



Update 9/25/2020

Revisions to slides and text since webinar broadcast:

- 9/25 Slide 11: corrected year from 2020 to 2021
- 9/25 Slide 33: revised script to reflect change in [FAQ](#) Q36 and Q37



National Artificial Intelligence (AI) Research Institutes

Accelerating Research, Transforming Society, and Growing the American Workforce

*James Donlon and Rebecca Hwa, CISE/IIS
Program Webinar, September 21, 2020*

While you wait: Review the FAQ! Easy access from Program web page, or (the hard way) at:
https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf20123


Click the 'Q&A' button to submit a question

Good afternoon and thank you for joining this webinar. I am Jim Donlon. I am a program director in the Division of Information and Intelligent Systems of CISE and lead program director for the National AI Research Institutes program. I am joined today by Rebecca Hwa, also a program director in CISE/IIS, and co-lead for the program.

Before we start, I will preview the schedule: The webinar is scheduled to end at 5PM eastern time. We will end at that time or when the Q&A session has ended. We will present for approximately 45 minutes, and then we'll take questions for the remainder of the time.



Questions

- **Submit your questions using the Q&A module** → 
- Questions will be addressed live, in the Q&A period (not in the module)
- **Program-wide** questions are encouraged
- Theme leads are here to address your **theme questions**
- If your question is not answered, feel free to email programmatic questions to AllInstituteProgram@nsf.gov; theme-related questions to relevant program contacts
- Webinar materials (slides, script, and audio recording) will be posted on the program/webinar web page

You may submit questions through the “Q&A” module in your Zoom toolbar. Questions will be addressed live, in the Q&A period; we will not be entering answers directly into the Q&A module. We plan to address as many program-wide questions and theme questions as we can, with particular attention to those relevant to a broad community. If we do not get to your question during the webinar, feel free to email your question to AllInstituteProgram@nsf.gov or directly to the relevant program contacts found in the solicitation.



Program/Theme Leads

Theme	Program Directors
Program-Wide	James Donlon, Rebecca Hwa
1. Human-AI Interaction and Collaboration	Prabha Prabhakaran CISE/IIS
2. AI Institute for Advances in Optimization	Roger Mailler CISE/IIS
3. AI and Advanced Cyberinfrastructure	Tevfik Kosar CISE/OAC
4. Advances in AI and Comp, and Network Systems	Matt Mutka CISE/CNS
5. AI Institute in Dynamic Systems	Ying Sun , ENG/CBET
6. AI-Augmented Learning	Amy Baylor , EHR/DRL
7. AI to Advance Biology	Sri Raghavachari , BIO/IOS
8. AI... Agriculture and the Food System	Steven Thomson , USDA NIFA

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National AI Research Institutes is a multi-sector program, represented by program directors from all NSF research and education directorates, as well as by key program officers representing the artificial intelligence priorities of our partner agencies. Many program contacts are attending the webinar. The contacts listed here will speak later in this webinar on behalf of Institute themes. We are also joined by representatives from partner organizations. In the program solicitation you will find a full list of program contacts for the themes and their organizational affiliations.



Welcome

Erwin Gianchandani

Deputy Assistant Director, Directorate for Computer and Information Science and Engineering (CISE)

Henry Kautz

Division Director, CISE Division of Information and Intelligent Systems

We will begin with a welcome from our NSF leadership in this program and a few words about the role and growth of this national initiative.

Here together to do this are
Erwin Gianchandani, the Deputy AD for CISE, and
Henry Kautz, the Division Director for IIS

First, Erwin --



Background

- **2019 Update to National AI R&D Strategic Plan**
Strategic priority 1: **long-term investments in AI**
- May 2019: NSF Convening of potential partners
- Oct 2019: FY20 Solicitation Released
- Aug 2020: NSF and USDA-NIFA announcements
 - 7 new Institutes
 - 11 planning grants




[Erwin Gianchandani]

Thanks, Jim. I am Erwin Gianchandani, Deputy Assistant Director for the NSF Directorate for Computer and Information Science and Engineering (CISE). On behalf of the NSF Director, Dr. “Panch” Panchanathan, the CISE AD Margaret Martonosi, and the entire leadership of NSF, I would like to welcome you and thank you for your interest in the AI Research Institutes program. We are very pleased that you have joined us to hear more about this funding opportunity, which is a continuation of the nation’s flagship investment in AI research and education.

This program is rooted in the national imperative to lead in AI research and development. Last year, NSF joined other federal agency partners in announcing the release of the [2019 Update to the National AI R&D Strategic Plan](#). The first strategic priority in this plan is to “Make long-term investments in AI research”. Accordingly, NSF and partner agencies collaborated to launch this new national initiative in AI, and we are pleased and proud to share with you the results of the first year and our plans for the growth of this program. I’ll say more about the growth of the program in a minute, but first let me turn to Henry Kautz, who will tell you about the program’s inaugural Institutes.

Henry is our lead division director for the program, and an eminent AI researcher himself.

Henry...

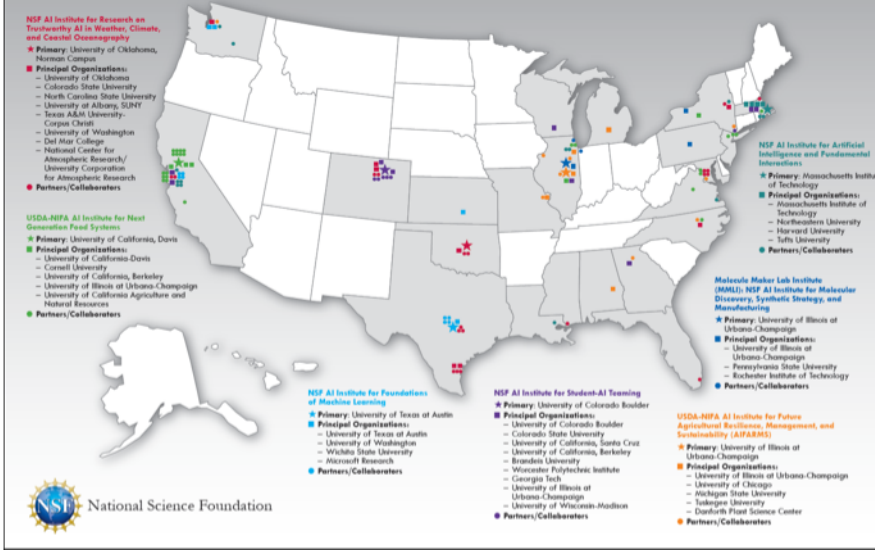


Year 1

- 5 NSF Institutes
- 2 NIFA Institutes
- 11 Planning grants
- [Announcement](#)
- [Link to all awards:](#)
[NSF Award Search](#)

Artificial Intelligence (AI) Research Institutes

The NSF-led AI Research Institutes—two USDA-NIFA AI hubs plus five NSF—comprise the nation's most significant single federal investment in AI to date and will advance national competitiveness in AI by accelerating research, transforming society, and growing the American workforce.



NSF AI Institute for Research on Trustworthy AI in Weather, Climate, and Coastal Oceanography

• **Primary:** University of Oklahoma, Norman Campus

• **Principal Organizations:**

- University of Oklahoma
- Colorado State University
- North Carolina State University
- University at Albany, SUNY
- Texas A&M University–Corpus Christi
- University of Washington
- National Center for Atmospheric Research/University Corporation for Atmospheric Research

• **Partners/Collaborators**

USDA-NIFA AI Institute for Next Generation Food Systems

• **Primary:** University of California, Davis

• **Principal Organizations:**

- University of California-Davis
- Cornell University
- University of California, Berkeley
- University of Illinois at Urbana-Champaign
- University of California Agriculture and Natural Resources

• **Partners/Collaborators**

NSF AI Institute for Foundations of Machine Learning

• **Primary:** University of Texas at Austin

• **Principal Organizations:**

- University of Texas at Austin
- University of Washington
- Wichita State University

• **Partners/Collaborators**

NSF AI Institute for Student-AI Training

• **Primary:** University of Colorado Boulder

• **Principal Organizations:**

- University of Colorado Boulder
- Colorado State University
- University of California, Santa Cruz
- University of California, Berkeley
- Brandeis University
- Worcester Polytechnic Institute
- Georgia Tech
- University of Illinois at Urbana-Champaign
- University of Wisconsin-Madison

• **Partners/Collaborators**

NSF AI Institute for Artificial Intelligence and Fundamental Interactions

• **Primary:** Massachusetts Institute of Technology

• **Principal Organizations:**

- Massachusetts Institute of Technology
- Northwestern University
- Harvard University
- Tufts University

• **Partners/Collaborators**

NSF AI Institute for Molecular Structures, Synthetic Biology, and Manufacturing

• **Primary:** University of Illinois at Urbana-Champaign

• **Principal Organizations:**

- University of Illinois at Urbana-Champaign
- Pennsylvania State University
- Rochester Institute of Technology

• **Partners/Collaborators**

USDA-NIFA AI Institute for Future Agricultural Resilience, Management, and Sustainability (AFARMS)

• **Primary:** University of Illinois at Urbana-Champaign

• **Principal Organizations:**

- University of Illinois at Urbana-Champaign
- University of Chicago
- Michigan State University
- Indiana University
- Danforth Plant Science Center

• **Partners/Collaborators**


[Henry] Thanks Erwin. Hello, I'm Henry Kautz, lead division director for the program and as Erwin says, a career AI researcher myself. I am currently serving at NSF on rotation from University of Rochester. I am greeting you on behalf of all of division directors participating in the program last year and this year. We are very pleased to share with you the success of the first year of this program. Last month, NSF joined with USDA's National Institute for Food and Agriculture, to announce the creation of seven new AI institutes—five of these funded by NSF and two funded by USDA. These institutes, along with several planning grants, will advance foundational AI in areas such as trustworthiness and the foundations of machine learning, while addressing pressing issues of national importance, such as extreme weather preparedness, bioengineering technology, navigation, learning, and robust food systems. We hope you will explore our announcement and listings of awards to see how these seven institutes are addressing frontier AI challenges as truly collaborative research and education hubs.

We see these as inaugural institutes in what we intend to be a network of National AI Research Institutes. As you will see in this webinar, in this next round we will further grow this network to continue to advance AI, add to the sectors of impact, and engage more of you in maintaining US leadership in AI. We look forward to seeing

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what you propose.



Now back to Erwin.





Growing the AI ecosystem

- New partnerships
- New themes
- [Read more](#)

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[Erwin] Thanks Henry. Our first year’s results are outstanding thanks to a true team effort. Nearly 60 program officers have contributed significantly to making this program a success in its first year. While it is not possible to name them all, I know the efforts of each one and I do want to *thank* them all. They represent 18 different NSF divisions plus USDA, DOT, and DHS, and this program would not have been possible without their service and hard work. We are very proud of the truly NSF-wide and multi-agency commitment that this represents. We fully expect the program will continue and grow in this way, befitting a multidisciplinary national initiative.”

Let me just close by expanding on what Henry called “growing the network” of AI Institutes. First of all, the program has expanded to include several industry funding partners. Our returning agency partners are

- U.S. Department of Agriculture (USDA) National Institute of Food and Agriculture (NIFA),
- U.S. Department of Homeland Security (DHS) Science & Technology Directorate (S&T), and
- U.S. Department of Transportation (DOT) Federal Highway Administration (FHWA),

We are very pleased that Accenture, Amazon, Google, and Intel Corporation have joined us this year to maintain and strengthen U.S. leadership in AI. Our national competitiveness benefits from partnerships of all kinds. These new program-level industry partnerships add a new dimension, complementing the myriad partnerships and collaborations you can engage in your institutes.

The other way we are growing this network, is by introducing this year's eight themes that are important and timely for our AI ecosystem--some of these are continuing and some new. You will hear much more about them in the webinar and have a chance to ask questions of the theme contacts.

In closing I would just like to say again how excited we are at NSF to continue to grow a strong science and engineering ecosystem for the advancement of artificial intelligence. And I want to thank you again on behalf of the participating NSF directorates and partner organizations for your attention to this national priority.



Outline

- Program overview and structure
- A detailed look at the themes of this solicitation
- Program-wide considerations
- Future plans
- Questions

[Jim]

Thank you, Erwin and Henry. The webinar is intended to familiarize participants with the new solicitation in the National AI Research Institutes program, and to help you prepare and submit proposals that are consistent with the goals of the program. You have just heard from our leadership about the background and strategic importance of the program. We will continue with an overview of the program, discuss its scope and focus, outline the key features of the solicitation, offer some practical considerations for submitting to the program, and address the most common questions about this solicitation.

As mentioned prior to the start of the presentation, **we will take questions via the Zoom Q&A feature**, and we will address as many of those questions as we can at the end.



National Artificial Intelligence (AI) Research Institutes

- **Continuation of a multi-year, multi-sector national initiative.**
 - Agency partners: NSF, USDA-NIFA, DOT FHWA, DHS
 - Industry Partners: Accenture, Amazon, Google, Intel
- **Goals:**
 - Significantly **advance research in AI** (foundational, use-inspired)
 - Accelerate the development of **transformational, AI-powered innovation**
 - **Grow a workforce** of future AI researchers and practitioners
 - **Nexus points** for further collaboration between universities, federal agencies, industries, and nonprofits

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We begin with the program at a glance.

This program is a continuation of a joint effort between NSF and partners to establish a network of AI Research Institutes that enable larger-scale, longer-term research. As you saw earlier, the funding partners in the program include these government agencies and industry partners.

The overarching goals of the program are to

- Make long-term investments in AI research in areas with the potential for long-term payoffs in AI,
- Where that payoff includes the potential to accelerate the development and transition of transformational, AI-powered innovation
- To grow a workforce of future AI researchers and practitioners, and
- To create national nexus points for broader collaboration between the institutes and diverse external organizations including universities, federal agencies, industries and nonprofits.



New/changes

- Desiderata (and corresponding solicitation-specific evaluation criteria)
 - Expanded from five to six to emphasize separately the goals that Institutes be **multidisciplinary** and that they be comprised of **multiple organizations**
 - Relationship between **foundational AI** and **use-inspired research** clarified and emphasized
 - In **nexus points**, the importance of collaboration with partners external to the Institute is emphasized
- Limit on Number of Proposals per Organization: 2 (new restriction)
- Limit on Number of Proposals for Senior Personnel: 1 (equivalent to the restriction in the prior solicitation for the "Institute Track")

We are now in our second year, and here we would like to orient you to some of the significant changes in this solicitation from the last. Overall the program scope and structure is very consistent with the first year. However, please take note of the significant changes as listed at the top of the solicitation. Among those,

We have expanded our desiderata for Institutes from five to six, to separately and more clearly emphasize two distinct notions of multidisciplinary and multi-organizational. We also have revised the way we describe several others. We will expand upon each in a few slides.

We also call your attention to these very important limits on the number of submissions, both for individuals in the capacity of senior personnel, and for organizations submitting as lead. Again, more detail later in the webinar.



This solicitation:

- **Must respond to one (or more) of eight identified themes**

1. Human-AI Interaction (CISE/IIS, EHR/DRL, SBE, Google, Amazon)
2. AI Institute for Advances in Optimization (CISE/IIS+CCF, ENG/CMMI, Intel)
3. AI and Advanced Cyberinfrastructure (CISE/OAC)
4. Advances in AI and Computer and Network Systems (CISE/IIS+CNS)
5. AI Institute in Dynamic Systems (ENG, MPS/DMS, CISE/IIS)
6. AI-Augmented Learning (EHR, ENG, CISE, Accenture)
7. AI to Advance Biology (BIO, CISE)
8. AI-Driven Innovation in Agriculture and the Food System (USDA/NIFA)

- Cooperative Agreements for 4-5 yr/\$16-20M institutes to be awarded in ~~2020~~ 2021.

Corrected

- Deadline **Dec 4, 2020**

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In this iteration of the program, Institute proposals are being solicited in eight high-priority areas. Here you can see the various directorates and partners who have made specific commitments to the various themes. These themes will be detailed later by the respective theme leads.

Institute awards will be in the form of cooperative agreements of between \$16,000,000 and \$20,000,000 for between four and five years (with average yearly budgets around \$4,000,000). Do not submit total budgets in excess of \$20M.

The deadline for proposals to this solicitation is Dec 4, 2020.

I am now going to turn to my colleague, Rebecca Hwa, who will carry on to describe the desiderata for AI Research Institutes.



Desiderata for All AI Research Institutes

1. Advance foundational research
2. Conduct use-inspired research
3. Grow the next generation of talent
4. Be multidisciplinary
5. Leverage multiple organizations
6. Be nexus points for collaborative efforts

We now turn our attention to the activities that constitute an AI Research Institute in this program. This is what we think of as the “global scope” of the program. The vision for the program is broad and ambitious. It is expected that each AI Research Institute will pursue this vision in a unique way. In so doing, each Institute must address each of the six desiderata common to all AI Research Institutes.



Advance Foundational AI Research

- Add significant new knowledge and understanding to artificial intelligence and demonstrate the potential to radically advance areas beyond the state of the art.
- Address new foundational AI research priorities that arise from rapid advances in AI and the increasing ubiquity of AI-enabled technology.
- Address areas in clear need of larger efforts over longer timeframes; the research will have broad and lasting impact.

The first function of Institutes, and critical to all proposals to this program, is that AI Research Institutes must advance foundational AI research. This means adding significant new knowledge and understanding to the AI research central to your Institute's vision. Institutes might address new foundational AI research priorities that arise from rapid advances in AI and the increasing ubiquity of AI-enabled technology; or challenge disciplinary divisions that result from the current state of specialization, or promote the establishment of new science, engineering and

educational communities that better reflect the long-term research needs for future AI.



Advance Foundational AI Research: Scope of AI

- Understanding the mechanisms underlying thought and intelligent behavior and their implementation in machines.
- “Core” theory and methods that give rise to these abilities and their implementation in machines
 - Research in all matters of learning, abstraction, and inference required for intelligent behavior
 - General architectures for intelligence, integrated intelligent agents, and multiagent systems.

To understand the foundational AI research that is the scope of this program, we summarize here the definition of AI provided in the solicitation. This definition helps to scope what the program is looking for in seeking to “significantly advance research in AI”.

In a broad sense, AI is concerned with understanding the mechanisms underlying thought and intelligent behavior and their implementation in machines. What we often refer to as “core” AI research are methods pertaining to the learning, abstraction, and inference considered essential for the implementation of intelligent behavior in machines. Core AI research also includes the study of architectures intended to directly manifest that behavior, including general architectures for intelligence, integrated intelligent agents, and multiagent systems.



Advance Foundational AI Research: Scope of AI, continued

- AI is a multidisciplinary endeavor
 - Computational methods draw insight from fields such as biology, neuroscience, behavioral and cognitive science.
 - Computer vision and human-language technologies provide critical capabilities to many AI systems.
 - Robotics is closely aligned with but not identical to embodied AI. AI systems may be able to act upon the world through embodiment.

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The modeling and implementation of intelligent behavior in machines began as, and has continued to be, a multidisciplinary endeavor.

Many computational models of intelligence have drawn inspiration from living systems, drawing from biologically-inspired computing, computational neuroscience, and behavioral and cognitive science.

Computer vision and human-language technologies have a high overlap with artificial intelligence, inasmuch as they provide methods for the perceptual and communications capabilities critical to intelligent systems.

Robotics is closely related to, but not identical to, AI. Robotics can provide the embodiment critical for intelligent systems to be able to act upon the world. While an embodied AI may be a robot, this solicitation's focus is on the AI aspect of the research. For example, this solicitation does not include in its scope development that is mainly focused on teleoperated robots or robots that repeat programmed instructions in controlled environments.

This definition of AI establishes the scope of research activities that are appropriate

for any submission to the program.

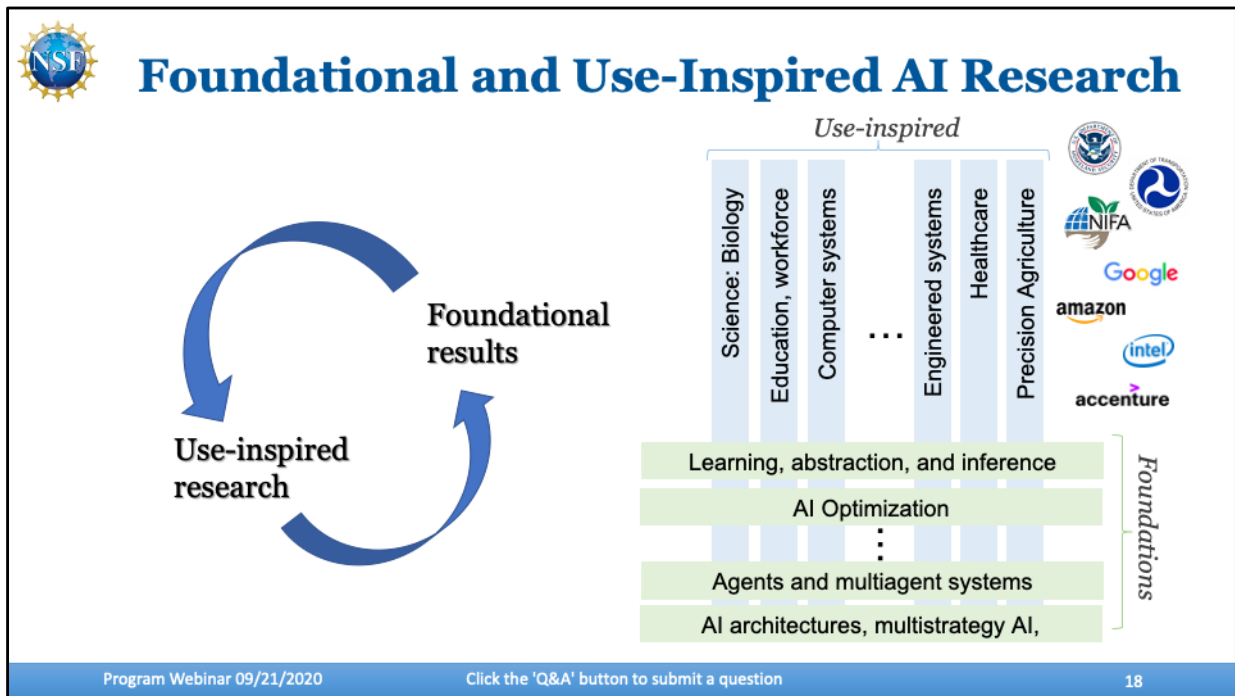


Conduct Use-Inspired Research

- Basic research that has use for society in mind
- Use-inspired research is a context that informs foundational AI advances and drives innovations in related sectors through use cases
- Clear and compelling goals to advance AI and to accelerate the fielding of AI-powered innovation
- Enhances the transfer of knowledge through the meaningful exchange of scientific and technical information with internal participants and external stakeholders.
- Creates the potential for the creation and sharing of community infrastructure, including data and software, to further research, promote reproducibility, and support education.
- Within the use-inspired context, balance the application of AI with the advancement of foundational AI as appropriate to your Institute vision

Second, AI Research Institutes will conduct use-inspired research. This refers to basic research that has use for society in mind. In the AI Institutes program, this means that a use-inspired context both informs the foundational AI research we just discussed and drives innovations in the related sectors through focus on use cases or application. The solicitation emphasizes that this should be conveyed in terms of clear and compelling goals, enhances knowledge transfer, and creates the potential for shared community infrastructure.

It is important to understand that use-inspired research is complementary to the first goal of advancing foundational AI, further expanding the context and value of the Institute's vision. A compelling use-inspired context should balance the application of AI with the advancement of foundational AI in a way that is appropriate to your Institute vision.



The goal in this program is that each institute incorporate substantial efforts in both foundational AI research and use-inspired research such that they form a virtuous cycle in which

- Foundational results provide a starting point for use-inspired research, and
- Results from use-inspired application areas are generalized and made foundational.

We use the phrase "use-inspired" rather than "applied" to emphasize that this solicitation seeks to support work that goes beyond merely applying known techniques, and adds new knowledge and understanding in both foundational AI and use-inspired domains.

The sectors for such use-inspired research are many and may be aligned with any area of science and engineering, segments of the economy, or societal needs. Illustrated here is the principle that the range of use-inspired research may, where appropriate, relate to areas emphasized in an Institute theme. Such research might also be motivated by the sectors represented by solicitation partners. The same applies to those applicable to the partnerships and collaborations uniquely enabled by your proposed institute. You should devise your use-inspired research in such a

way that it promises maximum impact to the advancement of AI, the goals of your theme, and the unique capabilities and opportunities you and your team bring to the proposal.



Next Generation of Talent

- Leverage the visionary nature of the research foci to drive innovative education for multiple kinds of educational institutes:
 - Undergraduates, graduate students, and post-doctoral researchers,
 - Community colleges and skilled technical workforce training,
 - Other opportunities that advance knowledge and education of AI.
- Develop innovative pedagogy and instructional materials, advanced learning technologies, project-driven training, cross-disciplinary and collaborative research, industry partnerships, and new career pathways.
- Offer broad, deep, and diverse experiences with a focus on broadening participation among the full range of groups traditionally under-represented in science and engineering.

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Third, AI Research Institutes are expected to actively build the next generation of talent for a diverse, well-trained workforce.

Specifically, these Institutes should leverage the visionary nature of their research foci to drive new and innovative education and development tailored toward the Nation's undergraduates, graduate students, and post-doctoral researchers, as well as through community colleges and skilled technical workforce training and other opportunities that advance knowledge and education of AI, including public understanding of AI.

This could include innovative pedagogy and instructional materials, advanced learning technologies, project-driven training, cross-disciplinary and collaborative research, industry partnerships, and new career pathways.

Institutes should offer broad, deep, and diverse experiences to build the next generation of the AI workforce, with a focus on broadening participation among the full range of groups traditionally under-represented in science and engineering. AI Research Institutes should maximize their unique position to grow the next generation of talent that will provide new discoveries and leadership.



Be Multidisciplinary

- Coherent multidisciplinary groups of scientists, engineers and educators appropriate for a large-scale, long-term research agenda for the advancement of AI and the fielding of AI-powered innovation.
- Catalyze foresight and adaptability beyond what is possible in single research projects.

Fourth, AI Research Institutes are coherent multidisciplinary groups of scientists, engineers and educators appropriate for a large-scale, long-term research agenda for the advancement of AI and the fielding of AI-powered innovation in application sectors of national importance. The multidisciplinary nature of these Institutes will catalyze foresight and adaptability beyond what is possible in single research projects.

This objective echoes the program's observation that AI itself has traditionally been highly multidisciplinary, and that use-inspired research requires synergy among a group of researchers to enable transformative advances in AI, related sectors, and the interfaces between these areas.



Leverage Multiple Organizations

- Create significant new research capabilities in new centers of AI leadership.
- Create a network for broadening participation from underrepresented groups and diverse institutions.
- Meaningfully integrated into a diverse Institute that is more than just the sum of the parts.
- Will be staffed with a Managing Director or Project Manager (distinct from the lead PI) and a suitable Management Team

Potential Advisory Board members should not be approached or identified until the Institute is funded

Fifth, AI Research Institutes are expected to be comprised of multiple organizations working together to create significant new research capabilities. NSF and partner organizations seek to grow the network of National AI Research Institutes in lead organizations distributed throughout the country to grow new centers of AI leadership and leveraging existing centers of excellence as appropriate. Institutes are strongly encouraged to include organizations that can directly contribute to NSF's commitment to broadening participation by engaging a diverse, globally engaged research community, integrating research with education and building capacity, and expanding efforts to broaden participation from underrepresented groups and diverse institutions across all geographical regions. Participants should be meaningfully integrated into a diverse Institute that is more than just the sum of the parts. In addition to a lead PI suitable to lead an Institute, each Institute will also be staffed with a Managing Director or Project Manager. Note that a change in this solicitation is that we require, rather than suggest, that this person be distinct from the lead PI.

It is important to emphasize – While an External Advisory Board is required, **please do not contact, invite, or identify in your proposals any potential Advisory**

Board members. This step should be taken after the merit review and selection process is complete.



Nexus Points for Collaborative Efforts

- Bringing together people, ideas, problems, and technical approaches for maximum impact.
- Engagement and growth of external partnerships to bring together people, ideas, problems, and technical approaches for maximum impact and knowledge transfer activities.
- Promote organizational collaborations among the best teams and approaches from institutions of higher education, federal agencies, industry, and nonprofits/foundations.
- Use this network of partners and affiliates to further the Institute's mission to broaden participation in research and education.

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Sixth, AI Research Institutes are expected to be nexus points for collaborative efforts. By “nexus point”, we refer to the role that an institute can play in creating an organization that encourages the continuing growth of collaborations – especially with external partners that can further enhance the impact of the Institute.

Institutes are expected to bring together the best teams and approaches from diverse organizations such as institutions of higher education, federal agencies, industry, and nonprofits/foundations. They promote organizational collaborations and linkages within and between campuses, schools, and the world beyond, broadening participation in research, education, and knowledge transfer activities through a network of partners and affiliates. NSF and its partners encourage institutes composed of a range of organizations.



FY 2021 Institute Themes

This year, Institute track proposals are being solicited in eight high-priority areas:

1. Human-AI Interaction
2. AI Institute for Advances in Optimization
3. AI and Advanced Cyberinfrastructure
4. Advances in AI and Computer and Network Systems
5. AI Institute in Dynamic Systems
6. AI-Augmented Learning
7. AI to Advance Biology
8. AI-Driven Innovation in Agriculture and the Food System

NSF estimates approximately 8 awards on the expectation that each theme will result in a new AI Research Institute

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We now turn our attention to the eight specific themes in which proposals are solicited for the Institute track. This year, Institute track proposals are being solicited in these high-priority areas. They are themes representing a subset of research areas that NSF and partners support, and which were determined to be both an immediate priority for funding partners and for which the research community was judged to be ready to respond this year.

The question sometimes arises about whether it is allowable to submit an Institute proposal that intends to address multiple themes. The solicitation allows for this, and we will address this further later.

NSF estimates approximately 8 awards on the expectation that each theme will result in a new AI Research Institute. The number of Institutes funded within or across themes will vary based on the quality of proposals, availability of funding, and other considerations.

I will now invite my colleagues who are principle points of contact for each theme to describe each at a high level. Please consult the solicitation for full descriptions of each theme, and direct questions about the specifics of these themes to the POCs

listed there.

Prabha...



1: Human-AI Interaction and Collaboration

- Address multi-user, multi-AI, multimodal interaction for teamwork in mixed human-AI groups.
- Inclusive approach by embedding:
 - Scientific excellence and ethics; Personal and social values; Different cultural and linguistic communities; Accessible and adaptive techniques for varying abilities and disabilities.
- Ensure use of fair and transparent principles:
 - Understood and vetted by the community and appropriately modified by stakeholders, avoiding unjust bias.
 - Accountability and privacy leading to trustworthy and safe collaboration.
- Include use-inspired research involving multiple domains of human-AI interaction and collaboration.
- Create new scientific methods, measurement and analysis techniques, effective metrics and engineering best practices for verification, validation, and performance monitoring in real-world environments.
- *Partial support for this theme is provided by Amazon and Google.*

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Good Afternoon. I am Prabha Prabhakaran, Program Director in the Division of Information and Intelligent Systems. Theme 1 is on Human-AI Interaction and Collaboration. This theme addresses multi-user, multi-AI, multimodal interaction for teamwork in mixed human-AI groups.

Even with the significant research advances made so far, most human-AI systems today handle only short, unambiguous exchanges. To overcome this important limitation, this theme envisages systems with seamless human-AI interaction and collaboration, leveraging multiple modalities such as: spoken or written natural language, vision, gesture, affective sensing, tactile and physical interaction, mixed and augmented reality environments, and combinations of these modalities. For humans to truly consider and work with AI systems as a collaborator, AI systems will need to earn their confidence by operating on fair and transparent principles. AI systems have to learn the goals and preferences of humans during interaction in order to support trustworthy and safe collaboration.

To achieve these objectives, researchers would have to employ participatory and

inclusive design, by embedding scientific excellence and ethics; Address personal and social values while taking care of different cultural and linguistic communities; and incorporate accessible and adaptive techniques for varying abilities and disabilities. The solicitation expects human-AI Interaction and Collaboration institute to include use-inspired research involving multiple domains and create new scientific methods, measurement and analysis techniques, effective metrics and engineering best practices for verification, validation, and performance monitoring in real-world environments.

Next up is Roger Mailler for Optimization.



2: AI Institute for Advances in Optimization

Integrating perspectives from both classical constrained and unconstrained optimization for solving previously “impossible” large-scale problems in planning, resource allocation, strategic reasoning, network and system design and optimization, hardware and software design and verification, and general combinatorial optimization and search.

- Cast a wide net (by discipline and organization).
 - Tie multiple computational approaches together with theory
 - Mathematics, computer science, and operations research approaches/perspectives are all important
 - Deterministic, probabilistic and/or approximate methods are acceptable
- Multiple use cases demonstrates generality of the approach
 - Should include automated design, management of computer systems, software or hardware
- *Partial support for this theme is provided by the Intel Corporation*

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Hello. I'm Roger Mailler, Program Director in the Division of Information and Intelligent Systems.

The AI institute for advances in optimization will support fundamental research in new technologies, methodologies, and approaches for solving large-scale optimization problems that are currently considered impossibly difficult and are not likely to become solvable through incremental improvements in hardware and software. We believe that this goal can be achieved by integrating and expanding on advances in operations

research, theoretical computer science, mathematics, and artificial intelligence.

Proposers to this theme should focus on developing a national-scale institute that brings together researchers from the classical constrained and unconstrained, data-driven, and theoretical optimization communities. Therefore, proposals that cast a wide net across disciplines and participating organizations are encouraged.

Successful institute proposals should focus on fundamental, multi-perspective advances that are driven and inspired by multiple use cases. It is important to select use cases that demonstrate the applicability and generality of any proposed advances. Some of these use cases should involve automated design, management of computer systems, software or hardware. We encourage anyone interested in submitting a proposal to review the theme description in the solicitation and to contact the theme PDs with any questions.

Next up is Tevfik Kosar from OAC.



3: AI and Advanced Cyberinfrastructure

Seeking the acceleration and transformation of AI research and practice enabled by advanced CI, and the integration of AI technologies toward a smarter, robust, and more effective CI ecosystem.

Activities of this institute can be in one or both of the following focus areas:

- 1) Development of next-generation advanced CI powered by AI technologies **(AI for CI)**.
- 2) Acceleration and transformation of AI research enabled by advanced CI **(CI for AI)**.

The **translational nature of CI research** is emphasized by this Institute — that is, building on basic research results and spanning the design to practice stages. *Foundational research on computing systems and networking is not within the scope of this Institute.*

Good afternoon, I am Tevfik Kosar, Program Director in the Office of Advanced Cyberinfrastructure.

Theme 3 is on “AI and Advanced Cyberinfrastructure.” Translational research activities at an Institute for AI and Advanced CI will seek the acceleration and transformation of AI research and practice enabled by advanced CI, and the integration of AI technologies toward a smarter, robust, and more effective CI ecosystem.

Activities of an Institute for AI and Advanced CI might be in one or both of the following focus areas:

- 1) Development of next-generation advanced CI powered by AI technologies (what we also call AI for CI). AI has the potential to significantly improve and transform advanced CI in terms of its performance, scalability, interoperability, robustness, security, usability, maintainability, and energy efficiency. AI-integrated advanced CI can also support increased transparency and reproducibility and enable novel science and engineering application formulations. Translational research activities at this Institute may focus on

how AI technologies can inform and transform the design and operation of all aspects of advanced CI, including computing, software, data, networking, and application workflows.

2) Acceleration and transformation of AI research enabled by advanced CI (which is also called CI for AI). Revolutionary advances in CI capabilities and services can significantly reduce the time and effort required for the complex computations and the demanding data management requirements of AI research and can enable novel AI methods and applications. Advanced CI components that are carefully tailored and tuned for AI workloads potentially offer orders of magnitude improvement in the performance and scale of AI computations. Translational research activities at this Institute may focus on how the nation's advanced CI, including computing, software, data, networking, and application workflows, can be used to accelerate and transform AI research and its applications.

Proposers are encouraged to consider other aspects of an Institute under this theme based on their vision, expertise, and collaborations, and driven by science and engineering use-cases. Proposers should note that the translational nature of CI research is emphasized by this Institute — that is, building on basic research results and spanning the design to practice stages. Foundational research on computing systems and networking is not within the scope of this Institute.

For the next theme, I introduce Matt Mutka, Program Director in CNS.



4: Advances in AI and Computer and Network Systems

- AI to advance Computer and Network Systems design and deployment
 - AI techniques might address issues of performance, reliability, manageability and security in computer and network system design and deployment
 - Systems range from cloud computing and data centers, to edge-computing systems and embedded and real-time systems
 - Networks ranging from wireless cellular and sensor networks to datacenter and Internet-scale networks
- Address long-standing and emerging challenges in Computer and Network Systems to improve AI applications
 - Improved designs and programming environments may facilitate expansion of usage and impact of AI applications
 - Consider tradeoffs of performance, accuracy, timeliness, and energy usage
 - Consider operation of AI applications with integrity, confidentiality, resilience and robustness

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I am Matt Mutka, Program Director in the Division of Computer and Network Systems.

This theme considers both how AI techniques can be used to advance computer and network systems, and how advances in computer and network systems can improve AI applications. Research should put forward transformative ideas that address both

long-standing and emerging challenges in computer and network systems, broadly defined. Computer systems can range from cloud computing systems and datacenters, to edge-computing systems and embedded and real-time systems with networks ranging from wireless cellular and sensor networks to datacenter and Internet-scale networks.

AI innovations may be applied to the design and deployment of computer and network systems across one or more domains. For example, AI techniques may address issues of performance, reliability, and security in networked computer system components. Research may employ AI innovations on re-architecting hardware systems to remove computing, memory, storage, and networking performance bottlenecks for target applications. AI may be harnessed for management and control systems of wired and wireless networks, or integration thereof. Of interest are AI-driven autonomous network systems for network configuration and robustness. Innovative approaches to computer and network security in existing networked systems or new secure-by-design systems enabled by the application of AI are of interest.

Improved computer and network system designs may facilitate an expansion of the usage and impact of AI applications. Advances in network and storage system approaches to improve the scalability and performance of AI applications are of interest. These include innovations to deploy AI applications on distributed environments, resource constrained systems, and real-time distributed systems. Advances in heterogeneous architectures for AI accelerations may be considered, as well as the programming environments needed for advanced heterogeneous AI systems. Designs may improve performance of AI applications across many metrics and consider many tradeoffs, including performance, accuracy, timeliness, and energy usage. Advances in computer and network systems to enable AI applications to operate with integrity, confidentiality, resilience, and robustness are of interest.

Proposals may address any range of ideas that demonstrate how the Institute will advance both AI and core domains supported by the Division of Computer and Network Systems. Proposals may identify use cases that demand the capabilities explored in the proposed research and should describe a substantial evaluation plan, including datasets to be used, modeling and simulation techniques and platforms, and prototypes to demonstrate feasibility.

For the next theme, I introduce Ying Sun, Program Director within the Directorate for Engineering.



5: AI Institute in Dynamic Systems

Research and education in fundamental AI and ML theory, algorithms, and use-inspired engineering and science for real-time sensing, learning, decision making and predictions that lead the way towards safe, reliable, efficient, and ethical data-enabled engineering and science systems.

- Institutes will balance foundational advances in data science, ML, and AI with innovative domain research to enable transformative new capabilities for dynamic engineering systems.
- The ability to handle sparse and noisy datasets and improved measures of reliability are desired. Interpretability and physical consistency are important.
- Proposals that address a broad range of meaningful engineering application areas are encouraged.
- Register for the [Theme-specific webinar](#) (to be held Sep 25, 3-4 ET) for more on cover theme-specific goals, requirements, and Q&A.

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I am Ying Sun, Program Director in the Directorate for Engineering.

An AI Institute in Dynamic Systems supports research and education that combine data-driven approaches with physics-based models and experiments to enhance understanding of complex dynamic systems and enable real-time sensing, learning, and decision-making.

Challenges to deploy AI-powered engineering systems including requirements for safety and reliability, the desire to respond to uncertain and time-varying conditions

in real-time, and the need to make appropriate decisions based on sparse and noisy data are key considerations.

The Institute in Dynamic Systems will enrich research and education in a broad engineering community through its activities as a nexus for collaborative efforts. Other factors being equal, proposals that support a wider scope of impactful engineering applications will be preferred.

The proposals should describe a plan to make the datasets generated within the Institute publicly available and accessible.

For more in-depth information on submitting to this theme, we encourage you to register for and attend the [Theme-specific webinar](#) to be held Sep 25 from 3-4.

I am followed by Amy Baylor,
for the theme in AI-Enabled
learning.



6: AI-Augmented Learning

AI-driven innovations to radically improve human learning and education writ large—in formal and informal settings, training, and on the job.

- AI techniques to support STEM and STEM-enabling learning. Must advance both foundational AI and the learning sciences.
- Grand challenge of “Education for All”
- Institutes should include systematic plans to address algorithmic bias, provide model transparency and support data privacy and security in the support of learning.
- Added interest in an Institute in the area of AI-Augmented **Adult Learning**
- *Partial support for this theme is provided by Accenture*

I am Amy Baylor, Program Director in the Division of Research on Learning in Formal and Informal Settings.

The primary focus of an institute in the theme of AI-Augmented Learning includes research and

development of AI-driven innovations to radically improve human learning and education writ large.

This could include learning in formal settings, training, and on the job, as well as informal settings.

An institute in AI-augmented learning could focus on the support of STEM learning outcomes and STEM-enabling content such as literacy, self-regulation, creativity, curiosity, communication, collaboration and social skills.

Institutes must advance both

foundational AI and the learning sciences.

For example, an institute in this theme could also address the grand challenge of "Education for All" through research of AI-supported learning systems to radically expand access of learning to all Americans and in response to the rapidly changing landscape of jobs and work.

Proposals should also include systematic plans to address algorithmic bias, provide model transparency and support data privacy and security in the

support of learning.

An Institute in AI-augmented learning should include careful attention to the role of **human** teachers/educators, mentors and collaborators.

In addition to a call for an Institute in the general theme (as just described) there is interest in an Institute with the primary emphasis in Adult Learning. Proposals with this focus could advance research in AI techniques to focus on adult learning in the context of technologies and work environments of the future, including the spectrum of AI fields.

This could include AI-driven research in adult learning for specific industries or more broadly to address reskilling/upskilling and workforce trajectories. There is a possibility of funding two institutes in Theme 6, one with an Adult Learning focus.

Accenture is providing partial support for this Theme.

Next up is **Sri** Raghavachari from the BIO Directorate.



7: AI to Advance Biology

Seeking bold AI-based advances and information infrastructure to push the frontiers of biology, increase our understanding of complex systems, and provide a theoretical basis for original research across the biological sciences.

- Institutes may focus on AI developments for scalable and efficient approaches for analysis, modeling or visualization of high-resolution biological data across the phylogenetic spectrum and workflow design for novel experimentation for hypothesis generation and testing.
- These efforts should be synthetic, with deep and sustained engagement of biological and computer scientists to integrate their expertise and needs in the research focus of the Institute.
- Institutes may address a wide range of research foci, build new multidisciplinary communities, and create the workforce needed to capitalize on and complement advances in instrumentation and technology in biology.
- *Proposals should **not** focus on biomedical or clinical applications or specific human disease.*

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I am Sri Raghavachari, Program
Director in the Directorate
for Biological Sciences.

This Institute theme seeks bold AI-based advances and information infrastructure to push the frontiers of biology, increase our understanding of complex systems, and provide a theoretical basis for original research across the biological sciences.

In the past two decades or so, advances in genomics and instrumentation have allowed researchers to measure biological processes from molecules to ecosystems

which has led to the generation of large-scale datasets. AI-based methods are ideally suited to complement traditional analytic approaches to quantify and discover causal interactions and their manifold across levels of biology from these datasets.

An AI Institute to Advance Biology will bring together AI researchers with domain scientists with the appropriate biological expertise to develop new methods, high-performance computing architectures, modeling tools, workflow design, and data visualization schemes to take advantage of the large-scale datasets and experimental methods to advance biological research.

Such an institute would seek to advance foundational AI research with a view to problems in biology. For example, use dependent advances in this Institute would combine AI approaches with mechanistic modeling of biological processes to facilitate the development of theoretical frameworks and predictive models across biological scales to understand genotype to phenotype relationships.

These could include AI powered infrastructure or algorithms for data parsing or information gathering from heterogeneous sources. A goal for such institutes would be to aid in mechanistic interpretation of biological components and processes.

Since such applications of AI to biological problems will ultimately require observation and hypothesis testing, the Institute should incorporate directed efforts to build transdisciplinary teams made up of researchers led or co-led by biologists with appropriate domain knowledge as well as AI researchers and data scientists.

Finally, I would like to stress that human biomedical or clinical research is outside the scope of this theme. Proposals focused on biomedical applications of AI or specific human disease targets will be returned without review.

Next is Steve Thomson, from USDA to describe Theme 8.



8. AI-Driven Innovation in Agriculture and the Food System

Advancing AI with application throughout agriculture and food production systems to overcome today's major challenges in agriculture, build new multidisciplinary communities, and create the workforce needed for an AI-powered revolution in agriculture.

- AI applied strategically throughout agriculture and food production systems will transform agricultural production, nutrition, and food safety.
- Address the critical challenges associated with the adoption of AI in agriculture as well as engagement and connection with stakeholders.
- The USDA [Science Blueprint for 2020-2025](#) presents several themes where technology can meet these challenges.
- Institutes could address a wide range of research foci, build new multidisciplinary communities, and create the workforce needed for an AI-powered revolution in agriculture.
- *This Institute theme is funded by USDA NIFA*

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I am Steven Thomson, National Program Leader at the USDA NIFA.

AI-Driven Innovation in Agriculture and the Food System is a theme that is sponsored entirely by USDA-NIFA. Proposals submitted to this theme will designate NIFA as the intended funding agency.

Agricultural production is a use-inspired enterprise. AI applied strategically throughout agriculture and food production systems will transform agricultural production, nutrition, and food safety.

There are critical challenges associated with the adoption of AI in agriculture. The success of AI for this purpose will depend on

- engaging and connecting with stakeholders,
- social engagement on the processes and products of AI, and
- overcoming challenges in methods, data interpretation, privacy, and AI principles of fairness

AI Research Institutes that simultaneously advance foundational AI research and agriculture/food systems can address a wide range of research foci, build new

multidisciplinary communities, and create the workforce needed for an AI-powered revolution in agriculture. Examples of such activities are included in the solicitation, consistent with both the new USDA Agricultural Innovation Agenda and Science Blueprint for 2020 through 2025. The range of activities presented in the solicitation is only illustrative of potential scope; it is not to be taken as either prescriptive or limiting.

AI innovations are likely to be transferable to, or informative for, other agricultural application areas and to other themes across this overall initiative. NIFA encourages cross collaboration and sharing of information, where possible and through various forums, to further enhance expanding opportunities with AI. Efforts resulting from the theme will ideally support the research, education, extension, and economics endeavors designed to advance public knowledge and responsible commercial interests.

Questions specific to this theme should be directed to the National Program Director at NIFA, listed in the solicitation.

Back to Jim.



Education, Workforce and Broadening Participation

- Important goals for all institutes
- Actively build next generation of talent
- New and innovative approaches to education and development
- Integration of research and education
- Encourage mechanisms to engage participants in multiple settings
- Broadening participation at individual and organizational levels

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Thank you, Colleagues. Now that we have finished looking at the individual themes relevant to the Institute track, we would like to conclude with some observations that again pertain to the entire program. We hope it is clear from both program-wide desiderata and theme descriptions that the AI Research Institutes program is dedicated to robust activities in education, workforce development, and broadening participation. Institutes are expected to propose meaningful plans in these activities, and submission requirements make clear where this should be addressed, especially in the section, “Education and Workforce Development”, where proposals will present plans toward actively building the next generation of talent for a diverse well-trained workforce. In addition, your proposals will also include a designated section for Broadening Participation Plans, in which proposals will describe broadening participation objectives and strategies for achieving them, increasing diversity through the participation of underrepresented groups, including women, minorities, and persons with disabilities.



Industry Partners

- New in this solicitation
- Themes with industry partners

1. Human-AI Interaction
and Collaboration.



2. AI Institute for Advances
in Optimization.



6. AI-Augmented Learning.



Now we would like to shift our attention to the new industry partnerships that are a feature of this year's iteration of the program. Three of the eight themes are partially funded by the companies listed here. As funding partners in the solicitation, Accenture, Amazon, Google, and Intel, Corporation have each pledged approximately \$1M per year to the specific themes shown. NSF and partner agencies are delighted to join with these partners toward the common goal of maintaining U.S. leadership in AI research, education, and workforce development.



Industry Partners

Script on this slide has been MODIFIED to reflect a change to the FAQ since the Webinar. See bolded text and consult FAQ.

- **After award**, industry partners may offer collaboration opportunities to the funded institutes in their theme, including
 - software,
 - data sets,
 - other computing infrastructure, and/or
 - researchers-in-residence.
- Do NOT describe in any way prospective collaborations of any sort with these companies. (Mention of accomplishments, publications, results from prior collaborations are allowed).
- Do NOT contact industry partners or make any prior arrangements.
- Individual relationships with these partners may or may not affect your eligibility to be personnel on a proposal. Consult the [FAQ](#).

Solicitation-Wide



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Partner companies hope to collaborate directly with the Institutes funded in their respective themes. Please be sure to consult the solicitation's Program Description as well as the program FAQ for full details about these partnerships and how partners and institutes will engage with the program. Again we are very excited to include these partnerships in the program, and this is in part because of the potential for these partners to collaborate closely with the institutes funded in the themes they support. As you can see such collaboration might include direct contributions of resources such as software, data sets, or other computing infrastructure. A company may also arrange to fund its own personnel as researchers-in-residence to directly participate, part-time or full-time, with funded AI Institutes within the themes in which they are participating.

Please observe this important distinction in preparing your proposals. These four companies are funding partners, and so it is important to your proposal's compliance and eligibility that you do not contact or collaborate with these companies in any way in the preparation or content of your proposal. This applies to all proposals to this solicitation, and not just to themes associated with the partners. The solicitation and FAQ provide important guidelines that will help you navigate this. Some key points include,

- Do NOT include these funding partners as collaborators of any sort in your proposal to this solicitation. This means it is inappropriate (and unnecessary) for you to mention any prospective use of partner resources in your plan. To be clear it is fine if your proposal refers to past activities, results, accomplishments that involved collaboration with these companies.
- Do NOT contact industry partners about any aspect of the solicitation or their anticipated participation in this program. Do not make any prior arrangements
- As for the personnel you include in the proposal take care that NONE of your personnel (senior or otherwise) should have any active relationships with these partners **associated with the theme you are submitting to.** This generally means that individuals employed by, consulting for, or who are on an agreement to provide services for the partner may not participate in a proposal **to the theme that partner is contributing to. This relationship does not disqualify the individual from participating in proposals to other themes in this program.** This does NOT include receipt of awards structured as unrestricted gifts, grants, prizes, fellowships, or in-kind offerings. Keep in mind that including ineligible personnel will adversely affect your proposal's compliance with the solicitation. Consult the FAQ.

All of that is intended to help you navigate this successfully. I want to remind you, though, that outside of these ~~Program Partners~~ restrictions, you are encouraged to include in your proposal partnerships with industry and other organizations.



Notes on Submission and Eligibility

- Institutions who may apply.
 - Institutions of Higher Education (IHEs)
 - Non-profit, non-academic organizations
 - Other organization types MAY be included as subawardees on proposals
 - See special criteria for Theme 8 (USDA-NIFA)
- Limit on Number of Proposals per Organization: 2
 - Collaborative proposals are to be submitted from a single organization.
 - Limit applies to the submitting (i.e. “lead” organization)
 - No limit on participation as non-lead (collaborative) organizations
- Limit on Number of Proposals for Senior Personnel: 1
 - Senior personnel defined in PAPPG, includes but not limited to PI/co-PI
 - PI/co-PI are subset of “senior personnel”

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As we near the end, we would like to emphasize some of the important submission and eligibility requirements in the solicitation.

For proposals intended for funding at NSF (this is themes one through seven), two types of organization may apply in the role of lead organization, as shown. Other organization types MAY be included as subawardees on proposals. Further clarification on these types of organization can be found in the *PAPPG*. Note that USDA NIFA list a broader range of eligible organizations (for theme 8). Consult solicitation, and contact the NIFA program contact with any questions about eligibility.

Where submission limits are concerned, the number of proposals per organization is limited to two. For context, note that all proposals to this program are to be single-organization proposals. That is to say, collaborators from multiple organizations will submit a single proposal from a lead organization, with collaborations configured as subawards. So the submission restriction refers to submission to the program as lead organization. There is no limit on participating as a collaborative organization in other proposals, including as sub-award. Also note that this limitation has no relationship to

proposals submitted to or funded under other solicitations, including the first year of this program.

There are also limits on the number of proposals for senior personnel. An individual may be on at most one proposal as senior personnel. This includes but is not limited to the roles of PI and co-PI. Consult the PAPPG for definition of the role Senior Personnel. This also makes no reference to submissions or awards to the prior solicitation.

In the event that either of these limits is exceeded, compliant proposals will be accepted based on earliest date and time of proposal submission and remaining noncompliant proposals will be returned without review.



Frequently-Asked Questions

- [FAQ](#) for the program is published
- 40 general program questions
- Theme-specific questions

https://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf20123

Let me remind you that we have a set of frequently-asked questions posted for this solicitation. Note that this is a new FAQ, and while there is some overlap in the questions from last time, this one is revised and authoritative, so take note. We will now address several of the more common questions that arise about the program this year.



Other Frequently-Asked Questions

- **Can I submit an Institute proposal that responds to multiple themes? Is it a good idea?**
 - The solicitation allows for this.
 - It is advisable that relevance to any more than one theme be identified only in cases where significant activity is planned in the five desiderata for Institutes for those additional themes.
 - Consult program contacts in the respective themes for advice
 - If the proposal responds to multiple themes, list them all in Keywords according to *proposal preparation instructions* (project summary), with the most relevant one first

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First, “Can I submit an Institute proposal that responds to multiple themes? And Is it a good idea?”

We can answer the first. The solicitation allows for this.

As for whether this is a good idea, this is a matter of the quality of proposal, which will be determined in merit review. As such, it is advisable that relevance to any more than one theme be identified only in cases where significant activity is planned in the six desiderata for Institutes for those additional themes.

It is a good idea to consult with the respective program contacts for each theme to get advice about your specific situation.



Other Frequently-Asked Questions

- **What is the appropriate balance between foundational AI research and use-inspired research?**
 - The first two desiderata are not in opposition to one another!
 - Choose appropriate use-inspired research contexts that:
 - Drive advancement of foundational AI
 - Lead to application of AI with high impact in the relevant sectors
 - Facilitate transition of AI-powered innovation in those sectors

Another question that arises is about the appropriate balance between foundational AI and use-inspired research. We want to warn against inappropriately putting these concepts in opposition to one another and instead recall the “virtuous cycle” we aspire to, in which use-inspired research propels advances in foundational AI as well as progress in the application sectors that define that use-inspired context. Competitive proposals will have these goals meaningfully integrated. Institute plans that focus on application at the expense of foundational AI are not excelling at use-inspired research. Similarly, plans that merely take inspiration from those sectors but do not significantly advance those sectors are also not excelling at use-inspired research.



Other Frequently-Asked Questions

- **Where can I submit proposals for planning activities? Will the program announce a funding opportunity for planning activities in the future?**
 - This solicitation does not accept proposals for planning activities.
 - This program may in the future include new opportunities to submit planning proposals.
 - It is possible that other funding mechanisms/opportunities may support planning activities relevant to this program. Contact relevant POCs in those directorates/divisions.

Next, recalling that the last solicitation invited planning grants, this one does not. At this time, we are not announcing plans regarding future opportunities to submit planning proposals.



Other Frequently-Asked Questions

- **Letters of collaboration...**
- Should I obtain letters of collaboration from organizations appearing in the budget as collaborating organizations?
 - No, their participation should be described in your proposal.
- Can the letter include statements of support or capability?
 - No. Follow the guidance in the PAPPG (see Chapter II.C.2.j)
- Can/Should I obtain one from any of the funding partners?
 - No! Proposals featuring such collaborations will be returned without review. Collaborations with partners may take place post-award.
- If I am senior personnel in a proposal to this solicitation, may I provide a letter of collaboration for another proposal?
 - Yes

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Questions about letters of collaboration often arise. These letters are most helpful for you to substantiate the broader range of partners you will engage in your institute and are therefore appropriate for such things. They are not generally necessary from the organizations that are proposing as awardee and subawardee, as their roles and commitments should be clear in your proposal. Including too many of those can distract from the ones that are truly value-added. Avoid including letters that contain statements of support. Letters that contain statements of support are not allowed from anyone. As a reminder, do NOT obtain letters of collaboration from funding partners, as these will make your proposal noncompliant. Finally, note that if you are participating in a proposal to this solicitation, it does not preclude you from providing letters of collaboration to others.



Other Frequently-Asked Questions

- **How do the submission limits apply to campuses of the same university system?**
 - Follow the PAPPG and consult the related [Frequently Asked Questions \(FAQs\) on Proposal Preparation and Award Administration Related to PAPPG \(NSF 20-1\)](#)
 - **Eligibility:** “Can different campuses of the same university system submit separate proposals in response to a program solicitation that limits the number of proposals to one per organization?”
 - A distinct organization for this purpose:
 - Has its own DUNS and is registered via an NSF electronic system using that;
 - has separate Sponsored Projects Offices with the ability to submit proposals directly to NSF;
 - is listed as the awardee organization on the NSF Cover Sheet;
 - **and can therefore submit up to two proposals to this solicitation.**

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Because the solicitation limits the submissions per organization, universities with multi-campus systems sometimes ask for clarification about how the limit applies to their system. Follow the PAPPG and consult the related [Frequently Asked Questions \(FAQs\) on Proposal Preparation and Award Administration Related to PAPPG \(NSF 20-1\)](#)

As you see here, this is addressed under “Eligibility” in that PAPPG FAQ. We recommend you consult with your sponsored projects office and follow up with us if there are any remaining concerns.



Out-year Opportunities/Plans


- This solicitation is the continuation of what is expected to be a longer-range, multi-sector investment in AI research and education.
- Future funding opportunities :
 - *may* continue the use of identified themes corresponding to high-priority areas,
 - *may* be solicited in areas corresponding to planning activities funded in the previous round, and
 - will be responsive to emerging priorities emerging from the research community and areas of national importance.

We want to conclude with a word about the future vision for the program.

As you saw in the introduction, this program is a continuation of a national-scale, multi-sector investment in AI research and education. There may be future solicitations in this program, although we cannot comment definitively on such possibilities. As with this second year in the program, future solicitations may continue the use of identified themes corresponding to high-priority areas. If used, those future themes may be solicited in areas corresponding to planning activities funded in the previous round but will not necessarily include or be limited to these areas. NSF and partners strive to be responsive to the research priorities emerging from the community and will also evaluate future research priorities on the basis of the quality of proposals, progress in funded projects, and emerging national research priorities.



Questions

- **Submit your questions using the Q&A module** → 
- Questions will be addressed live, in the Q&A period (not in the module)
- **Program-wide** questions are encouraged
- Theme leads are here to address your **theme questions**
- If your question is not answered, feel free to email programmatic questions to AllInstituteProgram@nsf.gov; theme-related questions to relevant program contacts
- Webinar materials (slides, script, and audio recording) will be posted on the program/webinar web page

On behalf of the National Science Foundation and partner agencies, we would like to thank all of you for your time and would also like to thank you for your interest in programs at NSF.

This presentation will be made available in the coming days on the National AI Research Institutes program website. If you have any questions pertaining to the program, we encourage you to consult the program's Frequently-Asked Questions list. If you have questions of us now, please submit them through the Q&A module.

Once again, we thank you all for your participation.