



# 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



## Office of Advanced Cyberinfrastructure (OAC)

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

Amy Walton  
Deputy Office Director



## Computing & Communication Foundations (CCF)

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

Irina Dolinskaya  
**Acting** Division Director



## CISE Leadership



Dilma Da Silva,  
**Acting** Assistant Director



Joydip Kundu,  
Deputy Assistant Director

Siddiq Qidwai  
**Acting** Deputy Division Director



Michael Littman  
Division Director



Wendy Nilsen  
Deputy Division 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)

Ellen Zegura  
Division Director



Behrooz Shirazi  
Deputy Division Director



# 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

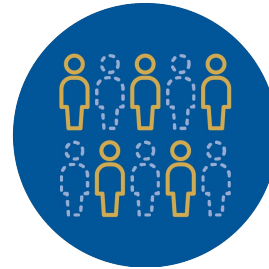
**29%**  
Funding rate



**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**

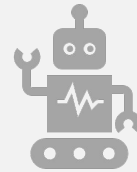
**Strengthening  
Research  
Infrastructure**



# 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



Google

intel.

IBM

NIST

USDA



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

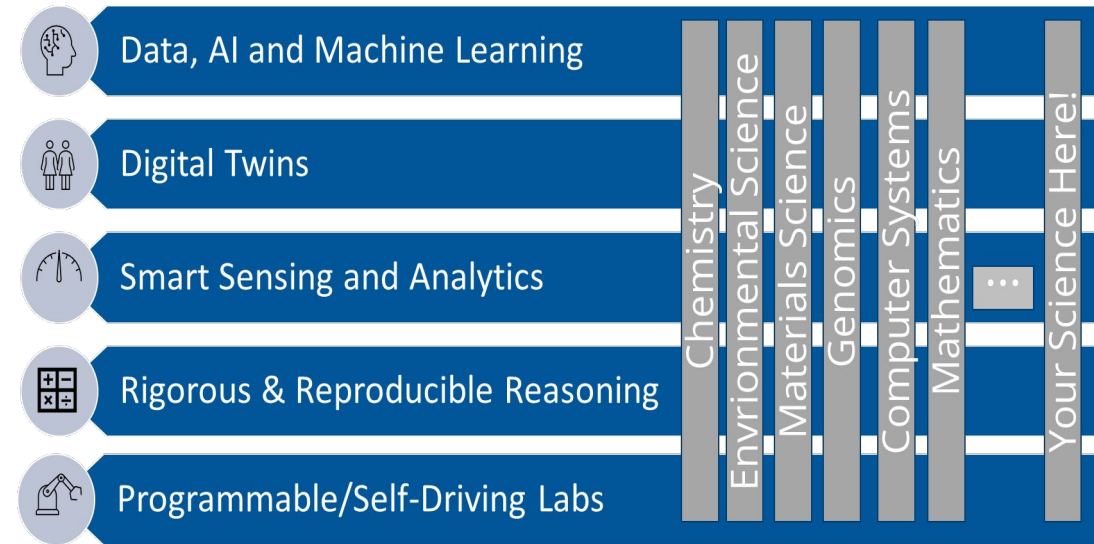




# ACED: Accelerating Computing-Enabled Scientific Discovery (NSF 24-541)

- 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**



An abstract graphic of a network or molecular structure. It features a dark blue background with a complex web of white and light blue lines connecting various circular nodes. Some nodes are larger and more prominent, while others are smaller. The overall shape is irregular and sprawling, resembling a neural network or a complex chemical molecule.

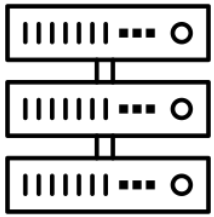
NAIRR

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.

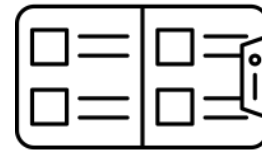
**A widely-accessible, national research infrastructure** that will advance the U.S. AI R&D environment, discovery, and innovation by empowering a diverse set of users through access to:



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*

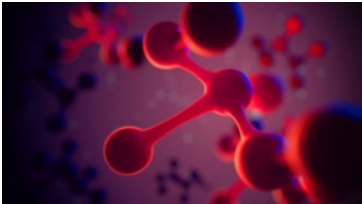
1. Demonstrate the value & impact of the NAIRR concept.
2. Support novel & transformative AI research while reaching broad communities.
3. Gain experience to advance and refine NAIRR design.



# NAIRR Pilot Users



AI Researchers



Domain Scientists  
Applying AI

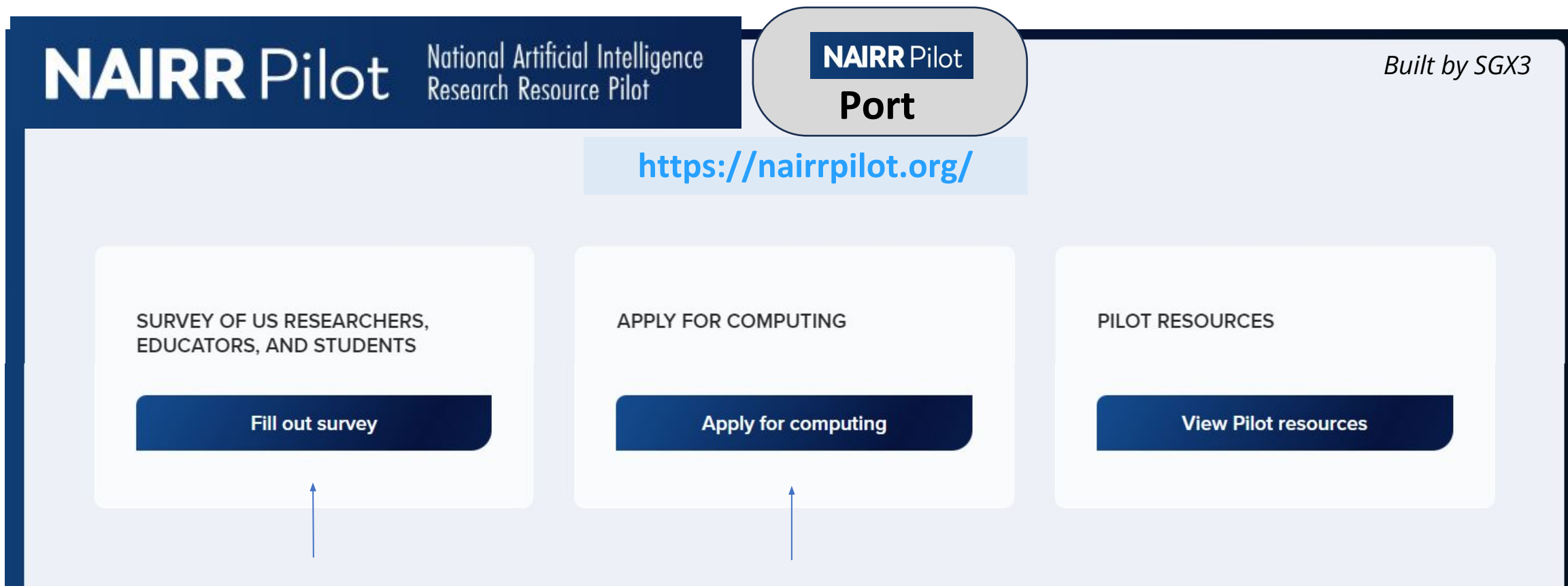


Students and  
Educators

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 24<sup>th</sup>, 2024 with 11 agency and 25 non-governmental partners



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

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

Initial datasets and trainings opportunities

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

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## 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

