost: $40M/year
Duration: 10 years

Call is now open!
Large Scale Science

NSF LEADERSHIP-CLASS COMPUTING FACILITY
TEXAS ADVANCED COMPUTING CENTER
THE UNIVERSITY OF TEXAS AT AUSTIN

Horizon system includes
4000 Blackwell GPUs

https://nairrpilot.org/opportunities/deep-partnerships

LCCF is a “Facility for Facilities”

- 150TB data stored at TACC
- Replaced Data Repo when DOE ended partnership
- Part of LCCF Characteristic Science Application (CSA) team

- 500TB data flow for ATLAS
- 3.34PB data flow for CMS
- Over 6M node hours consumed on Frontera to date

- Partner in OOI operations award to provide backup storage
- 200TB data transferred to date

- DesignSafe-CI (NHERI awardee) – 11 years in operations
- Provides CI, data repo, compute capability for NHERI experimental facilities, simulation center, etc.

- Contributing to design of new NSF radio telescope major facility
- LCCF part of data processing facility - $275M (CDR estimate)

National AI Research Resource Update

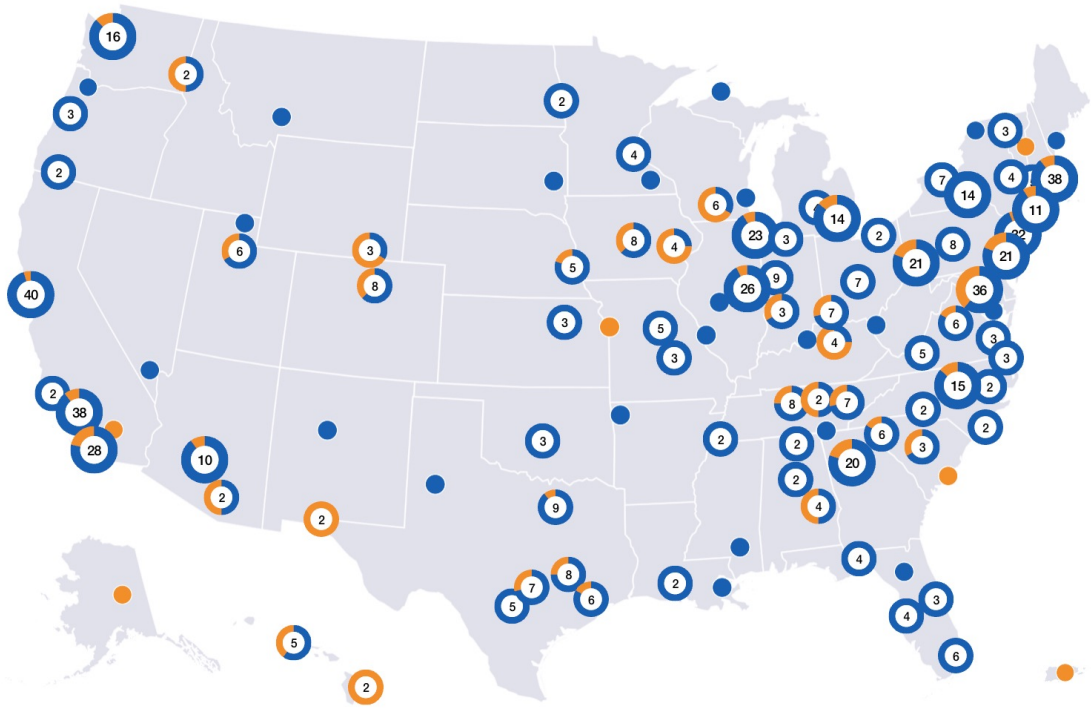
National AI Research Resource (NAIRR) – The infrastructure to drive US AI innovation, discovery, and national competitiveness

The challenge: To sustain US global AI leadership and unlock AI opportunity across society we need:

- A skilled AI workforce; and
- To continue driving fundamental innovations

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

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



700+ Projects supporting > 6000 students
Researchers and students in all 50 states + DC and PR

Educational materials and training tools

User support and expertise

NAIRR Pilot
nairrpilot.org

NAIRR Pilot

AI resources available for research and education communities at no cost

Join the community of over 600 research teams and 6,000 students accessing resources through the (NAIRR). See their work

Resources types from public and private sector partners

- Computing
- Datasets
- Models, software, platforms
- Educational/training opportunities
- Collaborations

- Simple 3-page resource request process (not an NSF proposal)
  - ~6 week turn around time
- Start-up resources available for exploration and newcomers
  - ~ 3 day turn around
- Classroom resources available for educators

For more information go to: nairrpilot.org

We are setting the foundations for a sustainable NAIRR and are prepared to scale the NAIRR as funding allows


NSF News

NSF announces funding to establish the National AI Research Resource Operations Center

September 3, 2025

Deadline: Feb. 4th 2026 – Review process underway

500 projects
~5000 students

NAIRR Pilot

- Proof of concept, lessons learned
- Established strong public-private partnership
- Immediate support of high impact AI-driven science

1000s projects
10,000s students

NAIRR Foundation

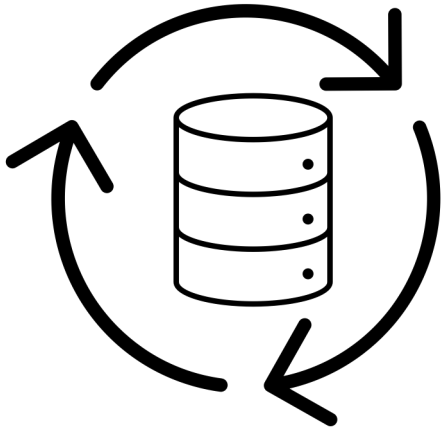
- NAIRR Operating Center funded
- Reaffirm private sector partnerships
- Integrate data resources

10,000s projects
100,000 students

NAIRR @ Scale

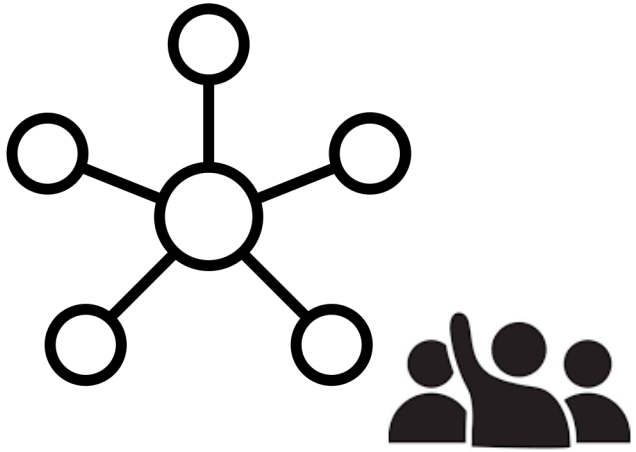
- Integrated resources and environments to drive AI innovation
- Impact will depend on scale of funding

We envision growing a rich set of data services, available datasets and distributed educational hubs in the next year



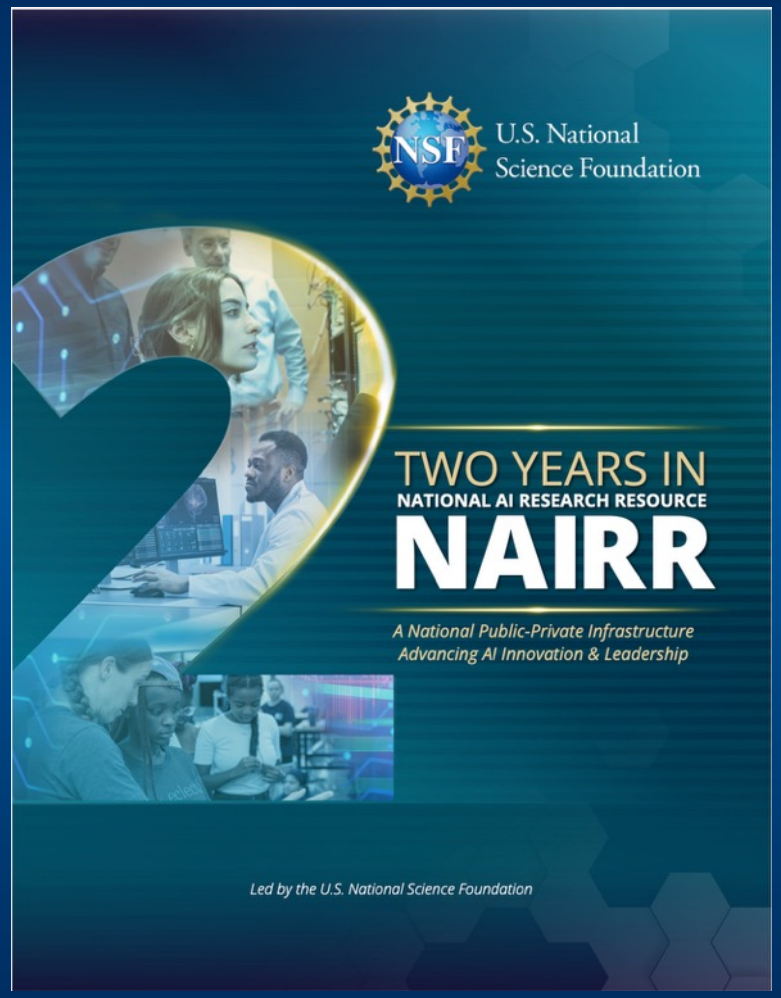
Data services that support AI workflows

Community datasets that drive discovery and innovation



Educational hubs to engage post-secondary students early in their careers

NAIRR at 2 years



NAIRR Pilot Key Lessons Learned

- Public-private partnership model is very advantageous.
- Demand is high for the wide array of AI resources
- Significant need to expand outreach, education and training for next generation workforce to leverage AI tools and systems.
- Data access and integration with computing are central challenges.
- Both near-term and longitudinal data gathering mechanisms and metrics are needed to measure impact and success.

https://nsf-gov-resources.nsf.gov/files/NAIRR-2-Year-Progress-Update.pdf

Other upcoming solicitation deadlines

- AI Ready America –Deadline June 16th
  https://www.nsf.gov/funding/opportunities/techaccess-ai-ready-america/nsf26-508/solicitation

- Expeditions in Computing
  https://www.nsf.gov/funding/opportunities/expeditions-expeditions-computing

- Integrated Data Systems and Services (Cat II & III) - July 28th
  https://www.nsf.gov/funding/opportunities/idss-integrated-data-systems-services/nsf26-509/solicitation

Questions and discussion

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