TO: **The Honorable Mike Rounds and the Honorable Martin Heinrich**

FROM: **Matt Hourihan (matt.hourihan@aau.edu), The Association of American Universities (AAU)**

DATE: June 30, 2025

RE: The American Science Acceleration Project

AAU appreciates the opportunity to respond to the Request for Information for the American Science Acceleration Project. Our response is informed by discussions with officials at AAU member institutions and with other stakeholders. AAU also supports the comments submitted by the Energy Sciences Coalition focusing on the Department of Energy (DOE).

Cross-Cutting Questions

1. How should the United States achieve the goal of accelerating the pace of scientific innovation? What roles should be played by Congress, the administration, industry, civil society, and academia?

Deployment of AI tools into scientific experimentation and workflows may eventually accelerate the pace of discovery by automating some human-performed tasks and augmenting others, while also enabling entirely new capabilities. Work to achieve progress in AI-powered science is already happening on AAU campuses across the country, in fields like Alzheimer's detection,[1] genomics,[2] robotics,[3] digital twins for agriculture,[4] materials design,[5] astronomy,[6] and other fields.

But to harness the AI-enabled science revolution at scale, several ingredients are needed, and Congress is in a position to foster all of these through investment and policy choices. These include:

- **Sustainment of the scientific foundation** to ensure a critical mass of domain expertise among U.S. scientists and engineers across a broad array of disciplines, who will be responsible for deploying and orchestrating AI tools, identifying grand challenges, and driving the scientific enterprise.
- **Strategy development** to understand scientific challenges, define goals, measure progress, coordinate resources, and chart novel directions for research.
- **Fundamental AI research into AI principles, theories, and novel techniques** for reliability, trustworthiness, explainability, and alignment.
- **Applied research into effective, scalable tools, models, and agents** that can be translated and seamlessly incorporated into discovery science workflows.
- **Computational infrastructure and access** upon which to build, train, and operate AI models and agents.
- **Data resources and infrastructure** to ensure U.S. researchers have access to the raw material of AI-powered discovery.
- **An AI-capable science workforce** with opportunities for learning and research experience.

- **Pathways to multi-sector partnerships** as no single sector has the capacity to fully and effectively own and drive the AU-enabled science revolution.

Without meaningful investments in these areas, the United States is at real risk in falling behind.

Observations follow regarding the roles of actors from the government, academic, industry, and civil society sectors. However, we should be cautious of drawing hard lines in defining these roles, as technical expertise, resources, and vision cut across sectors. The optimal path for driving AI-enabled science will continue to involve deep collaboration between public and private sector actors – just as was the case with every prior revolution in U.S. science and technology.

Government (including Congress and the Executive Branch) is well-positioned to support the backbone of American discovery science, with agencies and the White House enacting a vision developed jointly with Congress, and with Congressional oversight. This can be done through:

- Continued funding of research, instrumentation, education and AI literacy to sustain the science base across disciplines. The national science base is the substrate upon which technological and scientific progress is built to produce knowledge as a public good (as opposed to a private good), and it continues to be largely publicly funded.
- Supporting high-performance computing infrastructure at national labs like Argonne and Oak Ridge and academic computing centers across the country.
- Facilitating and incentivizing partnerships between industry and academia via fiscal and tax policy.
- Acting as a provider, curator, guardian, and steward of data resources for researcher use.
- Convening stakeholders representing the breadth of American society to set national strategy on AI-enabled science, and to advance AI literacy among the American public.

Universities offer particular strengths in the context of AI-enabled science and AI training and education:

- Deep scientific expertise across domains. Such expertise is important for identifying the most important scientific questions and contributing to the development of reliable, trustworthy, and accurate AI tools, in light of the ongoing shortcomings in the current generation of tools.[7] For years to come, it will be scientists representing a broad array of disciplines who will have to orchestrate and incorporate AI tools into discovery workflows. This will be doubly important for research activities that cut across disciplinary lines.
- Like the DOE national labs, many campuses provide homes for academic supercomputing centers that provide direct access for U.S. scientists.
- With a core mission of discovery and the lack of a strong market/commercial motive, university researchers are particularly well-suited for exploring novel ideas and AI techniques that lead to future drugs, products, and applications, but that that may otherwise go under-explored elsewhere.
- Training and education are also core university missions, and universities will continue to provide the talent base and workforce upon which industry relies. Universities are also important sources for public education to foster AI literacy among a broad array of stakeholders.
- Universities are storehouses for unique scientific data – the raw material of AI-enabled discovery – and have historically played an important role as data providers and curators.[8]
- Universities are particularly effective sources of spinoffs, startups, and entrepreneurship.[9]

- Universities are often core pillars of local tech clusters co-located with small and large companies and suppliers, nonprofit research entities, government facilities, and others, raising the possibility and benefit of cross-sectoral collaborations on research and education.

Industry is a critical partner in the drive for AI-enabled science given:

- The vast scale of industry as a builder and investor in computation, data, and energy infrastructure.
- The focus of industry on market-driven product R&D, leveraging the substrate of university discoveries and talent.
- The deep technical expertise industry brings to bear to advance AI techniques and powerful frontier models.
- The enormous capital needed from frontier firms and venture investors to appropriately steer future investments and direction in AI infrastructure, research, training, fellowships, and startups.
- Industries role as a major landing point for U.S. scientific and engineering talent.
- The significant dynamism of and ability for industry to move quickly in response to changing opportunities and market conditions.

Civil Society also has important contributions to make:

- Civil organizations can play an important role as curators and/or organizers of efforts around the large-scale challenge of coherent data curation and standardization.
- They can also help augment public education efforts around AI literacy and inform questions of ethics and public interest.
- Patients and other stakeholders can identify critical areas of societal need toward which AI-enabled science might be addressed.
- Philanthropic organizations are also increasingly prominent in science funding. While they cannot operate anywhere near the scale of government or industry, they play an important role in supporting research, especially as pilots for novel models and institutions.
- Public agency foundations – like the Foundation for the NIH or the Foundation for Energy Security and Innovation – can also serve unique and diverse roles as partners and conveners in the AI-enabled science ecosystem.

2. What infrastructure needs to be built to make scientists more productive, and for each type of infrastructure you recommend, what should the funding model be for the construction and operation of that infrastructure?

Access to powerful computing infrastructure continues to be a pressing need for U.S. scientists and engineers, which can be addressed via initiatives like the National AI Research Resource (NAIRR). We address this in our answer to Question 7.

Autonomous Labs. AI-powered laboratories that will allow scientists to design and conduct experiments, remotely, efficiently, and at scale are a source of great promise as engines of scientific discovery.[10] They are also an important front in the global technology race.[11] The United States should aspire to be home to a network of such labs, but significant technical challenges remain in AI systems, robotics, instrumentation, and equipment interfaces, and other areas.[12] **Congress should establish a focused consortium with new funding to tackle critical R&D challenges around autonomous labs**. The consortium should involve experts from universities, national labs, and industry, and be tasked with advancing the state-of-the-art in the field.

4. **In order to measure the success of ASAP, we need to have objective metrics that measure the speed of scientific innovation. What metrics already exist and what ones need to be created? What information should the federal government have to understand the health and productivity of our innovation ecosystem, and what tools processes, or institutions should be used to do so?**

The difficult question of how to measure progress and societal impact in science is an old one. Thanks to years of research effort and targeted support via programs like the NSF Science of Science & Innovation Policy (SciSIP) program, there exists a robust community of scholars – many of whom are located on AAU campuses – and a large body of work on the metrics and measurement of science.[13] Impact indicators can cover a wide range of data including citation rates and influence, new drug treatments, science-based startup formation, science-based IP creation and value, hiring trends for young scientists, and others. Some of these indicators touch American lives directly.

There also exist within the federal system several offices with an interest, data, and expertise in measuring science progress and impact. These include NSF's National Center for Science and Engineering Statistics, Science of Science program, and the Technology, Innovation and Partnerships (TIP) Directorate; the Government Accountability Office Science, Technology Assessment, and Analytics Team; the Patent & Trademark Office; the NIH Office of Evaluation, Performance, and Reporting; and others. Staff at many of these offices have a long engagement with questions of science metrics.

However, much of this work is now threatened by funding reductions and workforce upheavals that put federal expertise and extramural scholarship at risk.

Instead of settling for this state of affairs, **Congress should seek ways to actively foster a community of practice in the area of science metrics.** At the bare minimum, Congress should defend funding for offices with relevant expertise while directing them to develop strategies for improving the measurement of science (generally, and as it relates to AI-powered discovery), in partnership with external experts. Congress should itself gather input from government and external experts on how to improve or expand ongoing efforts related to science metrics and consider creating a standing interagency body to support and coordinate research and assessment.

ASAP Pillars

6. **How can America build the world's most powerful scientific data ecosystem to accelerate American science?**

There is a pressing need to improve researchers' access to the vast trove of federal data, much of it sensitive. To that end, an important activity is the **National Secure Data Service (NSDS)**, currently in its demonstration phase, and supported by NSF. The service is intended to dramatically streamline access and linkages to federal data resources. Congress should work with the Administration to ensure the project continues and is adequately resourced to scale appropriately.

It is also time for an **update to the Federal Data Strategy,** which was initiated under the first Trump Administration**.** Congress should work with the new Administration to ensure the federal Chief Data Officers Council remains in place and is empowered to develop a strategy that modernizes federal data practice and policy with an eye to AI readiness.

Leveraging our nation's top data assets to generate AI-ready data and platforms will speed time to discovery and impact. An enormous array of scientific data exists in academia, but it will take community-driven coordination and teamwork to identify the most valuable data and develop roadmaps for standardization and production of AI-ready datasets. Congress should provide federal science agencies with the authority and resources to **establish “data asset” teams** of experts from academia and civil society that can scout, coordinate, and unlock AI-ready scientific data. These teams can also develop aspirational “wish lists” of the most promising but unavailable data sets for each discipline.

Lastly, in light of intense energy demand from data centers and the public infrastructure challenges it creates, Congress and the Executive Branch should consider **establishing and funding with new appropriations an R&D initiative for efficient data centers**, in consultation with industry, academia and national labs. This initiative would focus on achieving rapid advances in areas like superconducting materials, thermal management, novel hardware approaches, control systems, and others to enable the design and engineering of more efficient and sustainable centers.

7. What does the U.S. need to do to ensure its researchers have access to enough computing resources to power new breakthroughs?

The single best way for Congress to support cyberinfrastructure for AI-enabled science is to **authorize and fully fund the National AI Research Resource (NAIRR).** There is a broad national consensus that NAIRR, currently in the pilot project phase, is critically important for connecting researchers with public and private compute and testing platforms as well as datasets, education and training, software, and partnerships. In addition, while there is a significant focus on very large, resource-intensive general AI models, research into smaller, more specialized, and energy-efficient models tailored for AI-enabled science may advance some fields of science more rapidly. These sorts of ideas, which may not be well served by industry, are worthy of deeper exploration. Considering the potential upside of AI-enabled science, which could dramatically elevate the pace of economic growth,[14] the recommended funding levels of $440 million per year represent good value.[15]

However, NAIRR does not exist in a vacuum. Industry-provided computational resources are crucial, but NAIRR partners also include compute centers at universities and national labs, built with public resources, and these centers are important sources of specialized access for researchers, while playing a vital role in advancing discovery in their own right.[16] As such, **Congress should continue to support public supercomputing resources** by funding the NSF Directorate for Computer and Information Science and Engineering (CISE), the NIH Office of Research Infrastructure Programs and platforms like BioData Catalyst, the Department of Energy’s Advanced Scientific Computing Research Program, and other similar accounts.

In light of the growing complexity of the nation’s cyberinfrastructure ecosystem, it would behoove policymakers to have a robust assessment and roadmap upon which to rely. **Congress should direct the Trump administration to initiate an assessment of recent high-performance computing and data storage investments, identify outstanding needs and opportunities, and create a unified vision** for targeted investments that will promote AI-enabled science, as part of its broader AI Action Plan. Such an assessment should leverage outside experts from industry, academia, and national labs, working with the National AI Initiative Coordinating Office.

10. In order to cut the time from discovery to deployment by a factor of 10, what changes are needed in the process of scientific innovation, such as in the regulatory ecosystem, scientific funding models, education and workforce pipelines, and the resources that constitute the scientific supply chain?

Fostering a scientific workforce capable of creating, using, deploying, and orchestrating AI tools is an important pillar for driving AI science forward. An effective federal strategy will take discipline-specific approaches to **curriculum development, boot camps, and other application-oriented AI training, as well as fellowships and scholarships**. NSF, NIH and DOE are particularly well suited to lead these efforts among the academic science community, but other agencies should play a role as well.[17] Congress should seek input to better understand the needs and opportunities in this area, and subsequently provide all necessary authorizations and appropriations to ensure these efforts to build an AI-ready, AI-literate scientific workforce are robust.

In addition, **Congress should support mobility between academia and industry** to maximize opportunities for students and to ensure that university researchers and industry stay mutually aware of needs and opportunities. These can be achieved through industry embed programs, apprenticeships, and externships.

Lastly, Congressional efforts to develop an AI-ready scientific workforce would benefit from a clearer understanding of the future human capital landscape. Congress should direct federal statistical agencies to develop a strategy for collecting and assessing data related to the AI workforce. Congress should also work with federal agencies and external stakeholders to understand skill needs and gaps and develop a roadmap.

---

[1] NYU Center for Data Science. (2022, November 23). CDS researchers develop a deep learning model for early Alzheimer's disease detection. *Medium*. https://nyudatascience.medium.com/cds-researchers-develop-a-deep-learning-model-for-early-alzheimers-disease-detection-6d5fdfcc66d4

[2] Martin, M. (2024, December 2). How artificial intelligence could automate genomics Research. UC San Diego. https://today.ucsd.edu/story/how-artificial-intelligence-could-automate-genomics-research

[3] DeFusco, D. (2024, October 23). Study: Robotic Automation, AI will accelerate progress in science laboratories. UNC Chemistry. https://chem.unc.edu/news/study-robotic-automation-ai-will-speed-up-scientific-progress-in-science-laboratories/

[4] Walker, M. (2024, December 6). AI-driven digital twins in agricultural research hold the promise for better crops. Purdue Department of Computer Science. https://www.cs.purdue.edu/news/articles/2024/ai-driven-digital-twins-in-agricultural-research-hold-the-promise-for-better-crops.html

[5] Jefferson, B. (2023, August 9). Survival of the fittest, AI style. University of Pittsburgh. https://www.pittwire.pitt.edu/pittwire/features-articles/evolution-ai-platform-building-metamaterials

[6] Biever, C. (2025). AI scientist 'team' joins the search for extraterrestrial life. *Nature*. https://doi.org/10.1038/d41586-025-01364-w

[7] See for instance: https://reforms.cs.princeton.edu/; https://rachel.fast.ai/posts/2025-06-04-enzyme-ml-fails/index.html; https://www.understandingai.org/p/i-got-fooled-by-ai-for-science-hypeheres

[8] For instance, https://www.rcsb.org/

[9] Rhyne, B. (2021, November 17). *Universities catalyze entrepreneurial culture*. NBER. https://www.nber.org/be-20212/universities-catalyze-entrepreneurial-culture

[10] Mayer, T., PhD. (2024, April 15). AI for Science: a paradigm shift for scientific discovery and translation. Elsevier. https://www.elsevier.com/connect/ai-for-science-a-paradigm-shift-for-scientific-discovery-and-translation

[11] Li, J., Ding, C., Liu, D., Chen, L., & Jiang, J. (2025). Autonomous laboratories in China: an embodied intelligence-driven platform to accelerate chemical discovery. *Digital Discovery*. https://doi.org/10.1039/d5dd00072f

[12] R. Ferreira da Silva, R. G. Moore, B. Mintz, R. Advincula, A. Al Najjar, L. Baldwin, C. Bridges, R. Coffee, E. Deelman, C. Engelmann, B. D. Etz, M. Firestone, I. T. Foster, P. Ganesh, L. Hamilton, D. Huber, I. Ivanov, S. Jha, Y. Li, Y. Liu, J. Lofstead, A. Mandal, H. G. Martin, T. Mayer, M. McDonnell, V. Murugesan, S. Nimer, N. Rao, M. Seifrid, M. Taheri, M. Taufer, K. D. Vogiatzis, "Shaping the Future of Self-Driving Autonomous Laboratories Workshop", Technical Report, ORNL/TM-2024/3714, December 2024, DOI: 10.5281/zenodo.14430233, https://info.ornl.gov/sites/publications/Files/Pub227078.pdf

[13] Much of this is covered authoritatively in Wang, D., & Barabási, A. (2021). *The Science of Science*. Cambridge: Cambridge University Press. doi:10.1017/9781108610834

[14] Besiroglu, T., Emery-Xu, N., & Thompson, N. (2024). Economic impacts of AI-augmented R&D. *Research Policy*, *53*(7), 105037. https://doi.org/10.1016/j.respol.2024.105037

[15] As recommended by the National Artificial Intelligence Research Resource (NAIRR) Task Force, which recommended $2.6 billion total over six years.

[16] For example, see https://www.sdsc.edu/research/index.html; https://www.rcac.purdue.edu/news/science

[17] For instance, the Food and Drug Administration is pursuing an agency-wide rollout of an AI-assisted scientific review, the results of which are worth monitoring. https://www.fda.gov/news-events/press-announcements/fda-announces-completion-first-ai-assisted-scientific-review-pilot-and-aggressive-agency-wide-ai