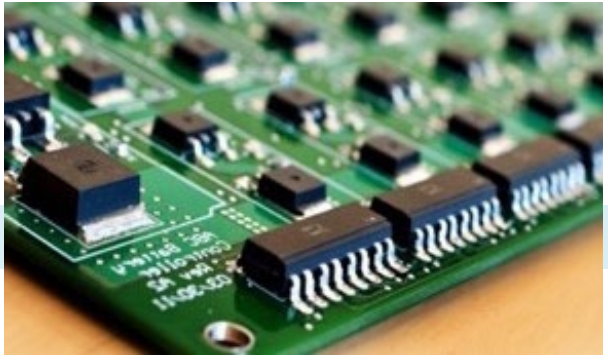
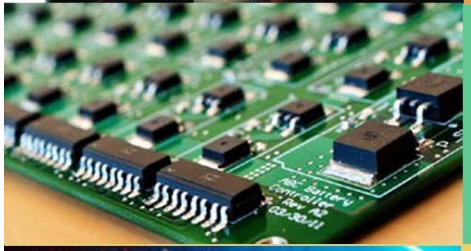


Research Funding
NSF's Computer and Information Science and Engineering Directorate

Wendy Nilsen, PhD
Deputy Division Director

CISE Divisions

Office of Advanced Cyberinfrastructure supports and coordinates the development, acquisition, and provision of state-of-the-art cyberinfrastructure resources, tools and services essential to advancing science and engineering.



Computing and Communication Foundations advances computing and communication theory, algorithms for computer and computational sciences and architecture and design of computers and software.

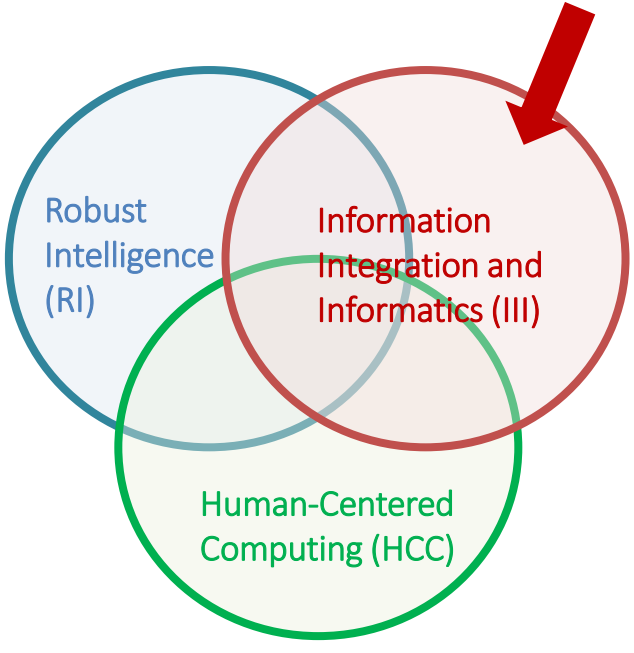
Computer and Network Systems invent new computing and networking technologies and finds new ways to make use of current technologies.

Information and Intelligent Systems studies the interrelated roles of people, computers, and information to increase our ability to understand data, as well as to mimic the hallmarks of intelligence in computational systems.

Information and Intelligent Systems

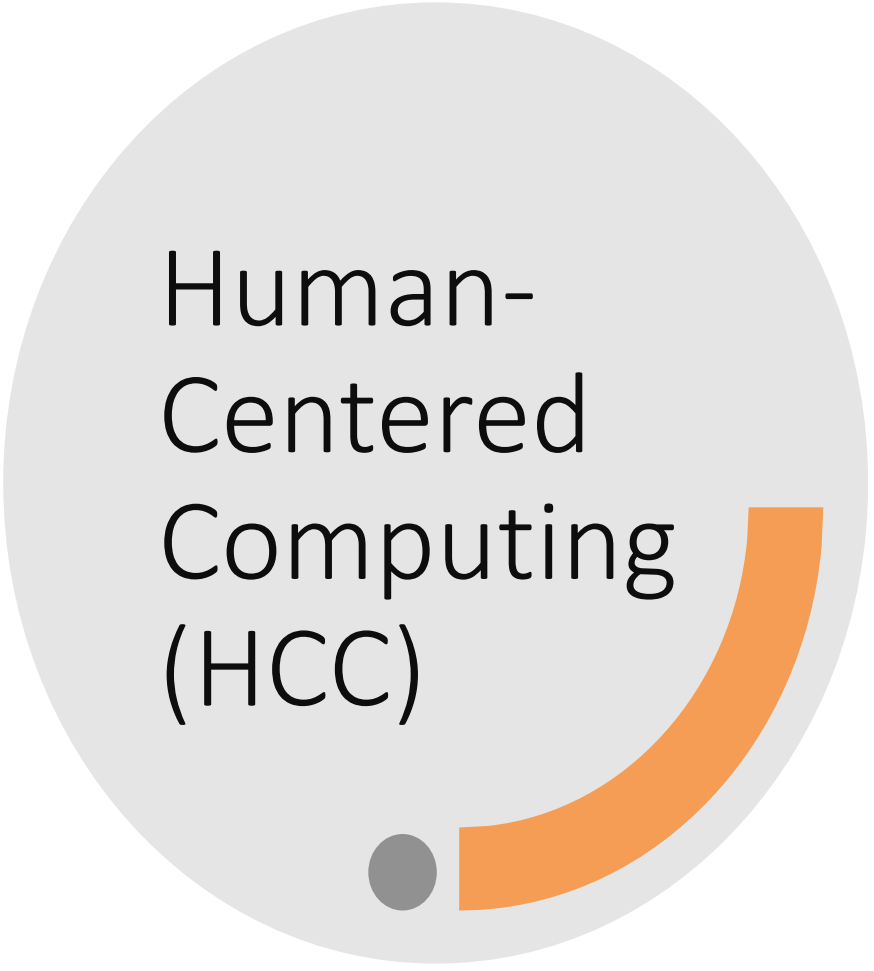
IIS supports research in the inter-related roles of people, computers, and information.

IIS includes three core programs:
Human-Centered Computing (HCC), Information Integration and Informatics (III), and Robust Intelligence (RI).
+ many interdisciplinary crosscutting programs.



Mission: Accelerate creation of new human-centered computing technology

- Advance our understanding of the complex and increasingly coupled relationships between humans and computing systems.
- Advance multiple dimensions of human capabilities:
  - perceptual and cognitive
  - physical and virtual
  - social and societal
- HCC research is central to how humans work, learn, and live in a world abundant with computers and blanketed by networks.



Robust Intelligence (RI) Core

Encompasses all aspects of the computational understanding and modeling of intelligence in complex and realistic contexts

Is characterized by:

- a system's flexibility, resourcefulness, use of a variety of modeling or reasoning approaches, and use of real-world data in real time, demonstrating a level of intelligence and adaptability seen in humans and animals

Advances and integrates the research traditions of:

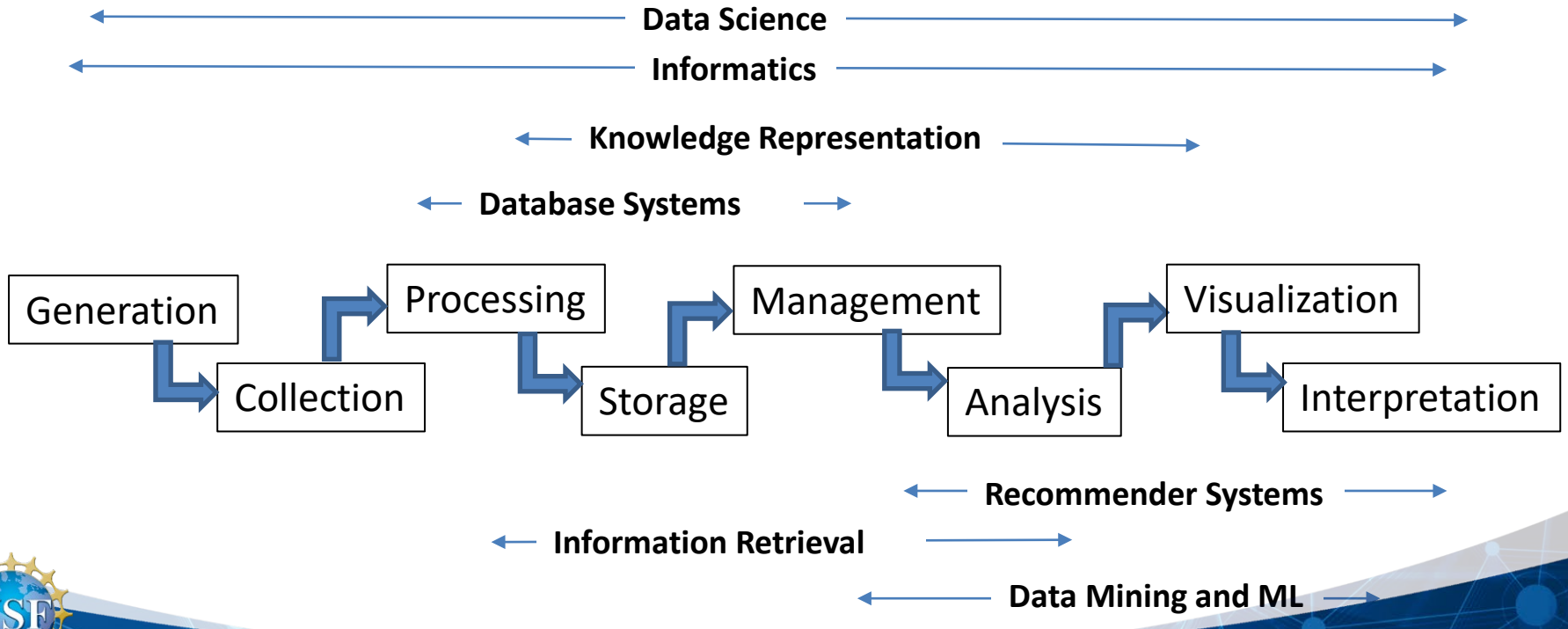
- artificial intelligence, computer vision, human language research, robotics, machine learning, computational neuroscience, cognitive science, and related areas

Information Integration and Informatics (III)

Mission: Realize the full transformative potential of data, information and knowledge in this increasingly digital and interconnected world

- *Areas of emphasis:*
  - Data of unprecedented scale, complexity, and rate of acquisition
  - Issues of heterogeneity and complexity
  - Diverse functionalities and processing needs for data, information and knowledge from disparate and uncoordinated sources
  - Coping with the changing landscape of computing platforms at scales ranging from small mobile devices to potentially global-scale cloud and networked computing resources
  - Focus on variety of dimensions, including scalability, interactivity, or scientific, technological or societal impact

III Program: Technically-Diverse Areas



Faculty Early Career Development (CAREER) Program

NSF 22-586

- Provide stable support for 5 years (≥ $400K most Directorates)
- Allow the career development of outstanding new teacher-scholars in the context of the mission of their organization.
- Build a foundation for a lifetime of integrated contributions to research and education.
- Increase participation of those traditionally underrepresented in science and engineering.

CAREER Investigator Eligibility

- Hold a doctoral degree in a field supported by NSF by proposal deadline
- Be employed in a tenure-track (**or equivalent**) position at an eligible institution as an Assistant Professor (by October 1 following deadline)
- Have educational responsibilities at the eligible institution
- Have not previously received a CAREER award
- Have not had more than two CAREER proposals reviewed

Integration of Research and Education

How will your research impact your education goals and how will your education activities feed your research?

- Involving others (graduate, undergraduates, K-12, high school teachers, public) in your research using new tools, laboratory methods, field components, web outreach, cyber networks, etc...
- Partnering with those in other communities, especially those traditionally underrepresented in science and engineering
- Bringing the excitement of your research topics to help in the education of others
- Searching for new methods to deliver your research results to a broader audience than those in the immediate research community
- Using the broader community to gather and analyze data for your scientific pursuits ("citizen science")

Computing Research Initiation Initiative (CRII)
NSF 22-598

Enabling early research independence

- Contributes to growth and development of future generations of scientists and engineers who will dedicate their careers to advancing CISE research and education
- Supports early-career academicians who specifically lack access to adequate organizational or other resources.
- PIs must be from non-RI institutions (according to the Carnegie classification) to be eligible
- Provides opportunity for individuals who are in their first academic position post-PhD to recruit and mentor their first students
  - Budget: < $175K/24 months

Cross-Cutting Programs of Interest

Image Credit: Exploratorium.

Smart Health and Biomedical Research in the Era of Artificial Intelligence and Advanced Data Science (SCH)

NSF

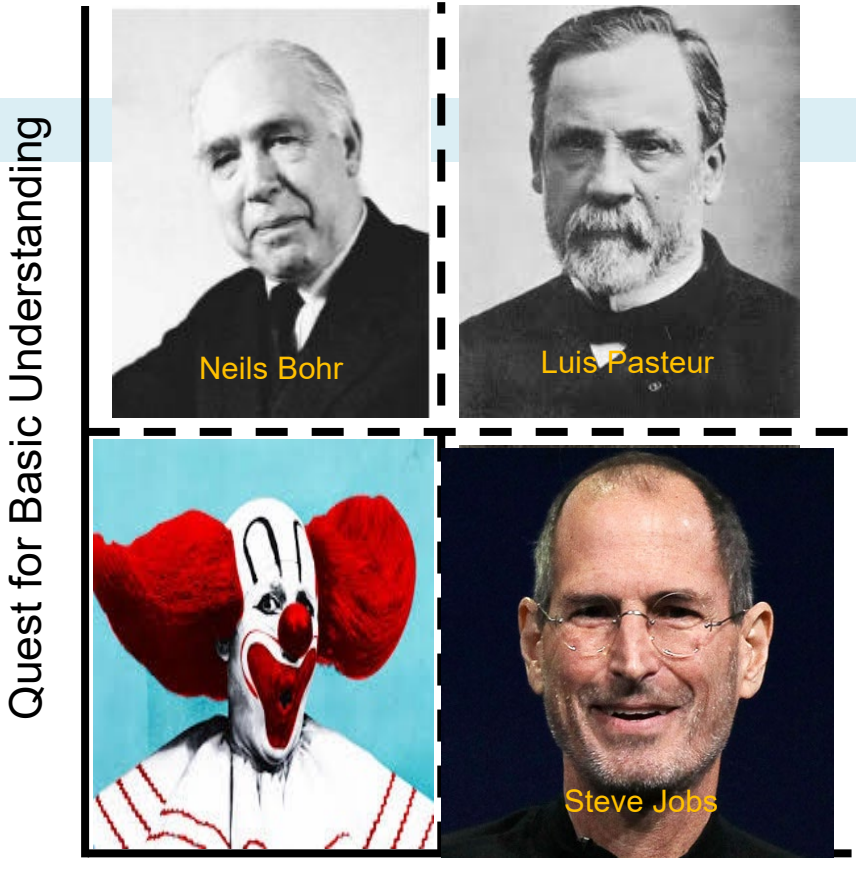
NIH
National Institutes of Health

Smart Health: Use-inspired Basic Research

Scientific advances in science or engineering *targeting* a key health problem.

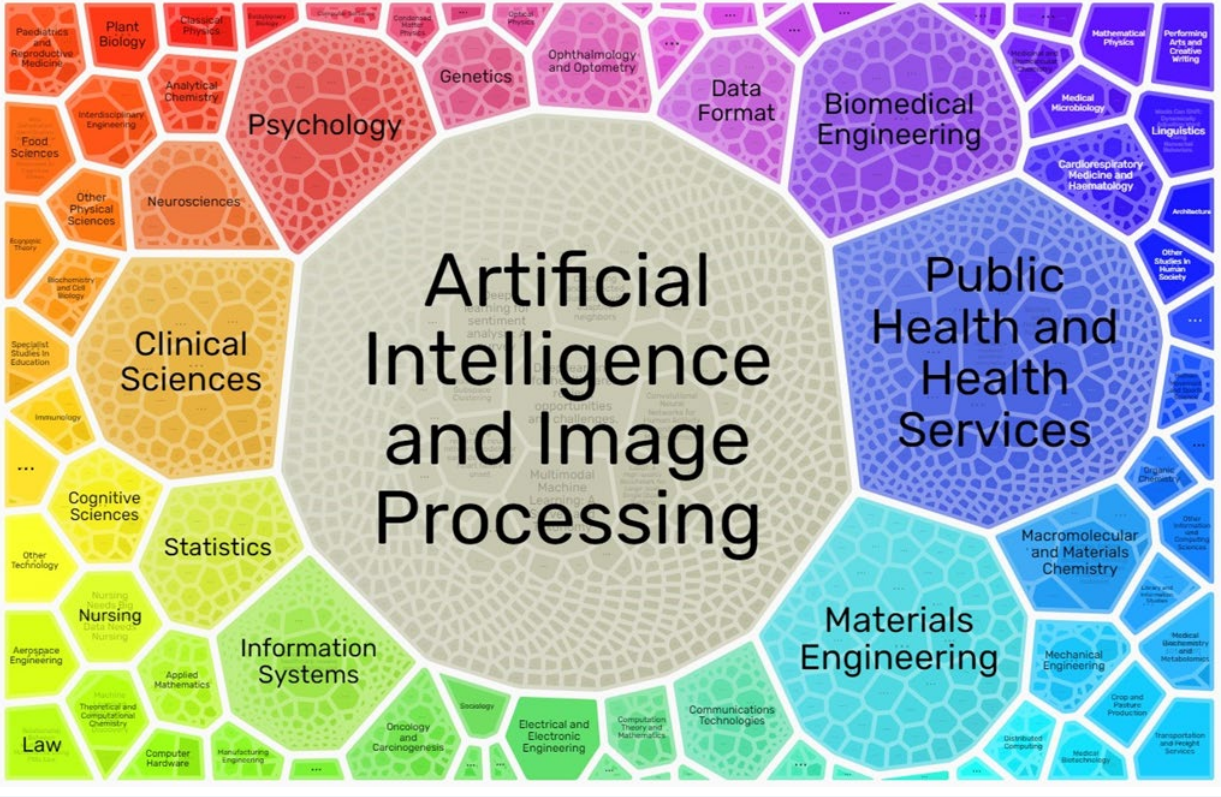
- **Funded** work must include & address:
  - ✓ Research gaps that exist in NSF science and/or engineering
  - ✓ A key biomedical and/or health problem
  - ✓ Include a research team with appropriate expertise in the major areas involved in the work

Pasteur's Quadrant



Donald E. Stokes, *Pasteur's Quadrant – Basic Science and Technological Innovation*, *Brookings Institution Press, 1997*

SCH Clustering 2013-2021



A Long-term Research and Education Agenda for Smart & Connected Communities

Growing an international inter- and multidisciplinary, multi-sector research and education community

Some Guiding Principles for S&CC Investment Portfolio

- Science involves multiple dimensions and application domains
- Benefitting communities **regardless of place and scale**, and benefitting all citizens in a **diverse and heterogeneous society**
- **Scalability of solutions**, when every community is unique. Moving beyond “islands of success” with incremental research
- **Quantification of impacts.** Engagement of stakeholders. Who cares? And how much better than today?
- Fundamental research and deployments/testbeds; **multi- and interdisciplinary collaborations**; appropriate local government, non-profit, industry, international, and anchor institution **partnerships**

National Artificial Intelligence Research Institutes

View guidelines
22-502

← Search for more funding opportunities

Print

Important Information for Proposers

A revised version of the *NSF Proposal & Award Policies & Procedures Guide* (PAPPG) (NSF 22-1), is

Supports institutes focused on long-term, high-reward AI research, with themes including next-generation cybersecurity, neural and cognitive foundations of AI, climate-smart agriculture and forestry, trustworthy AI, and AI-augmented learning.

Synopsis

Artificial Intelligence (AI) has advanced tremendously and today promises personalized healthcare; enhanced national security; improved transportation; and more effective education, to name just a few benefits. Increased computing power, the availability of large datasets and streaming data, and algorithmic advances in machine learning (ML) have made it possible for AI research and development to create new sectors of the economy and revitalize industries. Continued advancement, enabled by sustained federal investment and channeled toward issues of national importance, holds the potential for further economic impact and quality-of-life improvements.

The 2019 update to the National Artificial Intelligence Research and Development Strategic Plan, informed by visioning activities in the scientific community as well as interaction with the public, identifies as its first strategic objective the need to make long-term investments in AI research in areas with the potential for long-term payoffs in AI. The National AI Research Institutes program enables longer-term research and U.S. leadership in AI through the creation of AI Research Institutes.

This program is a joint government effort between the National Science Foundation (NSF), U.S. Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA), U.S. Department of Education (ED) Institute of Education Sciences (IES), U.S. Department of Homeland Security (DHS) Science & Technology Directorate (S&T), National Institute of Standards and Technology (NIST), Department of Defense (DOD) Office of the Under Secretary of Defense for Research and Engineering (OUSD (R&E)), and IBM Corporation (IBM).

This program solicitation expands upon the nationwide network established by the first 18 AI Research Institutes to pursue transformational advances in a range of economic sectors, and science and engineering fields. In this round, the program invites proposals for institutes that have a principal focus in one of the following themes, detailed in the Program Description:

Program guidelines

Award information
Institute awards will be made for between $16,000,000 and $20,000,000 for four to five years ($4,000,000 per year on average). Proposals outside this range may be returned without review. Estimated program budget, number of awards and average award size/duration are subject to the availability of funds.

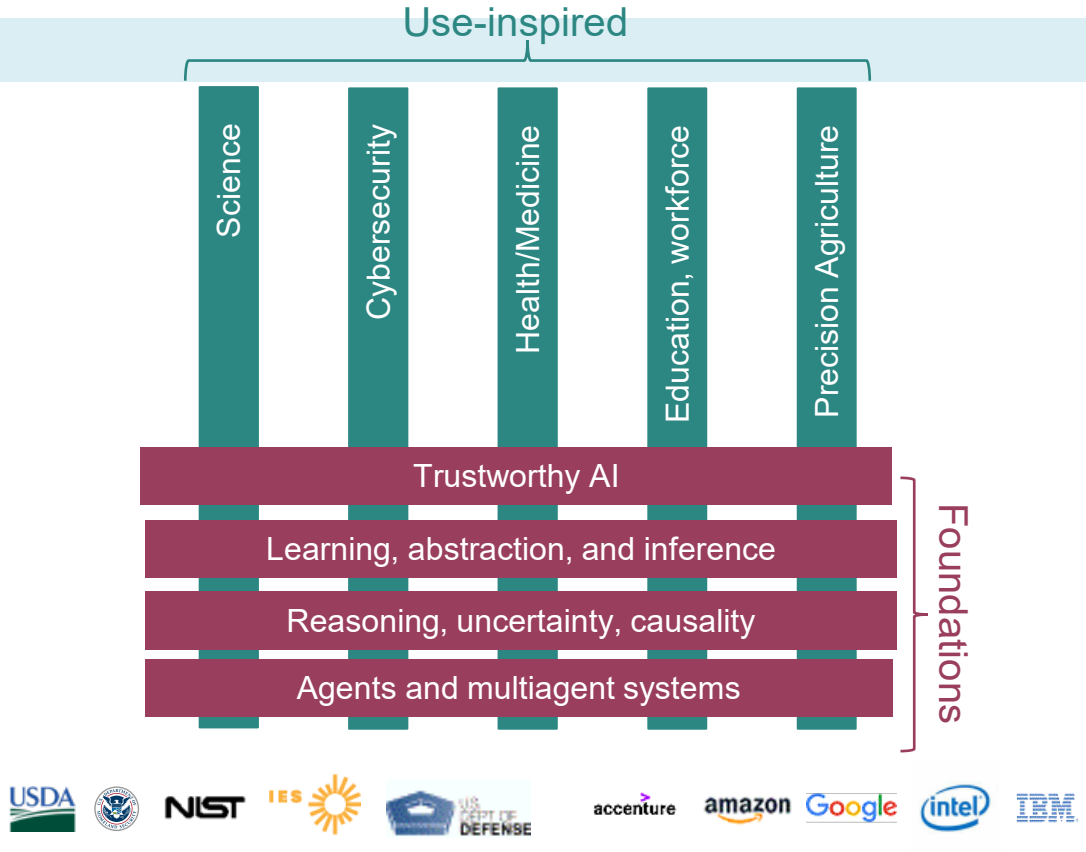
Estimated number of awards
7 - NSF plans to make approximately one Institute award in each of themes 1-5, and one award to each of the two tracks listed in theme 6 as described below.

Proposals may only be submitted by certain types of organizations. Please see solicitation for details.

Limit on number of proposals per organization
2 - An organization may submit no more than two preliminary proposals to this solicitation as lead institution. An organization may submit up to two full proposals that correspond to preliminary proposals reviewed under this solicitation. In the event that an organization exceeds these limits, preliminary proposals will be accepted based on earliest date and time of preliminary proposal submission, i.e., the first two preliminary proposals will be accepted, and the remainder will be

AI Institutes

2023 AI Research Institutes



National hubs for universities, government, industry and nonprofits to advance AI research and education

- $20M over five years per Institute
- First round: 7 AI Institutes announced Aug 2020
- Second round: 11 more institutes announced July, 2021
- Third round solicitation: 22-502
  Due dates:
  - Preliminary Proposal Jan 14, 2022
  - Full Proposal May 13, 2022

Growing Partnerships

Year 1 (2020 Awards)

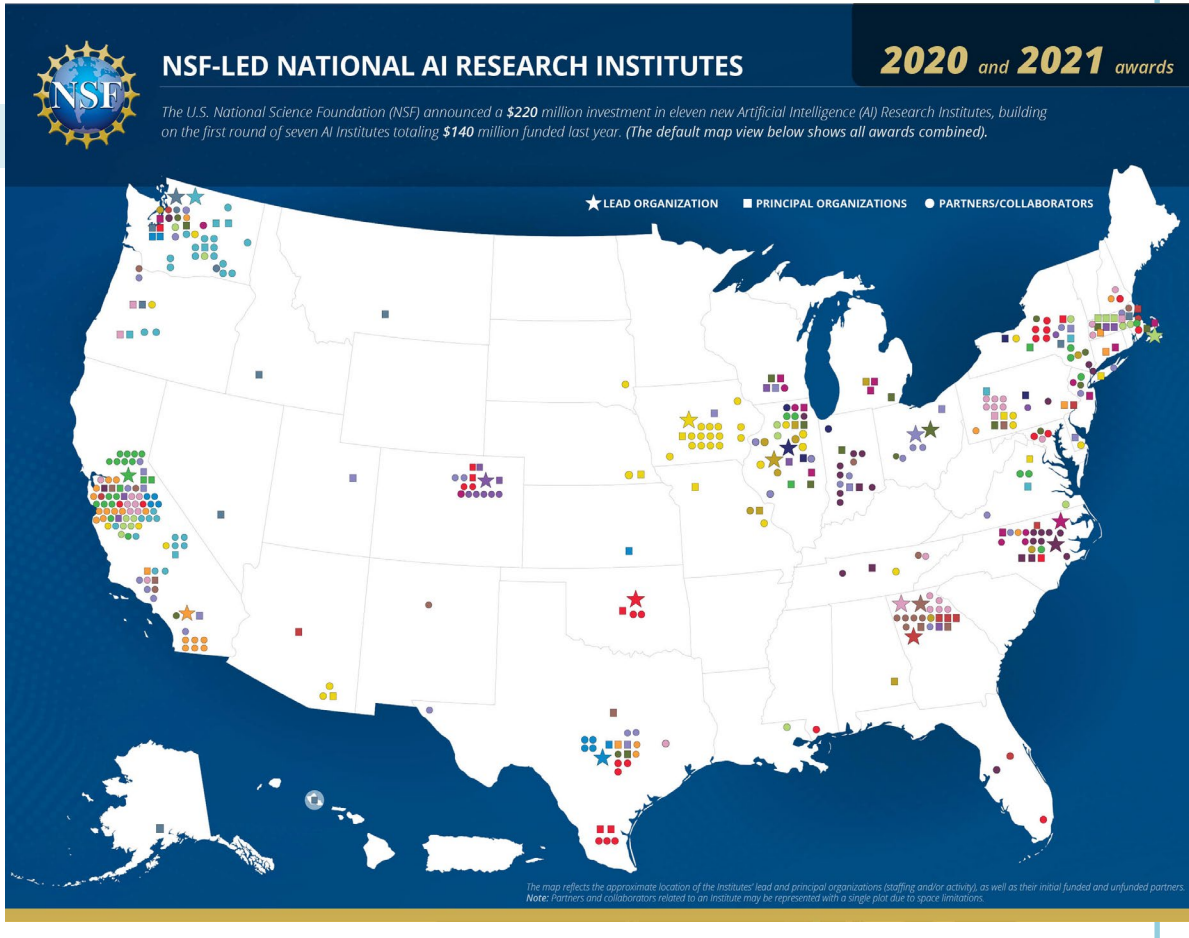
- 5 NSF Institutes,
  2 NIFA Institutes,
  11 Planning grants

Year 2 (2021 Awards)

- 9 NSF Institutes,
  2 NIFA Institutes
- More funding partners

This Round (2023 Awards)

- 6 themes
- 4 new funding partners



Some Quick Tips

Common Attributes of Successful Proposals (a non-exhaustive take)

- **Crisp** formulation of key problem that highlights **technical challenges** as **related to program** you are targeting for funding
- Carefully thought-out and researched contextualization
  - Have you done your homework on how related literature falls short?
- **Tight coupling** between identified challenges & proposed approach
- Make **your contributions in the problem** clear
- Bolster your proposed approach with evidence to support the work
- Credibility+Feasibility: PI expertise, well-thought out/planned activities, credible timeline, division of labor, roles of students, roles of collaborators, alignment of budget to activities

it should all come together (like a beautiful symphony)

I only have 15 pages!

- The more you write, the better you will become
- **Work on your grantspersonship**
- Do **NOT** write a proposal the week before it is due

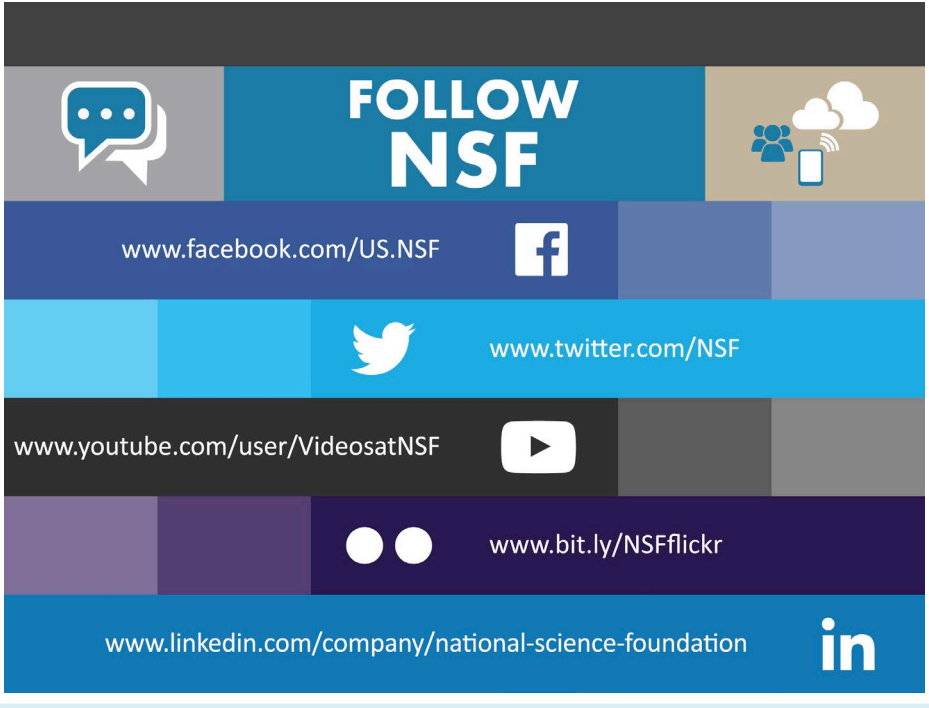
- Two *little known strategies* PIs are surprised to find out when they serve as panelists
  - Can claim recent publications as preliminary data/studies bolstering their arguments and launching their new plans
  - Facilities, Equipment, and Other Resources can be used to detail collaborations that (per PAPG) cannot be described in the letters of collaboration -- can describe there both funded and unfunded collaborations, what is the collaboration about, what are they bringing, how are you working with them

- **Ask a PD to be a panelist**
  - Send email with one paragraph of expertise (in body of email)
  - Attach a 2-page CV in case PD has time to enquire more
  - Relate how important this is for your career development
- **Observe your colleagues in action**
  - What excited them?
  - What dampened their enthusiasm?
  - What were unforced errors by PIs?
- **Ask someone you trust to give you feedback on proposal drafts**
  - Learn how to take criticism
- ***When you get rejected***
  - Reach out to PD to obtain more insight on panel discussion & ask what you can do to improve

How do I Improve my Grantspersonship?

THANKS!

wnilsen@nsf.gov



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- Don't include the brackets.
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- *Subscribe IIS_News Robin Smith*

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