AI Action Plan RFI Response

The Association for the Advancement of Artificial Intelligence (AAAI) is an international scientific society that works to advance understanding of the underlying mechanisms of thought and intelligent behavior that are embodied in machines. AAAI is composed of over 8,000 members who work in a wide array of research and development activities related to artificial intelligence (AI) across academia, government, and industry. AAAI is a 46-year-old organization that brings together AI researchers and practitioners to promote research on and responsible use of AI, increase public understanding of AI, inform the future directions of AI research and development (R&D), and encourage international collaboration.

AAAI is supportive of efforts to promote human and economic flourishing, as well as national security, as laid out in Executive Order (EO) 14179 on *Removing Barriers to American Leadership in Artificial Intelligence*.[1] To ensure that the US remains a leader in AI research and development (R&D), it must establish targeted efforts that promote innovation while ensuring systems stay safe and secure. As the US strives for excellence in AI innovation, it must sustain support for fundamental AI R&D that serves as the foundation for revolutionary discoveries, strengthen collaboration with its partners and allies, and promote the secure development and deployment of AI systems. The following comments serve to inform the development of a federal AI Action Plan, providing insight into the needs and policy priorities of the vast array of AI researchers, experts, and practitioners who make up AAAI.

1. Increase Resources for Fundamental AI Research

Fundamental research and scientific understanding are vital to the advancement of key technologies in any field of endeavor. Fundamental research means research in science, engineering, or mathematics, the results of which ordinarily are published and shared broadly within the research community, and for which the researchers have not accepted restrictions for proprietary or national security reasons[2]. Fundamental AI research is necessary for future innovation as advancements and emerging technology development invariably rely on a comprehensive understanding of fundamental principles. The United States has already enabled significant technological advances in AI through federal funding, and this leadership should continue. Examples include NSF's decades of investment in stochastic modeling, neural networks, and reinforcement learning[3], DARPA's investment in deep learning (leading to a Nobel Prize), autonomous driving, personal assistants, and Air Force Research investments in reinforcement learning (leading to a Turing Award). See the Appendix below for more details on these success stories.

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[1] Removing Barriers to American Leadership in Artificial Intelligence – The White House

[2] Export Administration Regulations, Part 734.8 (c), https://resources.uta.edu/research/_documents/rs_documents/734.pdf

[3] NSF Impacts from Investments: Artificial Intelligence - National Science Foundation

Similar research investments are crucial in the current age of AI for continuing to achieve technological breakthroughs, solve complex problems, enhance education, and foster innovation. The advent of LLM technology has provided significant advances, but it has also exposed technical limitations that remain to be addressed and will benefit from cross-fertilization with techniques emerging within other AI subdisciplines. In the same way that previously underappreciated work in neural network models was later found to be instrumental to fundamental advances in the field, it is essential that future basic research funding cultivate many different approaches, not just the most prominent or popular, to maximize opportunities for overall advancement in the field and the industries that emerge to apply these advances to achieve positive societal impact.

Under the first Trump Administration, $140 million was awarded to seven national AI Research Institutes working across a range of key AI R&D areas, including machine learning, precision agriculture, and synthetic manufacturing.[4] This investment supports revolutionary fundamental research and subsequent innovation at higher education institutions across the country. Investments like these are key to ensuring a solid foundation is in place to spur transformative advancements in AI and protect US leadership in AI R&D. Existing investments in novel AI R&D programming like the National AI Research Institutes must continue to be sustained and protected. As stated by the Director of the National Science Foundation, "The National AI Research Institutes are a critical component of our nation's AI innovation, infrastructure, technology, education and partnerships ecosystem. These institutes are driving discoveries that will ensure our country is at the forefront of the global AI revolution."[5]

Further, in 2021, President Trump called to double investments in nondefense AI R&D, noting that the President's budget would prioritize substantial investments in industries of the future.[6] The current Administration should continue to prioritize historic investment in critical technologies like AI that ensure our national security and scientific leadership. Robust support must be provided for innovation across the full spectrum of AI R&D, as fundamental AI research is critical to the creation and deployment of AI systems that provide revolutionary and trustworthy societal solutions.

We recommend the following AI policy actions:

- Include increasing federal investment in AI R&D in the President's Budget Request each year.
- Support the NSF NAIRR and publicize the benefits it brings to the U.S. economy, academia, industry, non-profit, and government sectors.
- Establish a national award to incentivize and recognize AI technology advances.
- Request funding for graduate student research fellowships to attract, cultivate, and promote the best AI talent.

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[4] The Trump Administration Is Investing $1 Billion in Research Institutes to Advance Industries of the Future – The White House

[5] NSF announces 7 new National Artificial Intelligence Research Institutes | NSF - National Science Foundation

[6] President Trump's FY 2021 Budget Commits to Double Investments in Key Industries of the Future – The White House

- Request funding for partnerships between universities and industry to increase the real-world impact of academic innovations.

2. Create Secure AI Development Standards

It is vital to ensure AI systems deployed across the US remain secure. To this end, the US must ensure it leads in developing standards for the development process that can mitigate risks in advanced technological systems, especially artificial intelligence. The National Institute Standards and Technology (NIST) should play a critical role by setting the precedent for developing secure systems through policies, standards setting, and cutting-edge research. Key initiatives like the NIST US AI Safety Institute ensure we not only identify and measure but also minimize risk through testing, evaluation, and establishing guidelines for trustworthy systems. Rapid AI innovation will depend on our ability to safeguard against harm and influence at all points in the development process. This will, in turn, increase the effectiveness and efficiency of systems. The US should strengthen NIST's ability to secure our AI systems by maintaining a strong workforce able to articulate the best guidance to AI developers while ensuring the relevant requirements are not unnecessarily burdensome. In addition, all agencies across the federal landscape should be encouraged to support programs and initiatives that prioritize safe and secure systems development.

We recommend the following AI policy actions:

- Request increased funding in the NIST AI Safety Institute and grow its workforce by 10% each year to ensure the ability to address and respond to new AI innovations.
- Solicit input from industry, academia, non-profits, government agencies, and international collaborators to inform standards development while addressing both security and feasibility.

3. Lead International AI Collaborations

While the US should strive to sustain leadership in AI development, maintaining our position as a key collaborator with allies and global partners will also remain critical. Global partnerships will be key in making viable technological advancements and fortifying national security through shared technological capabilities. For example, a core pillar of the US defense agreement with the UK and Australia (AUKUS) is enhancing joint capabilities and interoperability between the three nations. Since its announcement, this partnership has resulted in a $3 billion promised investment in US military capability by Australia, of which $500 million has already been paid.[7] AUKUS exemplifies the kinds of partnerships the US should be engaged in. Translating this spirit of cooperation to technological policies will be key to ensuring the US can make rapid advancements, maintain global technological leadership, and fortify national security. The US should continue collaborative

[7] Shared Challenges, AUKUS Partnership Top Topics as U.S., Australian Defense Leaders Meet for First Time > U.S. Department of Defense > Defense Department News

efforts to support AI research in and standardize AI policies with existing allies, like the UK, while exploring opportunities to join forces with like-minded nations.

AAAI fosters this spirit of collaboration within our Association through an international membership. International partnerships present the opportunity to share resources and research findings among a wide array of experts and can lead to a faster adoption of standardized AI governance that upholds democratic values and fosters fair competition. International collaboration expands access to a broader range of experts who can work together to innovate AI systems.

We recommend the following AI policy actions:

- Convene public, periodic international meetings of experts to discuss the latest challenges and questions raised by AI technological advances, demonstrating US leadership and attention to the key issues.
- Incentivize and encourage open-source releases of AI advances and data sets.

Thank you for your hard work in developing a national AI Action Plan and for providing the opportunity to offer advice and recommendations. AAAI stands ready to serve as a non-partisan source of technical expertise on artificial intelligence.

Appendix: Artificial Intelligence Innovations enabled by Federal Funding

- *Deep Learning* - The basic neural network (NN) architecture and back propagation learning algorithms that underlie the currently dominating *Deep Learning* approach to development of AI models were first invented in the mid 1980s by Geoff Hinton and others[8] with the support of block grants for foundational computer science and AI research provided by DARPA to various academic institutions. These algorithms were found to perform relatively poorly at the time due to their inability to scale to any problem of practical interest, and it wasn't until years later when advances in computer hardware overcame the scalability problem and unleashed the power of Deep Learning. Geoff Hinton and his colleagues Yann LeCun and Yoshua Bengio received the Turing Award in 2018 for these contributions. In 2024, Hinton was also awarded the Nobel Prize in Physics jointly with John Hopfield for this same foundational work.[9]

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8 D.E. Rumelhart, G.E. Hinton, R.J. Williams, "Learning representations by back-propagating errors", *Nature,* 323, 533-536, 1986

9 https://www.nobelprize.org/prizes/physics/2024/press-release/

- *Autonomous Driving* – Today's vast autonomous driving industry similarly owes its existence to basic scientific research carried out in US academic institutions with significant investment of federal research funds. Over the period from 2004-2007, DARPA sponsored a series of 3 autonomous driving competitions, starting with an off-road race through the desert and culminating with an urban driving competition, that resulted in accelerated innovation and maturation of techniques that now underpin today's autonomous driving industry.[10]
- *Personal Assistants* – Over the 5-year period from 2003 - 2008, the DARPA Personalized Assistant that Learns (PAL) program brought together over 300 researchers from 25 of the top university and commercial research institutions with the goal of building a new generation of cognitive assistants that can reason, learn from experience, be told what to do, explain what they are doing, reflect on their experience and respond robustly to surprise. Technologies created under this program provided the foundation for Apple's Siri assistant, and this innovation has triggered broad growth in personal assistant technologies.
- *Reinforcement Learning* – The explosion of Large Language Models (LLMs) on the AI scene over the past couple of years and companies with LLM offerings like OpenAI, Anthropic, Meta, Microsoft, and others also owe their success to earlier innovation of federally funded basic AI research. Reinforcement Learning (RL), the central learning mechanism used for building LLMs, was originally developed by Andrew Barto and Richard Sutton under funding from the Air Force Office of Scientific Research and the Air Force Research Lab in the early 1980s, and like Deep Learning techniques was not fully appreciated until computer hardware advances allowed broader application. Just this past week, Barto and Sutton received this year's Turing Award.[11]

[10] https://www.darpa.mil/news/2014/grand-challenge-ten-years-later

[11] https://www.nytimes.com/2025/03/05/technology/turing-award-andrew-barto-richard-sutton.html