



Computer and Information Science and Engineering (CISE) Directorate Overview

Board on Physics and Astronomy

2024 Spring Meeting

National Academies

May 7, 2024

Dilma Da Silva

Acting Assistant Director

Presenter:

Siddiq Qidwai

Acting Deputy Division Director

CISE Organization and Core Programs

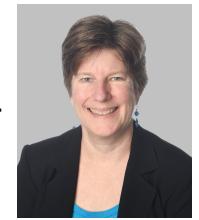
Katie Antypas
Office Director



Amy Walton
Deputy Office
Director



Ellen Zegura
Division Director



Behrooz Shirazi
Deputy Division
Director



Office of Advanced Cyberinfrastructure (OAC)

- Data/Software
- Leadership and Advanced Computing
- Networking/Cybersecurity
- Learning and Workforce

Computing & Communication Foundations (CCF)

- Algorithmic Foundations
- Communications and Information Foundations
- Software and Hardware Foundations
- Foundations of Emerging Technologies

Irina Dolinskaya
Acting Division
Director



Siddiq Qidwai
Acting Deputy
Division Director



Michael Littman
Division Director



Wendy Nilsen
Deputy Division
Director



CISE Leadership



Dilma Da Silva,
Acting Assistant Director



Joydip Kundu,
Deputy Assistant Director

- Computer Systems Research
- Networking Technology and Systems
- Education and Workforce Development

Computer & Network Systems (CNS)

- Human-Centered Computing
- Information Integration and Informatics
- Robust Intelligence

Information & Intelligent Systems (IIS)



CISE by the Numbers

NSF funds **80%** of federally-funded CS research in the US at academic institutions.



\$1,035.9 M
FY2023 enacted budget

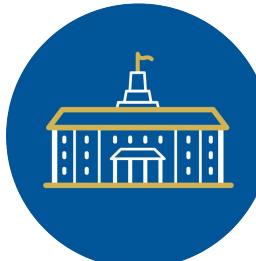


6,401
Proposals evaluated



1,847
Awards made

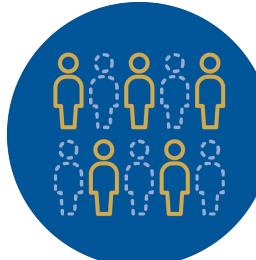
29%
Funding rate



371
Institutions supported



6,647
Grad students



21,623
Individuals from senior researchers to undergrads



48 states
+ D.C.
+ 1 territory



89
Minority-serving Institutions



62
Institutions funded in EPSCoR states

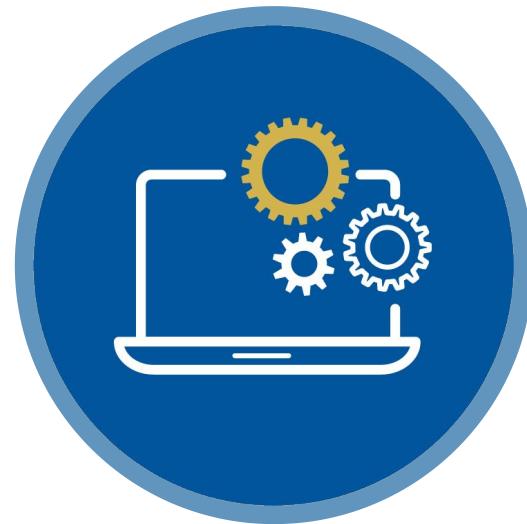
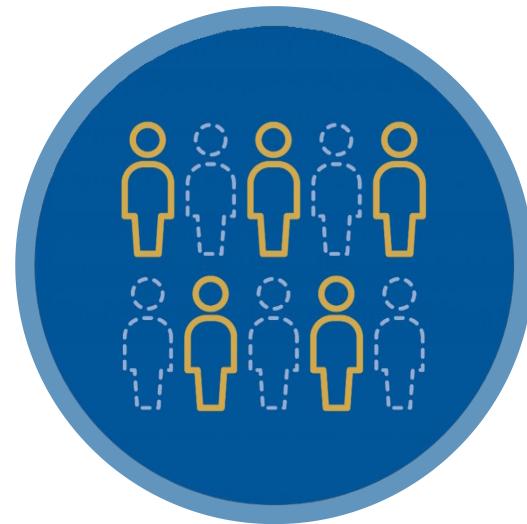


All data depicted is for fiscal year 2023.

NSF Budget Status

- **FY2023**
 - \$9.88 Billion
 - 12% increase with \$1B provided through disaster relief supplement
- **FY2024**
 - The budget (almost): \$9.06 B
- **FY2025**
 - President's budget request released on 3/11: \$10.18 B
- **CHIPS and Science Legislation (2022)**
 - \$80 billion over 5 years, in authorization language for NSF
 - \$200 million over 5 years, in appropriations language for semiconductor workforce





NSF's STRATEGIC THEMES

**Advancing
Emerging
Industries for
Economic and
National Security**

**Creating
Opportunities
Everywhere**

**Building a
Resilient
Planet**

**Strengthening
Research
Infrastructure**



CISE Overarching Technical Themes



CISE in a Post-Moore's Law
World: Seismic Shift



Transcendence of Artificial
Intelligence: AI for Everyone



Designing Beneficial
Sociotechnical Systems

CISE program portfolio

Recently released programs of interest



National AI Research Institutes

- NSF has funded **25 multi-organization AI Institutes**
- **~\$500 million** investment to advance fundamental and use-inspired AI

★ LEAD ORGANIZATION

● SUBAWARD

FEDERAL AGENCY AND INDUSTRY PARTNERS

amazon accenture



NIST

Google

intel

IBM



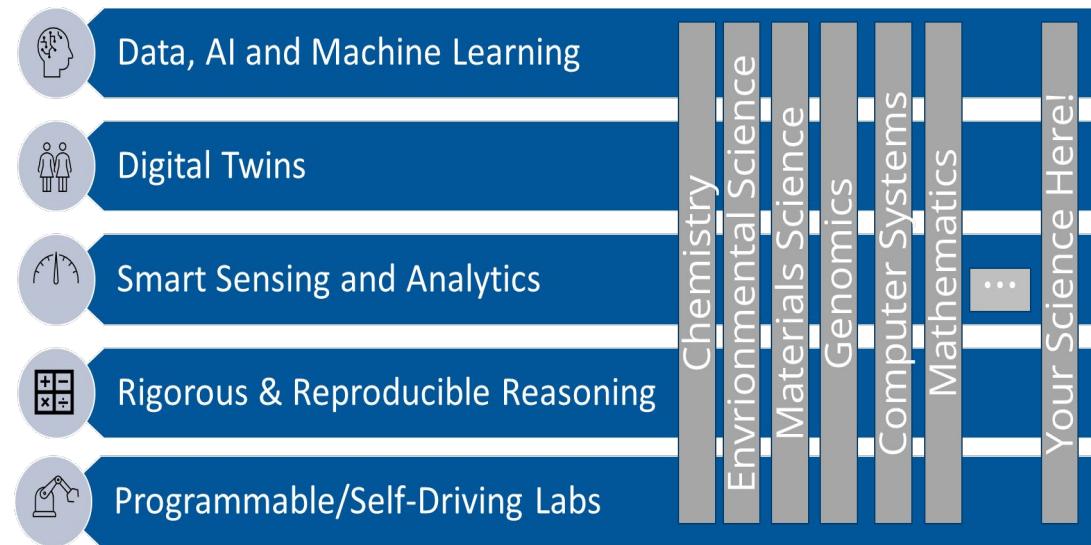
FY24 Solicitation, Theme 1: AI for Astronomical Sciences – 2 awards (Collaborators: The Simons Foundation)



ACED: Accelerating Computing-Enabled Scientific Discovery (NSF 24-541)

- New solicitation designed to harness computing in a virtuous cycle that: (a) benefits scientific disciplines through computational technologies and (b) fosters novel computing technologies that will enable advances beyond the specific use cases/domain.
- Requires collaborations between researchers in computing and another scientific or engineering discipline.
- The ACED program solicits proposals in two tracks:
 - Track I: Emerging Ideas Proposals: Support speculative multidisciplinary projects that explore bold new research directions. Projects are limited to \$500,000 in total budget, with durations of up to 18-24 months. Proposals due May 13, 2024.
 - Track II: Discovery Proposals: The objective of this track is to support transformative interdisciplinary research that will significantly advance both computing and the scientific discipline(s). Projects are up to 4 years with a total budget of up to \$3,000,000. Proposals due January 14, 2025-2026.

ACED supports NSF Priority Areas:
Emerging Industries, Resilient Planet, and Research Infrastructure



Partnership: CISE, BIO, ENG, MPS, and





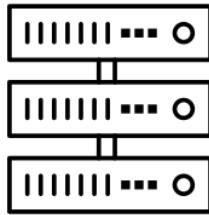
NAIRR

National Artificial Intelligence Research Resources

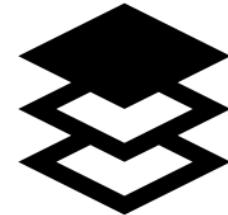
Vision for the National AI Research Resource

Objective: To strengthen and democratize the U.S. AI Innovation ecosystem in a manner that protects privacy, civil rights, and civil liberties.

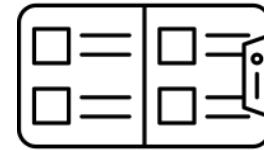
A widely-accessible, national research infrastructure that will advance the U.S. AI R&D environment, discovery, and innovation by empowering a diverse set of users through access to:



Secure, high-performance,
privacy-preserving
computing



High-quality
datasets



Catalogs of **testbeds** and
educational materials



Training tools and user
support mechanisms



Full NAIRR Vision vs NAIRR Pilot Goals



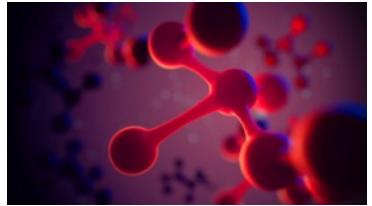
NAIRR Pilot Goals

1. Demonstrate the value & impact of the NAIRR concept.
2. Support novel & transformative AI research while reaching broad communities.
3. Gain experience to advance and refine NAIRR design.

NAIRR Pilot Users



AI Researchers



Domain Scientists
Applying AI



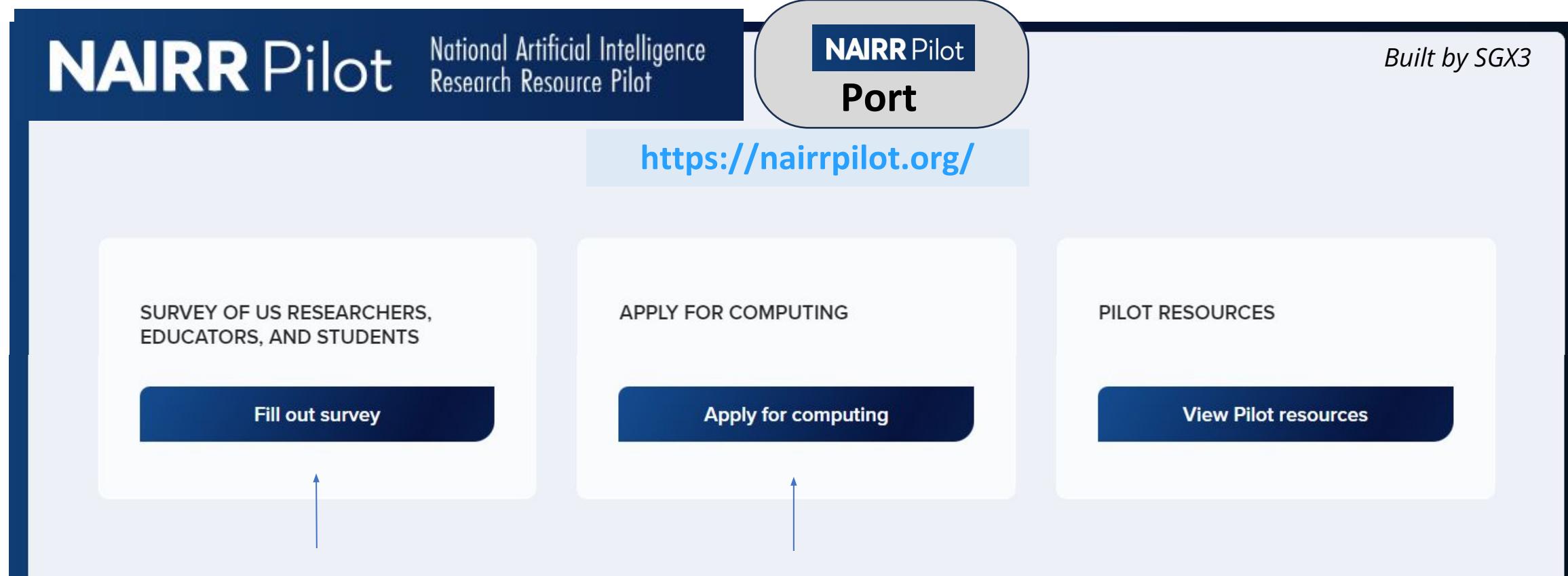
Students and
Educators



US-Based Institutions including:

- Academic institutions
- Non-profits
- Federal agencies or federally-funded R&D centers
- State, local, or tribal agencies
- Startups and small businesses with Federal grants

Pilot launched Jan 24th, 2024 with 11 agency and 25 non-governmental partners



The screenshot shows the NAIRR Pilot homepage. The header includes the logo 'NAIRR Pilot' and the text 'National Artificial Intelligence Research Resource Pilot'. A sub-header 'NAIRR Pilot Port' is enclosed in an oval. The URL 'https://nairrpilot.org/' is displayed in a blue box. The main content area is divided into three sections: 'SURVEY OF US RESEARCHERS, EDUCATORS, AND STUDENTS' with a 'Fill out survey' button, 'APPLY FOR COMPUTING' with an 'Apply for computing' button, and 'PILOT RESOURCES' with a 'View Pilot resources' button. Blue arrows point from the text descriptions below to the corresponding buttons on the page.

NAIRR Pilot
National Artificial Intelligence Research Resource Pilot

NAIRR Pilot Port

<https://nairrpilot.org/>

SURVEY OF US RESEARCHERS, EDUCATORS, AND STUDENTS

APPLY FOR COMPUTING

PILOT RESOURCES

Fill out survey

Apply for computing

View Pilot resources

Responses from ~1000 responses, from nearly all states indicating strong need for computing data and educational/training resources

Initial call closed March 1st
> 150 submissions, reviews underway

Initial datasets and trainings opportunities

Bringing together the strengths of government, private industry and non-profit partners

Contributing Partners

Agencies

- National Science Foundation
- Defense Advanced Research Projects Agency
- Department of Agriculture
- Department of Defense
- Department of Energy
- Department of Veterans Affairs
- National Aeronautics and Space Administration
- National Institutes of Health
- National Institute of Standards and Technology
- National Oceanic and Atmospheric Administration
- US Geological Survey
- US Patent and Trademark Office (USPTO)

Non-governmental Orgs

- AI2: Allen Institute for AI
- AMD
- Amazon Web Services
- Anthropic
- Cerebras
- Databricks
- Datavant
- EleutherAI
- Google
- Groq
- Hewlett Packard Enterprise
- Hugging Face
- IBM
- Intel
- Meta
- Microsoft
- MLCommons
- NVIDIA
- Omidyar Networks
- OpenAI
- OpenMined
- Palantir
- Regenstrief Institute
- SambaNova Systems
- Vocareum
- Weights & Biases

Questions and Discussion