CISE Overview

Dilma Da Silva
Acting Lead

About Dilma

Since 2014 in different roles:
Professor (since 9/1/20); interim director of two institutes
Professor and part-time Associate Dean (2019-2020)
Department Head and Professor (2014-2019)

Since 12/11:
AD - CISE
Since 7/22:
Division Director – CCF

BEFORE

Principal Engineer & Manager
Qualcomm Research
2 years

Researcher; Manager
IBM T.J. Watson Research Center
12 years

Assistant Professor
University of São Paulo, Brazil
1996-2000

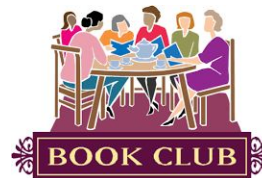## EDUCATION

PhD
Georgia Tech

BS, MS in Computer Science
University of São Paulo, Brazil

FUN

Research Areas: Distributed Systems, Data Science, Cybersecurity, CS education
Multidisciplinary efforts: Food Safety, Energy Systems, Transportation, Personalized Education

Now: 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

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)

Irina Dolinskaya,
Acting Division Director

Siddiq Qidwaj,
Acting Deputy Division Director

Michael Littman,
Division Director

Wendy Nilsen,
Deputy Division Director

Major CISE-wide and Multi-Directorate Initiatives

Office of Advanced Cyberinfrastructure (OAC)

Computing & Communication Foundations (CCF)

CISE-wide Initiatives

Expeditions in Computing

Broadening Participation in Computing Plans

CISE Community Research Infrastructure (CCRI)

CISE MSI Research Expansion

Principles and Practice of Scalable Systems (PPOSS)

Sample Multi-Directorate Initiatives that CISE Leads

National AI Research Institutes

Secure and Trustworthy Cyberspace (SaTC)

Cyber-Physical Systems (CPS)

Predictive Intelligence for Pandemic Prevention (PIPP)

Smart & Connected Communities (S&CC) /Civic Innovation Challenge (CIVIC)

Computer & Network Systems (CNS)

Information & Intelligent Systems (IIS)

CISE by the Numbers

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

$1,012M
Enacted FY22 Budget

6,466
Proposals evaluated

28%
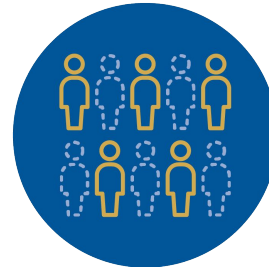Funding rate

1,780
Awards made

376
institutions supported

6,621
Grad Students

20,390
Individuals from Sr. Researchers to Undergrads

50 + 2
states and territories funded

74
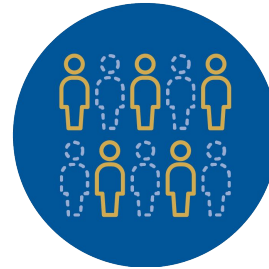Minority-serving Institutions (MSIs) with awards

FY23 CISE Numbers

6,401
Proposals evaluated

29%
Funding rate

1,847
Awards made

371
institutions supported

89
Minority-serving Institutions (MSIs) with awards

NSF's STRATEGIC THEMES

Advancing Emerging Industries for Economic and National Security

Creating Opportunities Everywhere

Building a Resilient Planet

Strengthening Research Infrastructure

Today

- Technical Themes
- "How to get there":
  - Programs
  - Infrastructure
- Broadening Participation in Computing
- Q&A

Technical Themes
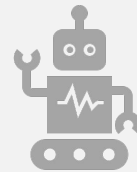
National AI Research Institutes

- 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　　DEPARTMENT OF DEFENSE United States of America　　DEPARTMENT OF EDUCATION United States of America　　U.S. DEPARTMENT OF HOMELAND SECURITY

Google　　intel.　　IBM　　NIST　　USDA

ExpandAI Program Highlights

- **Launched Oct 17, 2022:** ExpandAI Program (solicitation 23-506) under CISE's AI Institutes program (NSF 23-610)
- **Flexible Submission** windows, no single date deadline, 2-page concept outlines, MSI-specific goals and MSI-led awards
- **Outreach:** Live Webinars, Monthly Office Hours, Presentations at MSI PI Meetings, 1-on-1 virtual meetings with POs
- **Enthusiastic MSI Response!** 115 Concept outlines, 45 proposal invitations, 32 proposal submissions, 11 awards, 10 declines, 8 pending, last panel review 1/17/24

Capacity
Build AI capacity

MSI-specific goals
Institutional Change
Potential Path
to Partnership

Partnership
Leverage AI Institutes

MSI-led awards
AI Institute subawards
Shared vision and goals
Institute integration plans

Approach
Lower barriers to success

Concept outlines
Submission windows
Flexible submissions
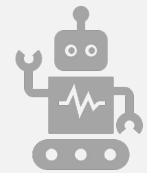
Infrastructure

Vision for the National AI Research Resource (NAIRR)

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:
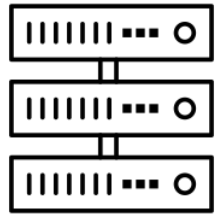
Secure, high-performance, privacy-preserving **computing**

High-quality **datasets**
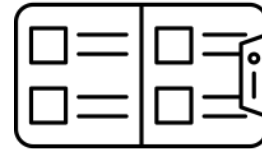
Catalogs of **testbeds** and **educational materials**

Training tools and **user support** mechanisms

Goals:

Spur **innovation**

Increase the **diversity** of talent in AI

Improve U.S. **capacity** for AI R&D

Advance **trustworthy AI**

NAIRR Pilot

National Artificial Intelligence Research Resource Pilot

https://nairrpilot.org/

Launched on January 24th

10 agency and 25 non-gov partners

Access to Computing

An initial set of NAIRR Pilot advanced computing resources, *including GPUs*, is available to researchers and educators.

The call is open through **March 1, 2024.** Future call in Late March

https://nairrpilot.org/allocations

Datasets & Other Resources

Browse other initial resource contributions, such as pre-trained models, AI-ready datasets, and research platforms.

More coming soon!

https://nairrpilot.org/pilot-resources

Available to research community __today__:

- Access to advanced computing systems and testbed architectures from DOE and NSF
- Select datasets from agency partners

Available in late March*

- 2nd open opportunity to access resources
- Wider range of capabilities, including cloud computing, API access to trained models, community platforms and collaboration opportunities

*Pending system and funding availability

Agencies

- US 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 Patent and Trade Office (USPTO)

 More Joining!

Non-governmental orgs

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

 More Joining!

Provide Feedback

NSF 24-051

Dear Colleague Letter: Request for Information on Researcher and Educator Use Cases for the National Artificial Intelligence Research Resource (NAIRR)

January 24, 2024

Dear Colleagues:

Artificial Intelligence (AI) resources and tools are rapidly advancing and becoming vital to science and engineering research and education. Progress at the AI research frontiers and effective use of AI in other research domains and in education often requires access to research infrastructure resources that may be difficult to find, access, and utilize, such as large-scale computing resources, AI-ready datasets, pre-trained

- Encourages responses from researchers, educators and students
- Barriers, challenges, and priorities for accessing and using AI resources and tools.
- Results will guide the NAIRR pilot, eventually full NAIRR and other investments.

https://bit.ly/3SvXT8C

Infrastructure investment **for your use:**
Chip Design Hub: Enabling Access to the Semiconductor Chip Ecosystem for Design, Fabrication, and Training

❑ Provide cloud-based design enablement to IHEs and beyond

 ❑ Dramatically lower the barriers for students to access

- State-of-the-art electronic design automation (EDA) tools
- Process design kits (PDKs), and
- Design intellectual property (IP) cores

 ❑ Enable students at various levels to design and test IC chips

❑ Solicitation: NSF 24-522
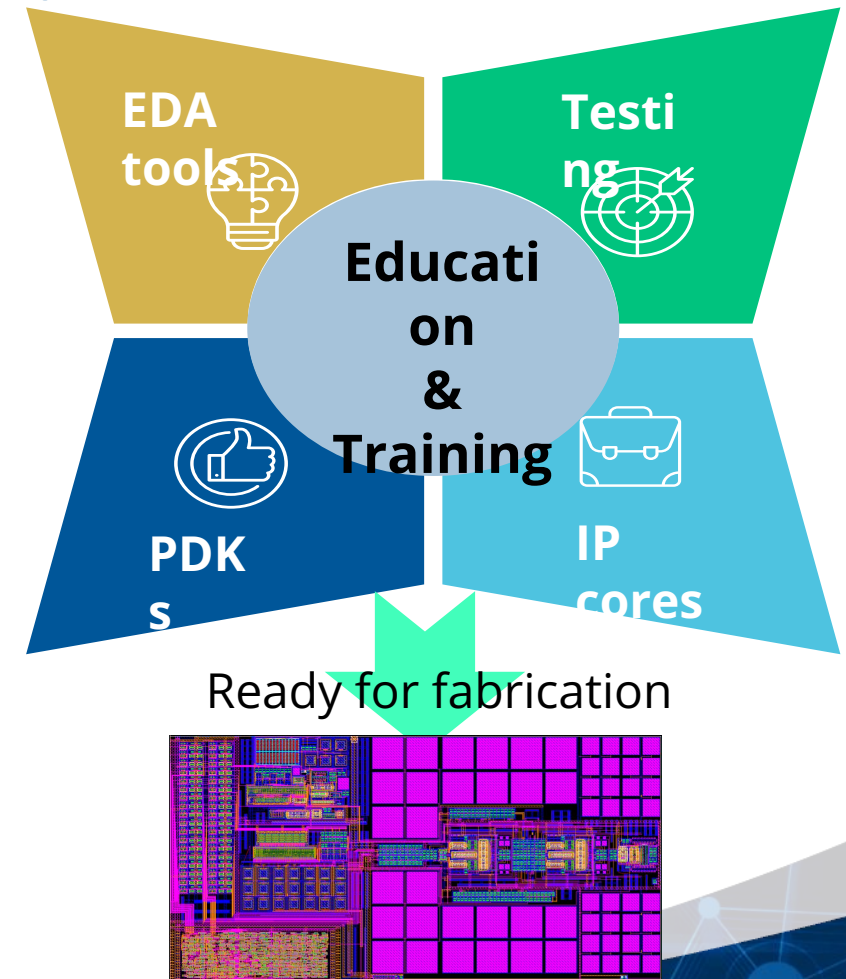
EDA tools

Testing

Education & Training

PDKs

IP cores

Ready for fabrication

Broadening Participation

Vision: Broadening Participation in Computing

- Goal: Measurable progress towards diversifying the CISE Research Community

- Goal: CISE research proposals include a meaningful plan to broaden participation in computing

- Approach: Individual PIs include BPC plans for Medium (and larger) proposals in Core, CPS, SaTC

- **Key Concept: Individual PIs plug into departmental and national plans and expertise**

- Increase collaboration, coordinate efforts, broaden expertise

Individual PI Plans and efforts	
Individual PI Plans and efforts	Department and Campus-Level Resources and Plans
Individual PI Plans and efforts	
Individual PI Plans and efforts	
Individual PI Plans and efforts	National-Level Resources and Plans
Individual PI Plans and efforts	
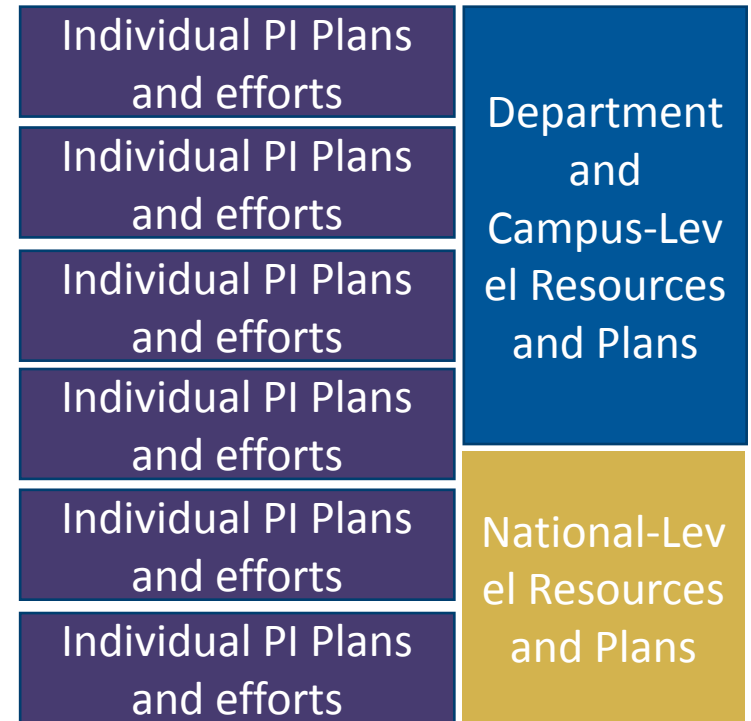
Expanding TRIPODS through Partnerships (XTRIPODS)

View guidelines

NSF 23-591

Expanding Capacity in Quantum Information Science and Engineering (ExpandQISE)

View guidelines

NSF 24-523

Computer and Information Science and Engineering Research Expansion Program (CISE MSI)

View guidelines
NSF 24-536

Expanding
diversity

Expanding Geographic and Institutional Diversity in Computer and Information Science and Engineering (CISE)
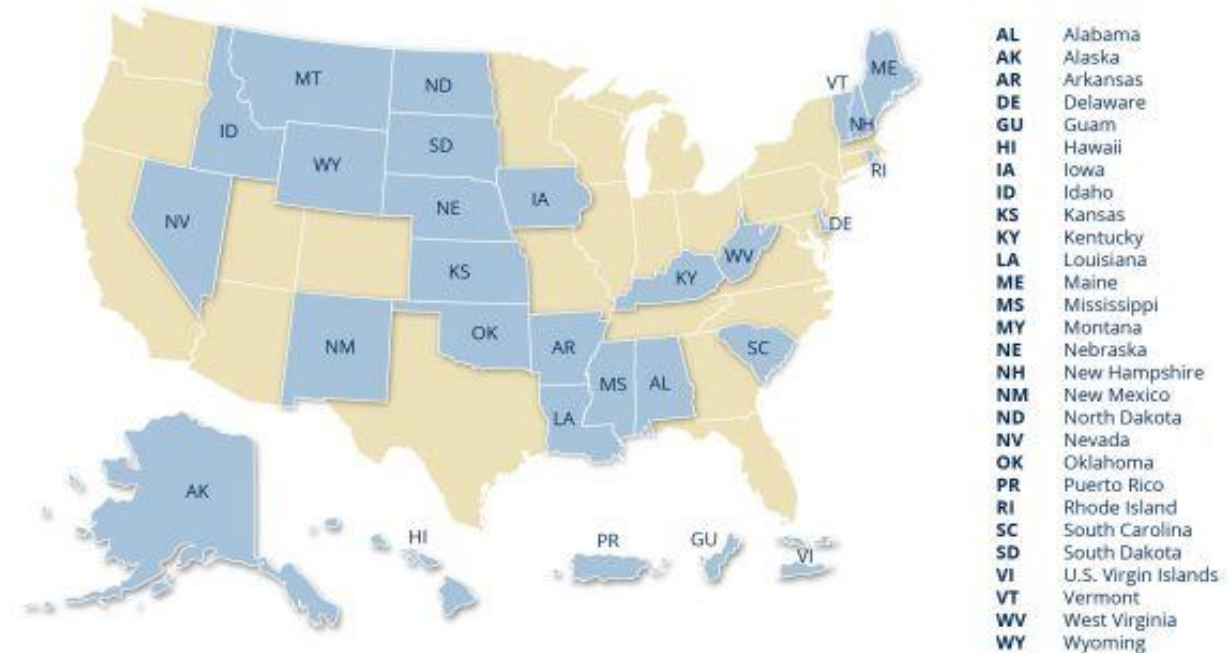
February 15, 2024

Encourages new proposals and supplemental funding requests from EPSCoR-eligible institutions to broaden geographic and demographic participation in computer and information science and engineering.

Dear Colleagues:

The National Science Foundation's (NSF) Directorate for Computer and Information Science and Engineering (CISE) welcomes submission of both new proposals and supplemental funding requests from Established Program to Stimulate Competitive Research (EPSCoR) eligible institutions to broaden geographic and demographic participation. Through this Dear Colleague Letter (DCL), NSF aims to promote CISE-funded activities that enable sustainable growth and competitiveness across EPSCoR jurisdictions. The goal is to increase the representation of NSF awards and funding to organizations across the twenty-eight (28) EPSCoR-eligible jurisdictions. Proposals from institutions across EPSCoR-eligible jurisdictions are welcome to submit to all CISE programs. Collaborative proposals between EPSCoR and non-EPSCoR institutions with EPSCoR institutions as lead and proposals from Minority Serving Institutions (MSIs) and Emerging Research Institutions (ERIs) in EPSCoR jurisdictions are particularly encouraged.

Established Program to Stimulate Competitive Research (EPSCoR) Program

Pursues a mission to enhance the research competitiveness of targeted jurisdictions (state, territory or commonwealth) by strengthening science, technology, engineering and mathematics (STEM) capacity and capability through a diverse portfolio of investments from talent development to local infrastructure.

AL	Alabama
AK	Alaska
AR	Arkansas
DE	Delaware
GU	Guam
HI	Hawaii
IA	Iowa
ID	Idaho
KS	Kansas
KY	Kentucky
LA	Louisiana
ME	Maine
MS	Mississippi
MY	Montana
NE	Nebraska
NH	New Hampshire
NM	New Mexico
ND	North Dakota
NV	Nevada
OK	Oklahoma
PR	Puerto Rico
RI	Rhode Island
SC	South Carolina
SD	South Dakota
VI	U.S. Virgin Islands
VT	Vermont
WV	West Virginia
WY	Wyoming

NSF: https://new.nsf.gov/funding/initiatives/epscor/epscor-criteria-eligibility

Back to the DCL NSF 24-056

CISE aims to promote funded activities that enable sustainable growth in the competitiveness of EPSCoR jurisdictions, including:

- research proposals to CISE core and cross-cutting programs;

- infrastructure investments to build research capacity in EPSCoR jurisdictions;

- scholarships, fellowships, and traineeships within new and existing programs to promote development of sustainable research and academic personnel;

- partnerships with non-EPSCoR institutions that are led by EPSCoR institutions with the goal of building and/or expanding research, education, and workforce development capacity in EPSCoR jurisdictions; and

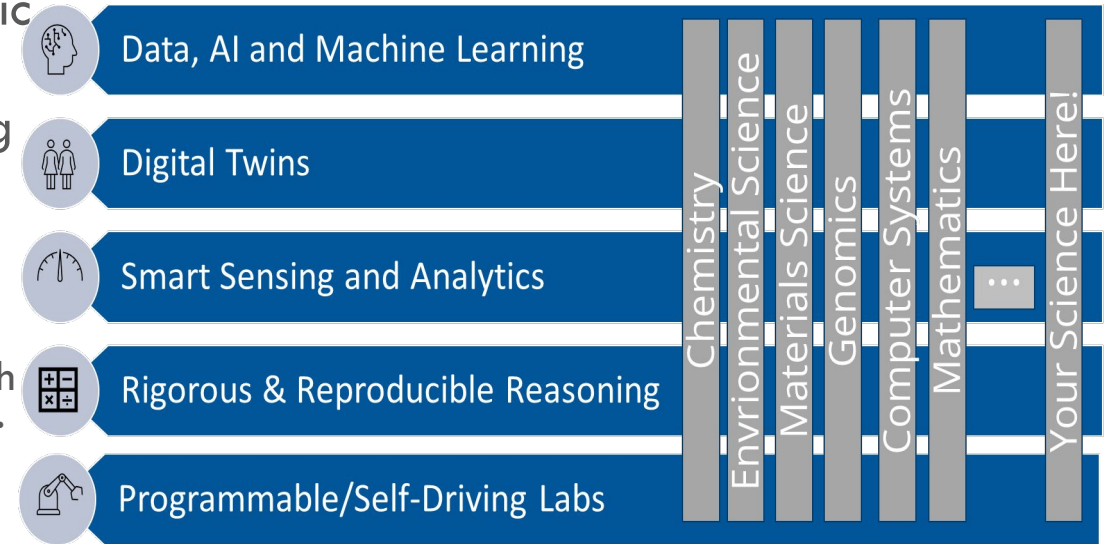- capacity building activities for ERIs and MSIs.

CISE program – recent samples

Recently released programs:
ACED, Educate AI

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 with CISE, BIO, ENG, MPS, and TIP

Data, AI and Machine Learning

Digital Twins

Smart Sensing and Analytics

Rigorous & Reproducible Reasoning

Programmable/Self-Driving Labs

Chemistry
Environmental Science
Materials Science
Genomics
Computer Systems
Mathematics
...
Your Science Here!

EducateAI

EducateAI enables *educators* to make high-quality, audience-appropriate artificial intelligence educational experiences available nationwide to **K-12**, **community college, four-year college** and graduate students, as well as adults interested in formal training in AI.

Emerging Industries:
Advancing inclusive computing education to prepare <u>all</u> learners for the AI workforce.

Creating Opportunities Everywhere:
Focus on broadening participation of groups who are historically underrepresented and underserved by existing computing courses and careers

Research Infrastructure:
Leveraging the NAIRR Pilot to support AI-related computational, data, model or other resources, and associated workforce training through NAIRR Classroom.

PHASE 1: EducateAI DCL (24-025)

Invites submission of proposals that advance inclusive AI education for preK-12 and undergraduate students through **CSforAll** and **IUSE: Computing in Undergraduate Education**

Questions ?