

Overview of Federal Artificial Intelligence Research and Policy Issues

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Executive Summary

This document provides an update on federal policies and funding opportunities in Artificial Intelligence and machine learning (AI/ML). The release of ChatGPT and other generative AI technologies has significantly increased interest by the Biden Administration and Congress in this emerging technology. There is still a strong bipartisan consensus that the U.S. must maintain leadership in this technology and grow research and development investments, but there are growing concerns about negative impacts, such as misinformation/disinformation, bias, job disruptions and losses, and cyber and national security vulnerabilities, and discussions on potentially regulating the use of AI to minimize harm to the public.

AI/ML remains a top research priority under the Biden Administration and continues to enjoy strong bipartisan support given the wide range of applications in national security, health care, education, climate and energy, finance, manufacturing, agriculture, and scientific discovery. Since the passage of

the National Artificial Intelligence Initiative Act (NAIIA) in December 2020, which authorized \$10 billion in federal AI/ML research and development over five years, federal agencies have continued to grow investments in AI/ML and Congress has continued to appropriate funding. In FY 2023, nondefense AI R&D investments are \$1.8 billion, an increase of more than \$100 million or 6 percent, compared to FY 2022. While classified defense AI R&D investments are likely comparable, if not more, than nondefense investments. The goal of this National AI Initiative is to maintain U.S. leadership in AI research and development, lead the world in the development and use of trustworthy AI in the public and private sectors, and prepare the U.S. workforce for the integration of AI systems across all sectors of the economy and society. Over the last year, there has been increased focus on R&D to advance AI systems that are ethical, trustworthy, safe, and serve the public good. Even though the Biden Administration requested additional funding for AI R&D in the FY 2024 budget request, increases for AI R&D are unlikely. The debt ceiling deal will keep non-defense funding flat over the next two years, impacting federal research agencies that fund AI R&D.

The U.S. defines AI as a “machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations or decisions influencing real or virtual environments. Artificial intelligence systems use machine and human-based inputs to perceive real and virtual environments; abstract such perceptions into models through analysis in an automated manner; and use model inference to formulate options for information or action.” Machine Learning (ML) is a subset of AI often used to describe algorithmic self-learning based on sample sets of data.

Upcoming, larger-scale funding opportunities, subject to final congressional appropriations, include:

- Up to \$100 million for the National Science Foundation (NSF) **National Artificial Intelligence Research Institutes** competition planned for Summer 2023 with various topic areas, including one likely in partnership with NOAA on climate issues and more specifically on “artificial intelligence, machine learning and data science approaches to support workforce training, automate stewardship, develop trustworthy and responsible AI systems, and Cloud optimized AI and analysis ready datasets” and one track related to astronomy and astrophysical sciences;
- The Department of Energy (DOE) does not plan to have targeted AI/ML opportunities but AI/ML is an essential and critical component of major funding initiatives, including up to \$200 million for **Energy Earthshot Research Centers**, up to \$75 million for **Energy Earthshot Research Foundations**, up to \$400 million for **Microelectronics Science Research Centers**, and up to \$60 million in AI/ML applications for **applied energy programs**, including renewables, carbon management and nuclear energy applications; and
- NSF has proposed \$30 million to prototype the AI Research Resource in FY 2024, which will be an open cyberinfrastructure platform for AI and ML research that utilizes computing resources from NSF, DOE, and other agencies.
- While not large scale-scale, opportunities to raise profile and show international impact include the Department of State **Global Engagement Center** \$1 million funding opportunity with responses due July 31 to support applied research to identify and expose Kremlin disinformation networks in Ukraine, Belarus, and Eurasia, and the Department of State **Quad Multistakeholder Critical and Emerging Technology Program** \$230,000 solicitation with applications due July 21 to strengthen education and policy activities between the U.S., India, Japan, and Australia.
- The Department of Education’s Institute for Education Sciences is also investing more than \$30 million in innovative research in learning sciences coupled with advanced technology, such as

the most recent call for proposals in the **Transformative Research in the Education Sciences Grants Program**.

Below is more detailed information on AI/ML priorities for the Biden Administration and Congress, as well as research priorities and major funding opportunities across federal agencies.

Biden Administration Artificial Intelligence Priorities

AI/ML continues to be a top research and development priority for the Biden Administration. In its most recent multi-agency research and development priorities [memo](#) to shape the FY 2024 budget request, AI was listed as a critical and emerging technology area that federal agencies should prioritize in future budgets and a major focus would be on “fundamental and translational AI research to make AI trustworthy, equitable, robust, safe, secure, and both rights-and privacy-preserving.”

The Biden Administration launched the [National Artificial Intelligence Initiative Office](#) (NAIIO) within the White House Office of Science and Technology Policy (OSTP) to oversee interagency coordination and serve as a central point of contact for technical and programmatic information on AI activities between federal agencies, industry, academia, nonprofit organizations, professional societies, and State and Tribal governments. The Office is currently led by OSTP Director Arati Prabhakar and NAIIO Deputy Director Mark Latonero. Dr. Latonero replaced the Founding Director of the NAIIO—Dr. Lynne Parker—in January 2023 and plans to serve in this capacity for at least two years while he is on detail from the National Institute of Standards and Technology (NIST). While at NIST, he served as a senior policy advisor on AI on the Trustworthy and Responsible AI team and helped draft NIST’s [AI Risk Management Framework](#).

PCAST and White House Meetings on AI

President Biden has taken a personal interest in the safe and equitable deployment and use of AI/ML. He charged his President’s Council of Advisors on Science and Technology (PCAST) to provide recommendations on how to address the limitations and challenges of AI adoption and use. In May, PCAST [met](#) to hear from experts on both the benefits of AI for science as well as the limitations and challenges. PCAST is meeting regularly to discuss AI issues and provide an initial set of recommendations at its next July meeting. This is in response to the Biden Administration’s growing concerns that AI technologies, such as ChatGPT, could be used to discriminate or spread harmful information and calls by both Congress and the White House to establish rules or legislation to regulate the industry. PCAST will likely provide advice on how to build trustworthy, responsible, safe, and ethical AI systems that could benefit society broadly.

At the same time, in June, the White House announced that key White House officials are meeting two to three times a week with leading experts from industry, academia, and other stakeholders to understand the wide-ranging impacts of this technology and potentially regulate its use. The Biden Administration plans to build on the October 2022 [Blueprint for an AI Bill of Rights](#) that seeks to guide the federal approach to ensuring privacy and equity in the use of AI, including avoiding algorithmic discrimination, urging data protection, and highlighting human alternatives to AI abilities. In February 2023, Biden also signed an [Executive Order](#) that directs federal agencies to rid new technologies of bias. In June 2023, the Biden Administration also [announced](#) a new National Institute of Standards and Technology (NIST) public working group with a focus on generative AI, following a roundtable discussion with AI experts in California earlier in June.

National AI Strategy and Leading Applications

In May 2023, the White House Office of Science and Technology Policy (OSTP) released a [Request for Information](#) from key stakeholders to provide recommendations on future AI national priorities and investments to develop the first National AI Strategy. The Biden Administration is seeking to develop the first National AI Strategy with the goal of developing a more cohesive and comprehensive approach to AI-related risks and opportunities. The purpose of the strategy is to understand recent and projected advances in AI and make sure that the United States is responsive and ready for new opportunities and challenges posed by AI, including global changes and threats over the next decade. Responses were due July 7.

In May 2023, OSTP also released a new [National AI R&D Strategic Plan](#), an update to the second plan issued in 2019. The updated National AI R&D Strategic Plan defines major federal research opportunities and challenges in AI. The focus is on maintaining U.S. leadership in the development and use of trustworthy AI systems, prepare the current and future U.S. workforce for the use of AI across all sectors, and coordinate ongoing AI activities across federal agencies. The plan identifies AI as a national priority, but a new emphasis in the updated plan is research and development to advance AI systems that are ethical, trustworthy, safe, and serve the public good. The updated plan reaffirms eight priority areas that were identified in the [2016](#) and [2019](#) plans and adds a ninth for a coordinated approach to international collaboration in AI research:

1. Make long-term investments in fundamental and responsible AI research.
2. Develop effective methods for human-AI collaboration.
3. Understand and address the ethical, legal, and societal implications of AI.
4. Ensure the safety and security of AI systems.
5. Developed shared public datasets and environments for AI training and testing.
6. Measure and evaluate AI systems through standards and benchmarks.
7. Better understand the national AI R&D workforce needs.
8. Expand public-private partnerships to accelerate advances in AI.
9. Establish a principled and coordinated appropriation to international collaboration in AI research.

The Biden Administration has also highlighted eight specific applications for AI, including agriculture, financial services, healthcare, COVID-19 and future pandemic response, national security and defense, science, transportation, and weather forecasting. Federal agencies have been tasked with using AI to help drive solutions for major societal grand challenges, such as improved healthcare, safer and more efficient transportation, personalized education, accelerating scientific discoveries, improved manufacturing, increased agricultural crop yields, and better weather forecasting. While all federal agencies are making investments in AI/ML, most of the non-defense funding for competitive grants comes from the National Science Foundation (NSF) and the Department of Energy (DOE). More targeted opportunities have been available through the National Institutes of Health (NIH), the National Institute of Standards and Technology (NIST), and the U.S. Department of Agriculture (USDA).

The Biden Administration also emphasized the importance of continuing investments in AI/ML research and applications to support national security in its [National Security Strategy](#). AI/ML investments are needed to enhance U.S. capabilities, defend against adversaries such as Russia and China, and protect our allies and partners. The strategy involves partnering with allies to develop, scale and deploy AI/ML and build reliable supply chains, including coordination through the U.S.-E.U. Trade and Technology

Council and the Indo-Pacific Quad. The importance of AI/ML R&D investments as well as building the future workforce in partnership with research universities was re-emphasized in the [National Defense Strategy](#).

National AI Research Resource

In January 2023, the National Artificial Intelligence Research Resource Task Force released a [final report](#) recommending \$2.6 billion over the next six years for a National AI Research Resource (NAIRR). The goal is to establish a national research infrastructure to broaden access to AI tools and resources. AI researchers and students would have expanded access to computational resources, high quality data, educational tools, and user support to accelerate AI applications. The FY 2024 President's budget request proposed \$30 million for the National Science Foundation to launch NAIRR.

Interagency AI Committee, National AI Advisory Committee, Subcommittee on AI and Law Enforcement

The NAIIA established an Interagency Committee in 2018 tasked with coordinating federal AI research, development, and workforce training activities across the government. The National Science and Technology Council [Select Committee on AI](#) is co-chaired by the Director of OSTP and, on an annual rotating basis, a representative from the Department of Commerce, the National Science Foundation (NSF), or the Department of Energy. The Select Committee consists of senior-level R&D officials from across federal agencies and are tasked with interagency coordination of federal AI R&D and education activities, developing an AI strategic plan; identifying opportunities to improve access to high quality datasets and computational infrastructure for AI R&D; and helping foster partnerships between academia, industry, civil society, and international allies.

The companion body to the Interagency Committee is an external National AI Advisory committee ([NAIAC](#)) that was established by the Secretary of Commerce in consultation with the Director of OSTP, the Attorney General, the Director of National Intelligence, and the Secretaries of Defense, Energy, and State. The NAIAC was launched in April 2022 with 26 members mainly from industry as well as labor organizations, academia, and non-profit organizations. The Committee is charged with providing the President and NAIIO advice and recommendations on topics such as the current state of U.S. AI competitiveness, issues related to AI workforce, adequacy of addressing societal issues, opportunities for international cooperation, issues related to accountability and legal rights, and how AI can enhance opportunities for diverse geographic regions. To date, the advisory committee has met two times, but it has not produced a report or written recommendations.

The Biden Administration also launched a new Subcommittee on AI and Law Enforcement (NAIAC-LE) that advises the President on matters related to the use of AI in law enforcement. This includes issues such as bias (including the use of facial recognition), data security, the adoptability of AI for security or law enforcement, and legal standards related to privacy, civil rights and civil liberties, and disability. Currently, 10 [members](#) from law enforcement, industry, academia, labor, and non-profit organizations serve on the Subcommittee.

National Security Commission on AI (NSCAI) and FY 2023 National Defense Authorization Act (NDAA)

The 2019 *National Defense Authorization Act* established the National Security Commission on Artificial Intelligence (NSCAI) "to consider the methods and means necessary to advance the development of artificial intelligence, machine learning, and associated technologies to comprehensively address the national security and defense needs of the United States."

The NSCAI delivered its final [report](#) in 2021. The report covered a broad range of recommendations and national security reforms required to advance U.S. primacy in AI. Some have been implemented, such as increased investments in critical AI science and technology areas across the federal government, including AI research centers. Other recommendations have yet to be implemented, such as changes to immigration law to attract top AI talent from across the globe.

The FY 2023 NDAA prioritizes AI adoption for integration into DOD systems and processes, including a five-year roadmap and implementation plan for “rapidly adopting and acquiring” AI systems and applications within the Department. The bill authorizes a \$3 million increase for AI for supply chain; \$3 million for AI for predictive maintenance; and a \$5 million increase for AI maritime maneuvering for the Navy. The FY 2023 NDAA also incorporates the *Advancing American AI Act*, which includes National Security Commission on Artificial Intelligence (NSCAI) recommendations. The *Advancing American AI Act* encourages the federal government (beyond DOD) to modernize its programs and “legacy” systems using AI. A notable provision includes a pilot program to develop use cases for the government to adopt readily available AI technology, such as predictive supply chain logistics and mission-oriented challenges for agencies, such as workforce development.

Congressional Overview

Congress continues to place a high priority on AI and this emphasis is expected to continue throughout the 118th Congress. Congressional interest in AI spans major legislation, such as annual appropriations, the *National Defense Authorization Act* that is reauthorized annually, and AI-specific bills recently introduced, as well as hearings, roundtables, and legislative frameworks to debate major issues.

Policy and Regulatory Frameworks

On June 21, Senate Majority Leader Chuck Schumer (D-NY) released a [SAFE Innovation Framework](#) to serve as a guide for future legislative work related to AI. The focus is on Innovation, with Security, Accountability, Foundations, and Explainability (SAFE). Senator Schumer also is working with Senators Mike Rounds (R-SD), Martin Heinrich (D-NM), and Todd Young (R-IN) to host roundtable discussions for Senators with leading experts from academia, industry, National Labs, and other key experts to focus on three main questions: the state of AI, future frontiers of AI and how to maintain U.S. leadership, and national security applications by the U.S. and our adversaries. The goal is to draft bipartisan legislation to address these major issues and regulate, or at least guide, the use of AI. Congress continues to hold hearings as well on AI, such as [three hearings](#) before the Senate Judiciary Committee on AI and human rights, intellectual property, and general rules for how AI is used and a [hearing](#) before the House Science, Space, and Technology Committee on AI innovations, risks and challenges, and strategies for regulation and safety.

While Senator Majority Leaders Schumer tries to pull together more comprehensive legislation related to AI, Congress could take up narrower AI bills aimed at increasing transparency and preventing bias. For example, Senator Gary Peters (D-MI) introduced the [Transparent Automated Governance Act](#) along with Senators Mike Braun (D-IN) and James Lankford (R-OK) that would require U.S. government agencies to notify individuals when they are interacting with certain automated systems and when a critical decision is made about them using an augmented decision process. It would also create a way for people to appeal any decision made by AI. As another example, Senators Michael Bennet (D-CO), Mark Warner (D-VA), and Todd Young (R-IN) introduced the [Global Technology Leadership Act](#) that would establish an Office of Global Competition Analysis to assess how the U.S. fares in critical technologies relative to other countries and help policymakers maintain U.S. competitiveness. The new

Office would use both federal and commercial data to look at the entire U.S. ecosystem to understand threats and opportunities in emerging technologies, including AI.

FY 2024 Appropriations

Congress has just started to advance FY 2024 appropriations bills and will likely not finalize a spending package until the end of the year. The FY 2024 President's budget request included increases to AI R&D and other activities across federal agencies. For example, the budget request included \$797 million, an increase of 16 percent above FY 2023 enacted level, for the National Science Foundation, and \$167 million for the Department of Energy Office of Science, an increase of 1 percent above the FY 2023 enacted funding level, for AI R&D. However, with the passage of the debt ceiling deal, known as the *Fiscal Responsibility Act*, AI R&D funding is likely to remain flat or see only modest increases. Under the deal, nondefense funding would remain flat at FY 2023 spending levels over the next two years, impacting federal research agencies that fund AI R&D. The impact of the debt ceiling deal can already be seen in several House FY 2024 appropriations bills. For example, the FY 2024 House Energy and Water appropriations bill proposes cutting mathematical, computational, and computer sciences within the DOE Office of Science that support major AI/ML efforts by \$44 million below the FY 2023 enacted level and \$117 million below the FY 2024 budget request. The FY 2024 House Defense appropriations bill also proposes cutting Department of Defense science and technology accounts (6.1-6.3) across the military services and defense-wide by nearly \$3.5 billion or 16 percent compared to FY 23 enacted levels, which would impact AI/ML programs. To date, the Senate has not advanced FY 2024 appropriations bills most relevant to AI/ML activities.

CHIPS and Science

The Biden Administration and Congress look to the *CHIPS and Science Act*, signed into law in August 2022, for some guidance on future AI/ML directions and investments. Artificial intelligence, machine learning, autonomy, and related advances are named as one of ten key technology areas motivating new programs authorized in the legislation such as Department of Commerce Regional Technology Hubs and National Science Foundation Regional Innovation Engines. In addition, there are several AI-specific provisions. Of note, these are all authorization provisions that do not include funding, and these programs would need to receive funding in future appropriations bills. Provisions include authorization for NSF to establish a new AI Scholarships for Service program modeled on the current cybersecurity-focused Scholarships for Service program. NSF is directed to report on the feasibility of establishing such a program within one year of enactment. To help inform this assessment, NSF is directed to conduct a study on AI research capacity at US institutions of higher education and consider potential pilot programs that could be implemented to increase capacity and expand the diversity of institutions participating in NSF-funded AI research. To that end, in May 2023, NSF released a [dear colleague letter](#) requesting input about the "capacity of institutions of higher education to produce graduates with degrees, certifications, and relevant skills related to AI." The legislation also authorizes \$15.2 billion in new funding over the next five years to advance the ten key technology areas at DOE, including AI, machine learning, and autonomy as noted above. These provisions build on the *National AI Initiative Act of 2020*, which established the National AI Initiative and coordination functions discussed above.

Federal Agencies' Investments in AI/ML

Below are major highlights of AI/ML research priorities and funding opportunities at key federal agencies.

National Science Foundation (NSF)

The FY 2023 omnibus bill provided NSF no less than \$686 million for research related to AI and encouraged the Foundation to continue its efforts on workforce development for AI, including a focus on Minority Serving Institutions (MSIs). The FY 2024 budget request for NSF includes \$795.6 million for AI funding, a 15.8 percent increase above the FY 2023 level. Growth would support current and planned AI institutes along with recently launched and long-standing AI programs in research and education. The budget request proposes \$30 million to launch the National AI Research Resource (NAIRR) that the [NAIRR Task Force](#) recently called for.

NSF's AI research and education activities cut across the agency, spanning "AI algorithms, robotics, human-AI interaction, and advanced hardware and systems for AI, as well as use-inspired research in neuroscience, biology, chemistry, physics, intelligent transportation" along with many other areas across the NSF portfolio. NSF activities to support AI include fundamental research, education and workforce development, translation activities, and access to data and advanced computing research infrastructure.

NSF AI Research Institutes

NSF's flagship activity in AI is the NSF AI Research Institutes. Winners of the first three rounds of AI Institutes were announced in [August 2020](#), [July 2021](#), and [May 2023](#) with 21 institutes funded at \$20 million over five years. The latest competition was released in October 2021 and many AI Institutes are run in partnership with other agencies and industry, including the U.S. Department of Agriculture's (USDA) National Institute of Food and Agriculture, Department of Homeland Security's (DHS) Science and Technology Directorate, the Department of Education's (ED) Institute of Education Sciences, the National Institute of Standards and Technology (NIST), the Department of Defense (DOD), IBM Corporation, Google, Amazon, Intel and Accenture. Each institute focuses on different aspects of AI and are competed in specific tracks. More information regarding the last AI Institute solicitation can be found [here](#). The next solicitation for AI Institutes is expected to be released in the summer of 2023.

Current and Future Funding Opportunities

Apart from the National AI Institutes, NSF has invested in AI through multiple funding opportunities including fundamental research across NSF. Examples of NSF programs that support AI research are described below.

Building the Prototype Open Knowledge Network (Proto-OKN) - launched in March 2023

- Aims to create a public data-infrastructure to "power the next information revolution similar to the Internet" through a new prototype Open Knowledge Network – "an interconnected network of knowledge graphs supporting a very broad range of application domains."
- More information on Proto-OKN can be found [here](#).

Safe Learning Enabled Systems program – launched in February 2023

- This is a partnership between NSF, Open Philanthropy, and Good Ventures that aims to "create a community of researchers who collaborate on the topics of design and implementation of safe learning-enabled systems; methods for rigorously reasoning (including

probabilistically/statistically/logically) about safety amid uncertainty (in data, environment observations, system calibration, etc.); and machine learning.”

- More information can be found [here](#).

Expanding AI Innovation through Capacity Building and Partnerships (ExpandAI) - launched in October 2022

- Aims to build capacity and broaden participation in AI research, education, and workforce development at Minority-Serving Institutions (MSIs). ExpandAI will support Capacity Building Pilots (CAP) awards, and partnership awards within the NSF AI Institute ecosystem (ExpandAI Partnership (PARTNER) awards). This solicitation includes DHS, USDA, NIST, and DOD.
- More information can be found [here](#).

Smart Health and Biomedical Research in the Era of Artificial Intelligence and Advanced Data Science (SCH) - launched in November 2020

- “The purpose of this interagency program solicitation is to support the development of transformative high-risk, high-reward advances in computer and information science, engineering, mathematics, statistics, behavioral and/or cognitive research to address pressing questions in the biomedical and public health communities.”
- Many NIH Institutes partner in this program, including:
 - Office of Behavioral and Social Sciences Research
 - National Center for Complementary and Integrative Health
 - National Cancer Institute
 - National Eye Institute
 - National Human Genome Research Institute
 - National Institute on Aging
 - National Institute of Allergy and Infectious Diseases
 - National Institute of Arthritis and Musculoskeletal and Skin Disease
 - National Institute of Biomedical Imaging and Bioengineering
 - Eunice Kennedy Shriver National Institute of Child Health and Human Development
 - National Institute on Drug Abuse
 - National Institute on Deafness and Other Communication Disorders
 - National Institute of Dental and Craniofacial Research
 - National Institute of Diabetes and Digestive and Kidney Diseases
 - National Institute of Environmental Health Sciences
 - National Institute of General Medical Sciences
 - National Institute of Mental Health
 - National Institute of Neurological Disorders and Stroke
 - National Institute of Nursing Research
 - National Library of Medicine
 - National Heart, Lung, and Blood Institute
 - National Institute on Minority Health and Health Disparities
 - Office of Data Science Strategy
- Waiting for a new solicitation.
- More information is available [here](#).

Foundational Research in Robotics (FRR) program – launched in February 2020

- “supports research on robotic systems that exhibit significant levels of both computational capability and physical complexity. For the purposes of this program, a robot is defined as intelligence embodied in an engineered construct, with the ability to process information, sense, plan, and move within or substantially alter its working environment.”
- More information on FRR can be found [here](#).

NSF Program on Fairness in Artificial Intelligence in Collaboration with Amazon (FAI)

- The program is now archived; NSF is planning new activities in this area.
- More information on FAI can be found [here](#).

Smart and Connected Communities (S&CC)

- “Supports use-inspired research that addresses communities' social, economic, and environmental challenges. Projects must work with community stakeholders on pilots that integrate intelligent technologies with the natural and built environments.”
- More information on S&CC is available [here](#).

NSF Research Traineeship (NRT Program)

- “Supports interdisciplinary, evidence-based traineeships that advance ways for graduate students in research-based master's and doctoral degree programs to pursue a range of STEM careers.” The current competition (with annual deadlines in September) includes a focused AI track.
- More information on NRT is available [here](#).

Cyber-Physical Systems (CPS)

- “Supports research on engineered systems with a seamless integration of cyber and physical components, such as computation, control, networking, learning, autonomy, security, privacy and verification, for a range of application domains.”
- More information on CPS is available [here](#).

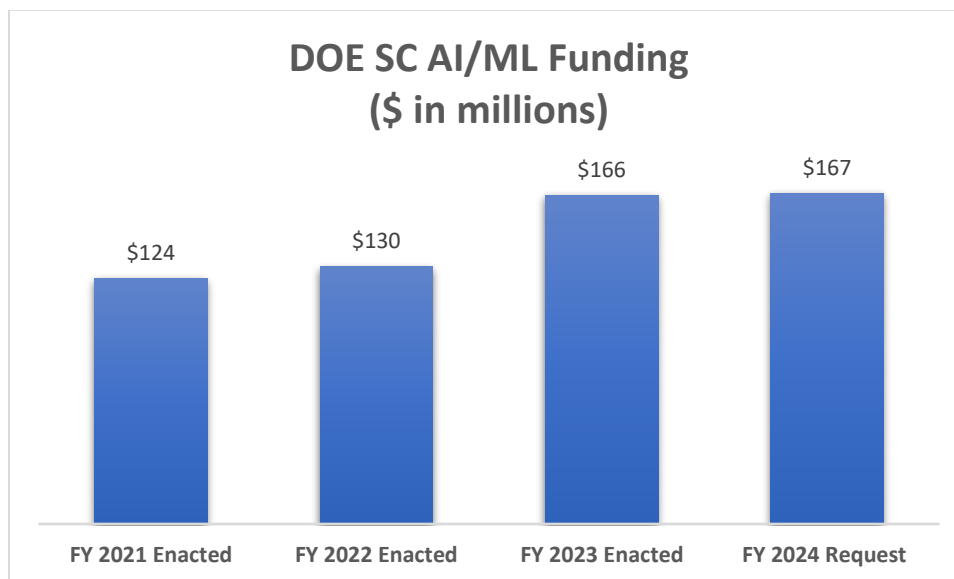
Additional opportunities:

- Dear Colleague Letter: Special Guidelines for Submitting Collaborative Proposals under National Science Foundation (NSF) and Natural Sciences and Engineering Research Council of Canada (NSERC) Collaborative Research Opportunities in Artificial Intelligence and Quantum Science. More information can be found [here](#).
- Dear Colleague Letter: Advancing Discovery with AI-Powered Tools (ADAPT) in the Mathematical and Physical Sciences. More information can be found [here](#).
- Dear Colleague Letter: International Collaboration Supplements in National Artificial Intelligence Research Institutes. More information can be found [here](#).
- Dear Colleague Letter: Announcing Collaboration Opportunities in Responsible and Equitable AI under the U.S. National Science Foundation (NSF) and the Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO). More information can be found [here](#).
- Dear Colleague Letter: Building Investigators' Capacity to Leverage Emerging Technologies to Improve STEM Education Research. More information can be found [here](#).
- Dear Colleague Letter: Mathematical and Scientific Foundations of Deep Learning and Related Areas (MoDL+). More information can be found [here](#).

- Dear Colleague Letter: Fairness, Ethics, Accountability, and Transparency: Enabling Breakthrough Research to Expand Inclusivity in Computer and Information Science and Engineering Research. More information can be found [here](#).
- Dear Colleague Letter: Advancing Research in the Geosciences Using Artificial Intelligence (AI) and Machine Learning (ML). More information can be found [here](#).

Department of Energy (DOE)

AI/ML continues to be one of DOE's top cross-cutting emerging technology research and development priorities. In FY 2023, DOE Office of Science (SC) allocated \$166 million toward AI/ML research and development activities and requested \$167 million in FY 2024, slowing down the trend of increasing support for AI research over the last few years (see graphic below). This investment is intended to support foundational areas like applied mathematics and computational science; accelerate discoveries in domain sciences such as chemistry, biology, and physics; and improve operations of DOE facilities and national laboratories. AI/ML is a cross-cutting program that supports research activities across all six Office of Science programs, but the majority of funding has come through Advanced Scientific Computing Research (ASCR) and Basic Energy Sciences (BES). DOE also continues to operate the Office for Artificial Intelligence and Technology (AITO) to coordinate AI R&D across the Department and adopt AI technologies to improve DOE business operations. However, AITO does not support R&D activities and R&D funding remains within individual programs.



DOE plans to issue fewer funding calls that directly target AI/ML research and development; instead, AI/ML is seen as an enabling technology that is increasingly used in many science and research and development activities and is often a subset of larger funding opportunities. Funding opportunities of most relevance in FY 2024 include:

- New AI/ML technologies to help address the seven Energy Earthshots topics. Research opportunities will be solicited through the National-lab **Energy Earthshot Research Centers** and the **Energy Earthshot Research Foundations**. In FY 2024, DOE requested an additional \$50 million (\$200 million over four years) for new Centers and \$25 million (\$75 million over three years) for small groups of PIs at research universities.

- \$60 million (\$400 million over four years) for up to four **Microelectronics Science Research Centers** to advance mission-driven research to address foundational challenges in the design, development, characterization, prototyping, demonstration, and fabrication of microelectronics. One major aspect will include the use of artificial intelligence, multiscale codesign, and advanced supercomputing capabilities to invent and manufacture revolutionary microelectronic devices.
- \$60 million to support AI/ML applications for **applied energy programs**, including renewables, carbon management and nuclear energy applications.
 - AI/ML development and applications will continue to be supported through various funding calls across eight major renewable energy technology programs: bioenergy, buildings, geothermal, hydrogen and fuel cells, solar energy, vehicles, water power, and wind energy. For example, in bioenergy, DOE will continue to support AI/ML applications to develop new catalysts and organisms using synthetic biology tools, model biomass feedstocks as they undergo preprocessing, and model bioenergy technology systems to support scaleup.
 - The Fossil Energy and Carbon Management program continues to support AI/ML activities in its funding calls related to extraction and recycling of critical minerals, hydrogen and carbon management, reliable carbon transport and storage, carbon dioxide removal, methane mitigation, point source carbon capture, and carbon dioxide conversion.
 - The [FY 2024 Nuclear Energy University Partnership solicitation](#) released on June 22 includes \$1 million over three years to support a university team for sensor development that adds new capabilities to existing technologies or develops novel technologies to support challenging operational conditions in the existing nuclear reactor fleet or advanced reactors. Specifically, DOE is seeking proposals that couple instrumentation and controls with AI/ML and integrate these techniques into digital twin platforms.
- \$100 million to support the missions of the National Nuclear Security Administration (NNSA). Most of this funding is for the NNSA labs and sites, but research universities can partner on certain projects. Primarily through the Advanced Simulation and Computing (ASC) Program, NNSA launched the **Advanced Machine Learning Initiative (AMLI)**, which aims to increase the use of commercially available artificial intelligence hardware and further develop machine learning algorithms to add to the ASC physics-informed simulation portfolio. The goal of this initiative is to significantly increase efficiency, improve models to better match experimental data, and tighten the integration of multi-scale and multi-dimensional models, while addressing concerns with validation of these techniques when new errors are introduced. This initiative supports ASC's primary missions in improving integrated design codes and physics and engineering models. Integrated design codes are used to produce large-scale, full physics codes to conduct detailed nuclear weapons assessments without the need for additional nuclear explosive testing. The physics and engineering models provide models and databases used in simulations supporting the U.S. stockpile.

Looking ahead DOE is thinking about the future of science and the role of AI/ML. Following DOE's *AI for Science* report released in 2020, the Agency held a series of targeted workshops to gather input on new and rapidly emerging opportunities and challenges of scientific AI in 2022. These efforts resulted in an updated [2023 AI for Science, Energy and Security](#) report that assessed the current state of AI and highlighted challenges, opportunities, and strategies necessary to advance and leverage new AI capabilities to support DOE priorities in basic science, applied energy, national security, and the

crosscutting Energy Earthshots. The report identified seven AI approaches that best leverage transformational technology to advance DOE missions and guide future DOE investments:

1. AI and Surrogate Models for Scientific Computing
2. AI Foundation Models for Scientific Knowledge
3. Discovery, Integration, and Synthesis
4. AI for Advanced Property Inference and Inverse Design
5. AI-Based Design, Prediction, and Control of Complex Engineered Systems
6. AI and Robotics for Autonomous Discovery
7. AI for Programming and Software Engineering

Department of Defense (DOD)

Since 2018, [DOD has taken a strategic approach](#) to investing in AI capabilities, workforce development, integration, and partnerships across the U.S. In 2022, DOD integrated the Joint Artificial Intelligence Center, the Defense Digital Service, Advana, and the office of the Chief Data Officer into a single coordinative office for AI: the Chief Digital and AI Officer (CDAO). The CDAO is the focal point of all AI activities for the Department and will accelerate, coordinate, and field novel AI capabilities across DOD while ensuring responsible renovation of every aspect of the DOD enterprise with AI. While not specifically funding R&D in AI, the CDAO will continue coordinating AI investment for the entire Department, ensuring R&D programs are integrated through the Under Secretary of Research & Engineering (USD-R&E) and its component agencies through the Military Service labs. In April 2022, Dr. Craig Martell, formerly head of AI for both Lyft and Dropbox, was appointed as the first CDAO.

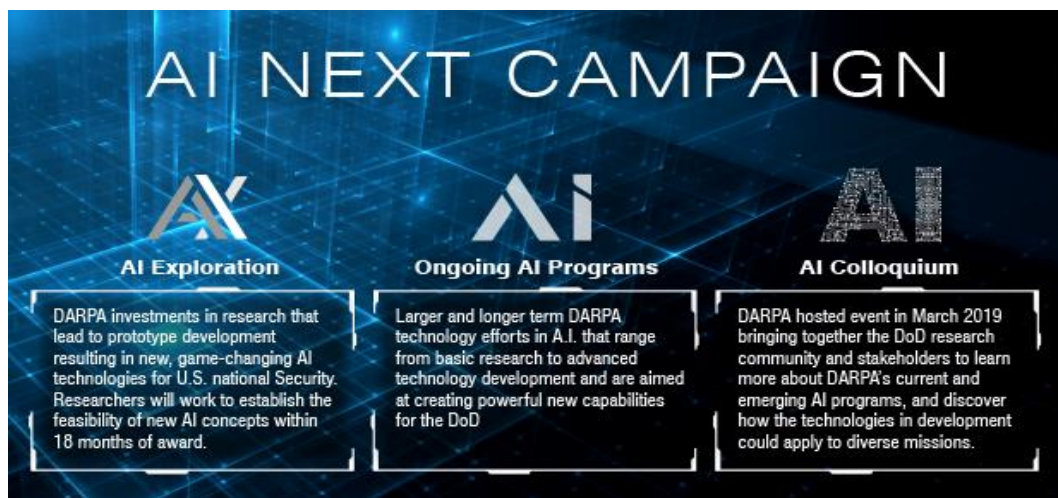
DOD increased funding in fiscal year (FY) 2023 for emergent technologies in AI and ML to enable operational maneuver, including autonomous systems, in highly contested environments with near-peer adversaries and in support of combatant command (CCMD) forces in Great Power Competition. The 2023 budget further increased resourcing of AI/ML technologies to facilitate development of neurocognitive mapping capabilities to capture the psychological data of target audiences relevant to special operations forces (SOF) more accurately. In the FY 2024 President's budget request, \$1.8 billion overall has been proposed for AI, with a large amount of funding being directed toward CDAO focused on technology demonstration and validation efforts (6.4 and above). Slight increases to 6.1-6.3 (S&T) accounts were also proposed across the military branches.

For FY 2023, the CDAO assumed the budgets of its progenitor offices for a total of nearly \$1 billion across RDT&E, O&M, and Procurement accounts. In line with its mission to scale AI capabilities efficiently and synchronize adoption and skillsets across the Department, the CDAO predominantly uses the [Tradewind OTA](#) to rapidly compete and award new capabilities. The Tradewind Marketplace offers a free-to-join platform for AI capability providers to receive and bid on DOD AI funding opportunities coordinated by CDAO and other DOD and Military Service AI entities. Acquisition processes are streamlined to enable optimal delivery of capability to DOD end users.

Defense Advanced Research Projects Agency (DARPA)

DARPA has been funding research in AI for decades and is responsible for some of the earliest advances in AI and ML technology. In September 2018, DARPA announced a multi-year investment of more than \$2 billion in new and existing programs called the ["AI Next" campaign](#). Key areas of the campaign include automating critical DOD business processes, such as security clearance vetting or accrediting software systems for operational deployment; improving the robustness and reliability of AI systems;

enhancing the security and resiliency of ML and AI technologies; reducing power, data, and performance inefficiencies; and pioneering the next generation of AI algorithms and applications.



DARPA's AI Next Campaign Pillars

[DARPA's Information Innovation Office \(I2O\)](#) Director Dr. Kathleen Fisher recently held [AI Forward](#), an initiative to explore future directions for AI. AI Forward seeks to explore novel and future directions for AI and consists of two workshops hosted by DARPA I2O. The first workshop took place on June 13 – 16; the second will be held in-person from July 31 – August 2 in Boston, MA. Attendance is limited to 100 people per workshop, and workshops will include industry, academia, and government leaders discussing the state of AI research and its future. As workshops conclude, participants will have the chance to team up and synthesize their ideas into white papers that DARPA will consider for its future AI strategy. DARPA intends to include two new Artificial Intelligence Exploration projects (AIEs) in this strategy based on the findings of both workshops. Workshop participants can submit their work for consideration to these AIEs, which will eventually be widely announced to solicit proposals.

Additionally, DARPA I2O issued a broad agency announcement (BAA) for the AIE, which seeks to invest in focused explorations of what the future AI science and technologies could be. The prototype projects pursued under AIE may include proofs of concept, pilots, novel applications of commercial technologies for defense purposes, creation, design, development, demonstration of technical or operational utility, or combinations of the foregoing, related to prototype. Proposal responses are due by August 18, 2023, and full details can be found [here](#).

DOD's concept for Joint All-Domain Command & Control (JADC2) enables multiple technologies, capabilities, and military assets through AI to achieve faster and more powerful decision-making for operational commanders. A \$950 million IDIQ was awarded by the Air Force in FY 2021 under which task orders are released to cleared vendors. This contract vehicle has become a source for AI development given the high application of AI technologies to identifying the right kind of data and ensuring it gets to the right warfighter or decisionmaker. JADC2 is envisioned and overseen by the Joint Staff with participation from all the Military Services through experiments like the Army's Project Convergence.

The Military Services

The Military Departments have continued prior years' investment in AI, establishing new R&D programs and centers to align with DOD priorities. Each military service generally develops capabilities for its own warfighters, primarily across joint initiatives but tailored for the Service's unique abilities (e.g. the Navy's autonomous submersibles). Some programs relevant to Service-specific AI development are outlined below.

Army

The U.S. Army has developed the [Artificial Intelligence Integration Center](#) (AI2C), formerly the AI Task Force, in partnership with and based out of Carnegie Mellon University. The center's mission is to connect the Army with the broader AI community to better identify new and emerging technologies to solve challenges in the field. AI2C has ten AI modernization portfolios including basic research, infrastructure and platforms; command and coordination; sustainment; battlespace awareness; force application; force integration; net-centric capabilities; corporate management and support; and protection.

AI2C released a BAA open until 2026 on [Transformative Artificial Intelligence Research and Applications](#). This program looks to bolster new technology in basic, applied, and advanced research (6.1, 6.2, 6.3, and higher). Areas of interest include autonomous platforms; AI/ML algorithms; AI-based decision making; human-machine interfaces; data visualization and synthetic environments; assured position, navigation and timing; sensing; communications and networks; internet of things; human performance; and underpinning methodologies.

The Army's Combat Capabilities Development Command (DEVCOM) is the umbrella command overseeing the Army Research Lab (ARL) and Army Research Office (ARO). All these organizations have released BAAs and other funding opportunities in the past year with amendments to include AI/ML capabilities. ARO and ARL released BAAs in late 2022 including carve outs for AI/ML fundamental research to solve materials design problems and better understand emerging technology opportunities. ARL also released a [BAA](#) in November 2022 that will be open until November of 2027 that includes topics related to AI, including Advanced Learning-Enabled Intelligent Cyber Physical Systems, Artificial Intelligence and Machine Learning with Extremely Sparse Data, Artificial Intelligence and Machine Learning-Enabling Technologies for Expeditionary Maneuver and Air/Ground Reconnaissance, Artificial Intelligence and Machine Learning Managing Massive Data Sets. AI is expected to still play a role in future opportunities released by both research offices.

Navy

The Navy funds a portfolio of science and technology (S&T) research primarily through the Office of Naval Research (ONR) and Naval Research Laboratory (NRL). ONR primarily coordinates science and engineering R&D for the Navy, while NRL serves as a corporate laboratory conducting basic research through prototyping. In FY 2023, the Navy received a \$5 million increase in artificial intelligence for maritime maneuvering under University Research Initiatives.

ONR's Division 333, Sea Weapons and Payloads, supports basic and applied research and advanced technology development of undersea weaponry. This division supports AI R&D through its [Artificial Intelligence/Machine Learning for Photonics, Power & Energy, Atmospheric, and Quantum Science program](#), which seeks to take advantage of efficient ML techniques and apply them to photonics, energy, atmospheric, and quantum science to improve naval capabilities. This program provides

opportunities to explore methods to implement deep learning algorithms, develop algorithms for data optimization and discover algorithms suitable for automatic control on naval systems.

Within the Naval S&T enterprise is the [Naval Air Systems Command \(NAVAIR\)](#), which typically funds rapid development research and provides support for airborne weapons systems. NAVAIR's Naval Warfare Center Aircraft Division (NAWCAD) released a BAA seeking proposals for various science and engineering projects that address the future technology needs of the naval warfighter. NAWCAD is particularly interested in AI/ML research and accepted white papers until recently, June 1, 2023. The full BAA can be found [here](#), and more information on NAWCAD can be found [here](#).

The Navy also utilizes [NavalX](#), a “super connector” focused on scaling non-traditional agility methods across the Navy workforce, to collaborate with academia in AI/ML and other priority topics. NavalX features various “tech bridges” across the country, such as in Orlando, Florida (which focuses on modeling and simulation), and Palmetto, South Carolina (which focuses on cyber, autonomy, communications, and advanced manufacturing).

Most of the advanced research in AI conducted on behalf of the US Marine Corps (USMC) resides in the Navy programs discussed above. USMC has mostly tapped Navy funding for AI to improve back-office functions in human resources, administration, and recruitment.

Air Force

In November 2023, the Air Force Research Lab (AFRL) developed the Air Force Cognitive Engine ([ACE](#)), a software tool that helps users develop AI solutions in real-time. The Autonomy Capability Team (ACT3) is the group of experts within the Air Force leading the development of ACE, which overall supports the successful fielding of AI capabilities within AFRL.

In 2021, AFRL partnered with the United Kingdom's Defense Science and Technology Laboratory (DSTL) to develop, train, and deploy AI/ML algorithms in support of Armed Forces for both nations. This collaboration comes after the Autonomy and Artificial Intelligence Collaboration (AAIC) Partnership Agreement, which was established in 2020. This four-year partnership encourages the acceleration of joint US/UK development and sharing of AI capabilities.

The Air Force Office of Scientific Research (AFOSR), which executes AFRL's basic research program, has multiple research areas of focus, one of which being [Information and Networks \(RTA2\)](#). This focus includes programs involving the utilization of AI for decision-making models, algorithms, and sensing/enhancing situational awareness.

AFRL developed an AI [research partnership](#) with the Massachusetts Institute of Technology (MIT) in May 2019. The \$15 million per year program focuses on accelerating AI technologies for medical readiness, situational awareness, and disaster relief.

The Combatant Commands (CCMDs)

Every geographic CCMD (e.g., USCENTCOM, USEUCOM) has listed AI as a priority emerging capability requirement and seeks evolving capabilities in AI. AI applications have been integrated with many aspects of CCMD daily operations, from the deployment and management of autonomous vehicles in theater to intelligence analysis. AI continues to play a big role in lessening administrative burdens and maximizing operational timing, taking on traditional “back office” functions like travel and expense management, and streamlining those processes to make CCMD staff more efficient.

U.S. Space Command (SPACECOM) is partnering with U.S. Cyber Command (CYBERCOM), the National Reconnaissance Office (NRO), the National Geospatial-Intelligence Agency (NGA), and the National Security Agency (NSA) to harmonize operations and data for commercial debris cleanup in orbit. CYBERCOM is working at the nexus of AI and cyber technical capability to develop rapid approaches to enabling its Cyber Mission Forces (CMFs), detecting adversarial cyber attacks, and marshaling just-in-time cyber defense capabilities against those attacks. As a functional CCMD, USCYBERCOM's responsibilities extend globally, and it is always seeking new AI-based methods for cyber attack detection, remediation, and counterattack.

U.S. Special Operations Command (SOCOM) develops and manages capabilities specifically for SOF deployed across the globe in support of ongoing operations for the geographic CCMDs. As such, SOCOM investment in technology like AI often becomes accelerated due to direct warfighter application and interest. One such application is using AI for military information support operations (MISO). Some of these operations include detecting malicious use of digital, internet-based media to influence, persuade, or dissuade populations through targeted disinformation or misinformation.

SOCOM coordinates the SOF enterprise's investments in technology, and is beginning to do so in a concentrated way for AI/ML. SOCOM program managers are seeking AI solutions for everything from coordination of unmanned autonomous systems like drone networks to next generation intelligence, surveillance, and reconnaissance (ISR). SOCOM is also interested in the proliferation of unmarked volumes of data across digital and analog networks, a problem that may be addressed with AI/ML.

National Institute of Standards and Technology (NIST)

NIST is a leader in the federal government for AI research, standards, and data. Most NIST R&D funding is for intramural programs as well as additional activities at the NIST Cybersecurity Center of Excellence. NIST is focused on fundamental research of [trustworthy and responsible AI](#), including validity and reliability, safety, security and resiliency, accountability and transparency, explainability and interpretability, privacy, and fairness with mitigation of harmful bias. NIST also partners with NSF's [Institute for Trustworthy AI in Law & Society \(TRAILS\)](#).

In March 2023, NIST launched its [Trustworthy and Responsible AI Resource Center \(AIRC\)](#) following the publication of its updated [Artificial Intelligence Risk Management Framework \(AI RMF\)](#) in January 2023. The AIRC supports "all AI actors in the development and deployment of trustworthy and responsible AI technologies," operationalizes the [NIST AI Risk Management Framework](#), and provides resources to the broader community.

In June 2023, the Biden Administration announced that NIST is launching a new public working group on artificial intelligence (AI), with a focus on **generative AI**. Following shortly after President Biden's [AI roundtable](#) earlier in June, NIST announced it is seeking technical experts from both private and public sectors to help NIST develop guidance to help organizations address risks and challenges associated with generative AI technologies. The announcement laid out the following goals for the working group:

- **Short term:** The working group will "serve as a vehicle for gathering input on guidance that describes how the [NIST AI Risk Management Framework \(AI RMF\)](#) may be used to support development of generative AI technologies."
- **Midterm:** The working group will "support NIST's work on testing, evaluation and measurement related to generative AI."

- **Long term:** The working group will “explore specific opportunities to increase the likelihood that powerful generative AI technologies are productively used to address top challenges of our time in areas such as health, the environment and climate change.”

The working group will be “facilitated via a collaborative online workspace,” and those interested in participating should [complete this form](#) no later than **July 9, 2023**. Questions about the public working group can be sent to generativeAI@nist.gov. The press release and additional information on the working group can be found [here](#).

NIST also hosts [AI Visiting Fellows](#), who contribute technical support to NIST and help with AI research projects and outreach events. Additionally, NIST hosts [AI workshops](#) to develop AI standards, tools, and guidelines in the research community, which contributed to the development of the AI RMF.

Additional Resources:

- [NIST AI RMF Playbook](#)
- [AI RMF Roadmap](#)
- [AI RMF Crosswalk](#)
- [Perspectives](#) about the AI RMF
- [Video explainer](#) about the AI RMF

National Institutes of Health (NIH)

NIH-Wide Interest

NIH is interested in using AI/ML to increase the utility of the vast amount of data generated through biomedical research, including data contained in electronic health records, omics and imaging data sets, and disease-specific databases. In 2018, the NIH Advisory Committee to the Director established a new [Working Group on Artificial Intelligence](#), with the goal of better understanding and promoting the use of AI/ML in biomedicine. The Working Group presented their [final report and recommendations](#) in December 2019, highlighting significant opportunities to leverage AI/ML to accelerate the pace of biomedical innovation and improve personalized medicine. In this report, the Working Group highlighted several challenges, including a lack of ML-ready biomedical data (e.g. missing metadata; data originally collected for narrow purpose; sampling biases); prohibitive access restrictions; and governance around informed consent and data reuse. The Working Group also made several specific recommendations that led to the creation of new agency-wide programs outlined below:

- Create program of flagship projects that will generate large-scale data suitable for AI/ML (support cross-disciplinary teams of biomedical experts and AI/ML experts);
- Develop new training approaches and mechanisms to produce “multi-lingual” researchers with expertise in both biomedicine AND AI/ML/data science; and
- Develop and disseminate governance and ethical frameworks for the use of AI and ML in biomedicine (and with human participants).

NIH’s Office of Data Science Strategy (ODSS) coordinates NIH-wide activities related to AI/ML, including:

- [Addressing the Workforce Gap in Data Governance](#): ODSS issued administrative supplements in summer 2021 (24 awards total) to encourage the development and implementation of training activities at the interface of AI/ML, information science, and biomedical research.

- [Ethics, Bias, and Transparency for People and Machines](#): ODSS issued a solicitation for administrative supplements in February 2022 for efforts focused on tools, metrics, and practices for the ethical development and use of AI/ML in biomedical research. 23 awards were made through that solicitation.
 - NIH hosted three Micro Labs and one Innovation Lab from December 2021 through March 2022 focused on [Collaboratively Envisioning AI and Ethics in Biomedical Research](#); recordings and summaries of those events are available online.
- [Improving the AI-Readiness of Existing, IC-supported Data](#): ODSS issued administrative supplements in summer 2021 (38 awards total) for investigators funded by NIH's Institutes and Centers (IC) to improve the AI/ML-readiness of their data generated through NIH support. An additional solicitation for these supplements closed in March 2022.

ODSS also curates a list of funding opportunities across NIH ICs for work related to AI/ML in biomedical research, available [here](#). NIH partners with NSF to support the Smart Health and Biomedical Research in the Era of Artificial Intelligence and Advanced Data Science, details of which can be found in the NSF section above and [here](#).

The FY 2023 omnibus appropriations bill provided \$135 million to support capacity in AI/ML at NIH, including \$85 million, an increase of \$15 million over FY 2022 levels, to ODSS. Congress encouraged ODSS to use an unspecified amount of these funds to launch a pilot with DOE to “study the potential for quantum computing for biomedical sciences.”

Bridge to Artificial Intelligence (Bridge2AI)

Bridge2AI, initially conceptualized as a Common Fund program called [Artificial Intelligence for Biomedical Excellence \(AIBLE\)](#), was developed in response to the recommendations developed by the ACD Working Group on Artificial Intelligence. The Bridge2AI program supports a consortium of centers that are focused on generating large-scale experimental data for AI and ML analysis that can address critical questions and challenges in biomedical research. NIH competed two opportunities under the Bridge2AI program in the spring of 2021:

- [Data Generation Projects for Bridge2AI](#): Goal is to “create flagship datasets based on ethical principles, associated standards and tools, and skills and workforce development to address biomedical and behavioral research grand challenges that require artificial intelligence and machine-learning (AI/ML) analysis.”
- [Integration, Dissemination, and Evaluation \(BRIDGE\) Center for Bridge2AI](#): Goal is to “integrate activities across Bridge2AI Data Generation Projects to develop cross-cutting products and best-practices.”

Awards were made for both of these solicitations in summer 2022; a full list of awardees is available [here](#). More details about the BRIDGE Center's structure and organization, including details about its core functions in administration, ethics, standards, skills and workforce development, teaming, and tool optimization, can be found [here](#). As of July 2023, NIH has no plans to re-compete these funding opportunities. Individual NIH Institutes will continue to advance AI and ML related research activities consistent with their programmatic priorities and missions.

Artificial Intelligence/Machine Learning Consortium to Advance Health Equity and Researcher Diversity (AIM-AHEAD)

[AIM-AHEAD](#)'s goal is to "establish mutually beneficial and coordinated partnerships to increase the participation and representation of researchers and communities currently underrepresented in the development of AI/ML models and enhance the capabilities of this emerging technology, beginning with electronic health record (EHR) data." The program seeks to increase the representation and participation of researchers and communities currently underrepresented in AI/ML research. Funding was [awarded](#) for the multi-institutional coordinating center for AIM-AHEAD in September 2021; the center includes cores focused on consortium leadership, data science training, infrastructure, and data and research. The initial goals of the center in its first two years will be to build a consortium of researchers and stakeholders for the program and to identify priorities in research, training, and infrastructure that will be needed to advance the health equity and AI/ML goals of the program in the future. Future funding opportunities competed through AIM-AHEAD are likely to be based on the priorities identified by this center and will be dependent on funding provided by Congress.

NIH Policies on AI

In addition to its support for research on AI/ML, NIH [announced](#) in June 2023 that the agency prohibits the use of generative AI technologies, including natural language processors and large language models, in peer review of NIH grant applications and contract proposals. NIH cites the need for confidentiality and security during the peer review process as the motivation behind this policy, and notes that peer reviewers will need to sign a modified Security, Confidentiality, and Nondisclosure Agreement verifying their compliance with this policy. NIH has provided FAQs on this policy online [here](#).

Advanced Research Projects Agency for Health (ARPA-H)

ARPA-H was launched in March 2022 with the goal of accelerating better health outcomes for all Americans and revolutionizing how we prevent, treat, and cure diseases. The agency is currently funded at \$2.5 billion, available through FY 2025, and has launched an Open Broad Agency Announcement ([Open BAA](#)) and a BAA for a specific program on Novel Innovations for Tissue Regeneration in Osteoarthritis ([NITRO](#)). Additional programs housed in ARPA-H's four mission offices are expected to be launched in the months ahead; these mission offices are:

- *Health Science Futures*: Accelerating advances across research areas, removing limitations that stymie progress towards solutions;
- *Scalable Solutions*: Addressing geography, distribution, manufacturing, data and information, and economies of scale challenges to create timely and equitable solutions;
- *Proactive Health*: Focus on prevention by creating new capabilities to detect and characterize disease risk and promote treatments and behaviors to anticipate health threats (e.g., viral, bacterial, chemical, physical, psychological); and
- *Resilient Systems*: Capabilities, business models, and integrations to respond to crises (e.g., pandemics, social disruption, climate change, economic instability).

While artificial intelligence is not currently an explicit focus of ARPA-H, proposed projects that incorporate AI/ML are likely to be well-received given the agency's interest in revolutionary technological advancements. As an example, the Open BAA notes one interest area with the Resilient Systems mission office as "novel ways to protect, secure, integrate, analyze, communicate, and present health data, including but not limited to advances in privacy, cyber security, artificial intelligence with enhanced patient safety properties, low-code or no-code technologies, semantic approaches, and rapid integration techniques."

Department of Education (ED)

In May 2023, the ED Office of Educational Technology (OET) released a [report](#) focused on the potential risks and opportunities for the use of artificial intelligence (AI) in learning, research, assessment, and teaching. The report was compiled after engaging with over 700 educational stakeholders during public listening sessions hosted by OET and discusses the need for engaging educators, sharing knowledge, and refining technology plans and guidelines around the use of AI. ED has indicated this report is a part of the Biden Administration's larger effort to create a comprehensive strategy around AI across all aspects of government and is an important aspect of the Administration's commitment to leveraging technology to improve learning outcomes.

Through the Institute of Education Sciences (IES), ED has also joint funded with NSF two recent [AI Institutes](#) – one focused on development of artificial intelligence (AI) tools and approaches to accelerate noncognitive skills for effective STEM learning and one focused on AI tools to meet the speech language pathology needs of children. The IES's National Center for Education Research is currently completing a revised grant program, which is aimed at supporting bold, innovative research in learning sciences coupled with advanced technology, such as AI. The Transformative Research in the Education Sciences Grants Program is being treated as a pilot for the high-risk, high-reward research enterprise that is currently being established at IES. Called the National Center for Advanced Development in Education (NCADE), it is expected to be a DARPA-like division that would catalyze breakthroughs in teaching and learning and serve as a bridge through the "Valley of Death" that can prevent federal investments in R&D from benefiting society through promotion and identification of revolutionary advances in fundamental and applied sciences and translate scientific discoveries and cutting-edge inventions into technological innovations and pedagogical practices. In FY 2023, IES received \$30 million dollars in initial funding for this effort. Throughout this year, IES Director Mark Schneider has [emphasized](#) the importance of establishing NCADE in order to increase student achievement and modernize the field of education research. While not specific to only AI, applications of AI in the classroom and its impact on students and learning would certainly be an area of interest for NCADE.

Department of Veterans Affairs (VA)

The VA continues their exploration of artificial intelligence (AI) through their [National Artificial Intelligence Institute \(NAII\)](#). The NAII, led by Dr. Gil Alterovitz, is an ongoing joint initiative established in 2019 by the Veteran's Affairs Office of Research and Development and Office of the Secretary's Center for Strategic Partnerships with the purpose of prioritizing and understanding AI research and development that is meaningful to Veterans and the public, specifically focused on improving veteran's health outcomes. The VA has dedicated a significant amount of their research and implementation process to ethical and trustworthy AI. Previous actions include their [VA Artificial Intelligence Strategy](#), which was used in collaboration for the blueprint of the White House AI Bill of Rights announced in October 2022. They have continued their effort to adhere to the [White House AI Bill of Rights](#) by establishing two new programs to safely monitor AI research and implementation, the AI Institutional Review Board and the AI Oversight Committee. With the leadership of Dr. Alterovitz, NAII continues to build strategic partnerships across the private sector, federal government, and research community to maximize AI's potential.

In 2022, the NAII launched their [AI Summit Series](#) to bring together AI experts and stakeholders to address the uses of artificial intelligence and its role in improving health outcomes, specifically health care delivery, for Veterans and the public through trustworthy AI. [The NAII Brain Health and](#)

[Rehabilitation through Artificial Intelligence \(BRAIN\) Summit](#) was the inaugural AI Summit event that brought together leading health care, AI, and industry experts that discussed the impacts and integration of AI in helping with suicide prevention and addressing brain cancer, as well as innovative implementation of AI into current VA infrastructure. NAII will be hosting the [International Summit for AI in Health Care](#) September 6-8 2023, where the focus will be on health care delivery through trustworthy AI/ML.

As part of NAII, the VA continues to invest in artificial intelligence through various mechanisms such as [NAII AI Tech Sprints](#). The AI Tech Sprints are a three-month competitive engagement to partner with academia and the private sector to develop new uses of artificial technology for healthcare practices relevant to veteran needs. The 2022 AI Tech Sprint was focused on the development of the ASPIRE Demonstrator. The All Services Personnel and Institutional Readiness Engine (ASPIRE) is an AI-driven system that maximizes the knowledge and skill of the federal workforce by testing and generating specific learning pathways based on an individual's needs. Agencies including NASA, DOL, and HHS have also partnered with the VA on this program.

Investigators interested in collaborating with the VA are recommended to reach out to the local VA center. Investigators interested in partnering with the NAII on pilots and high-impact AI research can contract the VA at NAII@va.gov.

U.S. Agency for International Development (USAID)

USAID has cross-cutting interests in enabling AI/ML to advance international development and humanitarian assistance. The agency has developed a suite of strategy and guidance documents to help capture benefits from AI/ML in the development context while avoiding risks.

USAID's [Artificial Intelligence Action Plan](#) was released in May 2022. The document showcases how AI/ML can be utilized as a tool to improve international development outcomes and emphasizes "Responsible AI" as a core value for foreign work—including upholding equity and inclusion and respecting human rights. USAID's AI Action Plan calls for: a commitment to responsible AI/ML in USAID programming; efforts to strengthen systems within communities to promote responsible AI/ML use; and to foster collaboration/partnerships that can help form an international AI agenda. To compliment the Action Plan, USAID has published resources targeted towards development practitioners, including those focused generally on using AI/ML in international development, toolkits for running workshops on how to incorporate AI into development-focused proposals, and materials focused specifically on the use of AI/ML to enhance global health interventions. All these documents are available on the [USAID AI/ML technology page](#).

Since USAID is receptive to the use of AI/ML as an enabling technology to enhance development outcomes, the agency is encouraging development practitioners to incorporate AI/ML components into USAID programs. Nonetheless, there are few USAID-sponsored AI/ML research opportunities at USAID. A comprehensive list of forecasted USAID opportunities is released quarterly on the USAID [business forecast webpage](#). Some thematic areas through which solicitations may support development/application of AI/ML tools are listed below.

- **Development Innovation Ventures:** USAID's [Development Innovation Ventures \(DIV\) Award](#) is open on a rolling basis to support development-focused innovation from pilot scale (\$200,000) to full deployment (\$15 million), with an emphasis on scaling. Some previous winners have

incorporated AI/ML into their innovations and several winning teams have been led by or include university partners. The program page, which provides more details, is available [here](#).

- **Global Health:** USAID has contributed to a broadening of the recognition of how AI can be utilized to improve health outcomes globally. For example, they helped to develop the [Artificial Intelligence in Global Health Report](#), an initiative funded by The Gates Foundation to evaluate AI opportunities that can be deployed in developing country contexts, identifies barriers to deployment/adoption, and identify investment areas that may help speed up the adoption of AI as it applies to global health. More recently, USAID has expressed interest in supporting research and development intended to introduce, adopt and scale-up of products, technologies, and systems to improve health and nutrition in low- and middle-income countries generally. Most USAID's global health research programs, however, are often overseen or implemented by third-party partners. More information on global health-focused research is available [here](#).
- **Digital Development:** The agency's [USAID's 2020-2024 Digital Strategy](#) outlines USAID's approach to harness digital technologies, including AI/ML, to promote democracy and advance freedom. USAID bureaus and missions have and continue to release funding opportunities to advance this strategy, which may include consideration, application, and development of AI/ML tools to advance the goals outlined in the digital strategy.

Department of State (DOS)

Recognizing that emerging technologies, including AI/ML, have the potential to revolutionize entire societies, change governmental structures, and have a significant impact on the global economy, DOS has, over the last few years, increased the level of attention to these issues across its regional and functional bureaus. While the U.S. has long engaged on AI policy through various multilateral forums and bilaterally with U.S. partner countries, it has recently made organizational changes designed to bring additional technology and policy expertise, diplomatic leadership, and strategic direction to the U.S. approach to technology diplomacy. For example, in January 2023, the Department began operations in the Office of the Special Envoy for Critical and Emerging Technology to work across the Department "to develop and coordinate critical and emerging technology foreign policy, and to engage foreign partners on emerging technologies . . . including biotechnology, advanced computing, artificial intelligence, and quantum information technologies."

Notably, DOS coordinates [the U.S. participation in the Global Partnership on Artificial Intelligence \(GPAI\)](#), a group of several allied nations set up in 2020 to formulate international policy on the responsible, ethical development of AI. Headquartered in Paris, France, the GPAI has established four working groups on 1) Responsible AI; 2) Data Governance; 3) The Future of Work; and 4) Innovation & Commercialization, all focused currently on leveraging AI to address the COVID-19 pandemic. While no direct funding opportunities have been publicized by GPAI or its member nations, AI capability providers are encouraged to engage with them. Similarly, DOS has also actively engaged in AI-focused activities hosted by the [Organisation for Economic Co-operation and Development](#) and in coordination with other multilateral groups including the G-7, G-20, and the Quad Nations with links to relevant agreements and announcements available [here](#). Each of these groups also encourage member states to support joint research and development efforts, which are typically implemented by their own domestic research-focused institutions sometimes in partnership with international partners.

While DOS is primarily focused on influencing international AI policy and in harnessing AI/ML to increase DOS efficiency and capability, there are limited DOS funding opportunities to support AI/ML research or

capacity building activities that may be of interest to universities. Most DOS opportunities are relatively small, non-recurring, and targeted to address specific foreign policy objectives. A few examples of open AI/ML focused opportunities are included for illustrative purposes:

- The [Global Engagement Center \(GEC\)](#) leads interagency efforts in identifying and combatting foreign influence and disinformation campaigns, a mission that could benefit from robust AI/ML innovation in sorting through massive amounts of digital data. In support of their mission, the GEC recently published a Notice of Funding Opportunity for a \$1 million program to support applied research to identify and expose Kremlin disinformation networks in Ukraine, Belarus, and Eurasia, due **July 31, 2023**. Like many DOS opportunities, the value of the award is greater than funding alone. Through this program, GEC will publicize resulting research publication and work to put research findings into action in regions with immediate, pressing needs. The GEC also has an open annual program statement, available [here](#) and has an academic liaison who frequently hosts events targeted towards networking/information sharing among academics, government officials, and other interested stakeholders.
- The Science and Technology Adviser to the Secretary of State (STAS) occasionally supports programs designed to advance economic ties and deepen relationships between science and technology ecosystems in the multilateral context. To this end, STAS recently published a \$230,000 solicitation, the [Quad Multistakeholder Critical and Emerging Technology Program](#). The objectives are to facilitate activities between the U.S., India, Japan, and Australia: (1) to strengthen founder education and mentoring networks for critical and emerging technology entrepreneurs in Quad countries; and (2) provide policy direction in one of the critical and emerging technology sectors, including a report with recommendations and a related workshop. The application is due by **July 21, 2023**.

Department of Homeland Security (DHS)

In March 2023, the Secretary of DHS requested the Homeland Security Advisory Council develop a new Subcommittee to provide recommendations in furtherance of a future DHS Strategy on Artificial Intelligence, signaling the Department's intent to issue enterprise-wide guidance for its components and program offices in both offensive and defensive contexts. A month later, Secretary Mayorkas announced a first-of-its kind task force for AI aimed at collaboration across the spectrum of DHS mission-sets, including cargo screening, narcotics detection, trafficking of humans and illicit goods, and critical infrastructure security. This task force will be Co-chaired by the Undersecretary for Science and Technology and the Chief Information Office of the Department. These initiatives follow three years of significant activity by the Department, as more and more programs and components within DHS turn to AI to enhance security and safety.

In 2021, the DHS Science and Technology Directorate released an [Artificial Intelligence and Machine Learning Strategic Plan](#), presenting the office's approach to mitigating risks and driving R&D opportunities associated with AI/ML and the homeland security enterprise. Informed by the larger department-wide [Artificial Intelligence Strategy](#) released in December 2020, S&T establishes the following three goals meant to orient the Department stakeholders toward integrating AI activities while supporting DHS mission needs:

1. Drive Next-Generation AI/ML Technologies for Cross-Cutting Homeland Security Capabilities.
2. Facilitate Use of Proven AI/ML Capabilities in Homeland Security Missions.

3. Build an Interdisciplinary AI/ML-Trained Workforce.

DHS S&T regularly updates its five-year [Long-Range Broad Agency Announcement](#), which will remain open until September 30, 2023. The current list of topics includes Trustworthy and Responsible AI research within the Preventing Terrorism Framework, which aims to support decision making and explainability through mapping, improved risk analysis, bias detection. Other existing topics tangentially apply to AI and may be used to develop AI capabilities in the near-term.

Other programs within DHS include the [Transportation Security Lab \(TSL\)](#), which evaluates AI/ML capabilities to improve the nation's air transportation system, and U.S. Customs and Border Protection (CBP), which leverages data analytics and machine learning for programs such as their Automated Passenger and Cargo Targeting Systems, as well as other capabilities deployed at and between ports of entry.

DHS and the Department of Justice (DOJ) continue to wrestle with the ethical implications of AI deployment for law enforcement purposes, where algorithms can quickly process individuals' personal data in tools like facial recognition software. Lewis-Burke expects these issues to continue to be the subject of Congressional oversight in the remainder of the 118th Congress and beyond.

Department of Justice (DOJ)

Over the past several years, DOJ has expressed interest in supporting AI research and practices as they pertain to criminal justice applications. Aside from the rare AI-specific research calls, AI research and demonstration projects have been included as subtopics or allowable expenses for larger funding opportunities. For example, the National Institute for Justice (NIJ), DOJ's primary research office, typically supports AI as a subtopic in funding opportunities related [to advancing forensic sciences](#). Similarly, the more applied Bureau of Justice Assistance (BJA), has allowed AI systems to be used for some of their SMART programming that supports technology-enabled criminal justice, including their recent [SMART Policing Initiative](#). NIJ's interest in AI research to support criminal justice activities, particularly in the forensic sciences, is expected to continue.

Department of Labor (DOL)

Through the Employment and Training Administration (ETA), DOL has funded several grants via its [H-1B Skills Training Grants](#) for workforce development in high-skilled H-1B occupations for key industry sectors including AI. These grants are open to state and local governments, workforce development nonprofits, and academic institutions. The Biden Administration has also proposed increased funding for apprenticeships to accelerate workforce development in critical labor areas supporting AI technology development. An example of DOL support for AI workforce development is available [here](#).