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General Comment

See attached PDF for SCSP's comment to the RFI.

Attachments

SCSP NITRD RFI Response_20250528



Response to the Request for Information on the 2025 National Artificial Intelligence (AI) Research & Development (R&D) Strategic Plan¹

I. Introduction

Advancements in artificial intelligence (AI) have accelerated **scientific innovation**. Frontier AI models now generate hypotheses, run “self-driving laboratories,” and optimize experiments in real-time, compressing discovery cycles from years to months and extending their reach across various sectors, including healthcare and transportation. In this new era, **AI will unlock new frontiers not only in what the United States can invent but in how fast America can scale and manufacture those inventions**. The nation that dominates AI for science will have a leg up in the great power competition for innovation power, accruing economic, military, and cultural power by innovating faster and more proficiently than geopolitical rivals.²

If the United States is to retain its technological and economic lead, federal AI research and development (R&D) over the next five years must be built on the following **three mutually reinforcing pillars** of American AI dominance:

1. Drive the AI Frontier

- The United States should prioritize leadership in AI research and security to underpin the infrastructure crucial in the race to achieve artificial general intelligence (AGI).

2. Leverage AI for Scientific Discovery

- Turn AI and its convergence with other technologies into a 24/7 discovery engine that unlocks an innovation flywheel for science writ large.

3. Build the New Manufacturing Stack

- Stand up the infrastructure for robotics, advanced energy, and biomanufacturing to enable America to build and scale its inventions domestically.

America has a culture of achieving technological advantages—from the atomic bomb to the moon landing and the human genome—by setting audacious goals and harnessing the full, voluntary power of its innovation ecosystem to achieve them. The efforts to achieve these pillars should draw on this uniquely American attribute and include one or multiple national technology programs. The sections below outline key objectives and specific program and public-private partnership mechanism recommendations for each of the three pillars above.

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² Eric Schmidt, [Innovation Power: Why Technology Will Define the Future of Geopolitics](#), Foreign Affairs (2023).

II. Drive the AI Frontier

A. Why it Matters

Frontier AI models are a force multiplier for the U.S. economy, national defense, and global influence. Today, America's lead in AI is the result of decades of government investment in basic research and the dominance of American firms in the digital domain. Yet America's edge is not guaranteed. China is more than a fast follower on AI. Chinese AI startups routinely match their U.S. counterparts in model performance and are innovating around the energy and compute constraints of the current scaling paradigm. To ensure America's continued place at the technological frontier, the U.S. government must champion the next generation of AI breakthroughs and unleash the innovation ecosystem to achieve AGI.

B. Key Objectives

Champion the Next Generation of AI Breakthroughs.

As recommended by the National Security Commission on Artificial Intelligence, the United States should maintain its technological lead and boost national competitiveness through increased investment in federal AI R&D by gradually scaling non-defense AI R&D funding to \$32 billion annually.³ Additionally, the United States must harness the full strength of its innovation ecosystem to create the AI future through public-private partnership mechanisms, including the establishment of the following:

- **National Artificial Intelligence Research Resource (NAIRR) 2.0.** Convert the pilot National AI Research Resource into an expanded and fully operational tool that provides broad academic access to data, AI software, and computation through a federated super-cloud that blends U.S. Department of Energy (DOE) exascale nodes with commercial hyperscaler credits and secure enclaves, giving every qualified U.S. researcher and small business access to frontier-class AI infrastructure.⁴

Protect Today's and Tomorrow's American AI Assets.

As AI and emerging technologies become increasingly integrated into critical infrastructure, the vulnerability of research assets to cyber threats poses unprecedented risks to U.S. technological competitiveness.⁵ Without proactive cybersecurity measures embedded throughout the R&D lifecycle, adversaries can readily exploit vulnerabilities in the cyber realm to compromise foundational technologies before deployment. To achieve this, the U.S. government should establish the following:

- **Secure Innovation Supply Chain Initiative.** Establish mandatory security-by-design requirements for all government-sponsored R&D contracts involving critical technologies, including funding for security implementation, secure component sourcing mandates,

³ [Fueling Innovation: Insights into Federal AI R&D Investment, Special Competitive Studies Project](#) at 8 (2024); [Final Report](#), National Security Commission on Artificial Intelligence at 188 (2021).

⁴ [Fueling Innovation: Insights into Federal AI R&D Investment](#), Special Competitive Studies Project at 16 (2024).

⁵ [The NIST Cybersecurity Framework 2.0](#), National Institute of Standards and Technology (2024).

and a trusted vendor certification program to ensure emerging technologies are developed with robust cybersecurity protections from conception through prototype.⁶

Unleash the Innovation Ecosystem to Achieve AGI.

The federal government should lead in establishing and enabling the critical infrastructure necessary to ensure the United States gains and maintains a strategic advantage in AI, advanced models, and the long-term pursuit of AGI, through targeted initiatives and strategic partnerships with the private sector. This can be achieved through identifying energy resources, advancing compute capacity, expanding secure data access, and accelerating the talent pipelines necessary to power AGI development at scale.

III. Leverage AI for Scientific Discovery

A. Why it Matters

America's historical success stems from its pioneering discoveries. Its world-class ecosystem of national laboratories has driven countless significant scientific advances of the 20th century. Yet, as the epicenter of innovation has shifted from government to industry, America's innovation geometry has undergone a detrimental reorientation. Expertise, resources, and talent remain scattered across the innovation ecosystem and largely ungathered for national purposes.

The dawn of a new AI-driven scientific paradigm underscores both the necessity and the opportunity for our innovation ecosystem to take a new shape. Already, AI is slashing time-to-breakthrough in fields ranging from plasma physics to therapeutics to advanced materials. If harnessed for national competitiveness, an AI for science flywheel can translate to new companies, jobs, and exports. America's innovation system can become *the* testbed for AI-driven science if the United States successfully leverages and modernizes public-private partnerships for this purpose.

B. Key Objectives

Establish New R&D Tools.

Partner with industry to leverage AI-powered tools that can accelerate scientific discovery and innovation in fields such as fusion energy, quantum information science, and biomanufacturing. Increase funding for specific AI for science initiatives, such as:

- **A National AI for Science Discovery Platform.** Integrate scientific data, expertise, and insights from decades of scientific research into a national AI-enabled S&T Discovery Platform accessible across the DOE National Lab enterprise.⁷ Make this platform available to academics, startups, and other researchers working on grand challenges for science, such as the biomanufacturing of critical minerals.

⁶ [Memos to the President: Future Tech Transition](#), Special Competitive Studies Project at 4 (2024)

⁷ [Generative AI: The Future of Innovation Power](#), Special Competitive Studies Project at 70 (2023).

- **Establish a National Quantum Grand Challenge.** Quantum computing, sensing, and communication have the potential to supercharge the R&D process and revolutionize fields such as medicine, materials science, and cryptography. To jumpstart R&D across quantum information sciences, this White House should set a grand challenge of developing a one-million-qubit fault-tolerant quantum computer with interconnected output to classical computers by 2028.⁸ It should leverage the National Quantum Initiative Act to coordinate efforts across existing government quantum programs, regularly convene private sector players, and establish more consistent and targeted quantum technology grant programs.⁹

Build the Laboratories of the Future.

Future scientific laboratories will conduct experiments, analyze data, and generate new hypotheses with minimal human intervention. Select DOE National Labs have pioneered the creation of these self-driving labs. Meanwhile, the concept of a “cloud lab” could radically transform the way science is performed and taught, moving scientific experimentation from the “wet bench” into a virtual cloud that a researcher can access from anywhere in the world.¹⁰ These novel laboratory models should be emulated across the country and networked into shared data assets for national purpose. To achieve this, the U.S. government should establish the following:

- **National Self-Driving Lab Network.** Prioritize the creation of self-driving labs at every DOE National Lab. These self-driving labs should integrate robotics, high-performance computing (HPC), and foundation models to run uninterrupted experimentation across research fields, including fusion energy, biotechnology, and materials science.
- **University Cloud Lab Credits.** Provide financial incentives, such as tax credits, to the first public university in each state to create or partner with a cloud lab for academic research.¹¹

Create Shared AI for Science Resources.

The connective tissue of the 21st-century innovation ecosystem will be shared access to the tools and fuel for AI-enabled discovery. Public-private partnerships can work to leverage cutting-edge AI systems, scientific data, and computational power for national purpose. To achieve this, the U.S. government should establish the following:

- **Expand National Lab-Industry Partnerships.** Build on efforts such as DOE’s Frontiers in Artificial Intelligence for Science, Security, and Technology (FASST) proposal to

⁸ [National Action Plan for U.S. Leadership in Advanced Compute & Microelectronics](#), Special Competitive Studies Project at 17 (2023).

⁹ [Memos to the President: Quantum Computing](#), Special Competitive Studies Project (2025).

¹⁰ [Carnegie Mellon University and Emerald Cloud Lab to Build World's First University Cloud Lab](#), Carnegie Mellon University (2021).

¹¹ [National Action Plan for U.S. Leadership in Biotechnology](#), Special Competitive Studies Project at 14 (2023).

cultivate robust partnerships and sustained, secure resource sharing between National Labs and U.S. AI startups.¹²

- **Cross-Disciplinary Data-Sharing Platforms.** Create secure platforms that enable researchers across disciplines to share data and collaborate on complex scientific challenges. Cloud vendors should mirror these platforms at zero egress cost, unlocking AI training for academia and small businesses.

IV. Build the New Manufacturing Stack

A. Why it Matters

Manufacturing is not only a downstream application of AI, but a critical component of the R&D process. From prototyping novel AI-enabled systems to building experimental facilities and innovative infrastructure projects, manufacturing is essential to translating research into practical, applicable technologies. Integrating manufacturing into the AI R&D strategy ensures that innovations can be tested, refined, and scaled in real-world settings, accelerating the feedback loop between discovery and deployment. Moreover, investment in R&D infrastructure, such as smart factories and testbeds, not only builds national capacity for innovation but also reinforces industrial competitiveness and creates new categories of jobs.

B. Key Objectives

Invest in Deep Tech R&D.

AI is unlocking an entirely new paradigm of highly autonomous and flexible manufacturing. Federal R&D can drive advances in the tech stack that will power factories of the future, including robotics hardware, sensors, novel architectures for embodied AI, and industrial data. To achieve this, the U.S. government should:

- **Create a Data Foundry for Robotics and Industrial AI.** Training embodied AI systems requires real-world physical data, including the spatial location of objects, their movement and interaction, and the processes for manipulating them. Because China can compel firms to share their data, it maintains a critical advantage over the United States in training industrial AI. The United States should create a trusted third-party hub that works to collate and distribute private-sector industrial datasets for mutual benefit.¹³ A tiered access data foundry would incentivize pre-commercial sharing of industrial data and could be linked to the Manufacturing USA Institutes.

Build the Emerging Manufacturing Stack.

The new industries unleashed by AI-driven science—from fusion energy to robotics to biomanufacturing—will form the foundational infrastructure for 21st-century manufacturing. If the United States hopes to lead in building these new industries, federal R&D must help

¹² [Frontiers in Artificial Intelligence for Science, Security, and Technology](#), U.S. Department of Energy (last accessed 2025).

¹³ [Will the United States or China Lead in Humanoid Robotics?](#), Special Competitive Studies Project (2024).

accelerate the most promising fields of science towards commercial readiness. To achieve this, the U.S. government should establish the following:

- **Fusion Energy Foundations.** To drive the commercialization of fusion energy, set a National Fusion Goal of constructing the world's first commercial fusion power plant this decade. To achieve the goal, build the R&D facilities recommended by DOE,¹⁴ de-risk multiple technologically diverse commercial pilot plant deployments through fully funded milestone and cost-share programs, and support the development of a robust domestic fusion supply chain through tax credits such as an advanced manufacturing production credit.¹⁵
- **Factories of the Future.** To offset China's manufacturing dominance, the U.S. Department of Defense (DoD) should partner with industry to create a network of scalable, AI-enabled factories that can adaptively produce goods.¹⁶ In addition to boosting the U.S. manufacturing base in peacetime for industry sectors such as automotive, a network of scalable factories would create essential industrial surge capacity in the event of a conflict. The DoD should establish a national program office to track these facilities and drive their adoption.

Integrate R&D Into the Manufacturing Process.

21st-century manufacturing will require systems that can adapt at the pace of technology. China has built process innovation into its manufacturing culture over the last few decades.¹⁷ The time has come for America to catch up by building R&D into the missions and budgets of government-supported manufacturing programs nationwide. To achieve this, the U.S. government should:

- **Upgrade the Manufacturing USA Program.** The Manufacturing USA program is a network of 17 public-private partnership institutes focused on advancing the production of critical technologies like robotics, biomanufacturing, and microelectronics. To unlock the program's full potential, the United States should eliminate restrictive five-year term limits for institutes, encourage institutes to network and develop integrated technology packages, and increase federal base funding by \$500 million annually.¹⁸

V. Conclusion

Winning the AI era means out-inventing and ultimately out-building our rivals. The strategy above channels federal R&D into pillars that will grow the economy, strengthen industrial resilience, and secure America's strategic edge. SCSP stands ready to assist OSTP and NITRD

¹⁴ Brian Wirth, et al., [Report of the FESAC Facilities Construction Projects Subcommittee](#), Fusion Energy Sciences Advisory Committee (2024).

¹⁵ [Fusion Power: Enabling 21st Century American Dominance](#), SCSP Commission on the Scaling of Fusion Energy (2025).

¹⁶ [Memo to the President: National Robotics Strategy](#), Special Competitive Studies Project at 2 (2025). Additionally, DoD entities such as the Office of Strategic Capital should explore opportunities to invest in companies building such factories.

¹⁷ Dan Wang, [How Technology Grows](#) (2018).

¹⁸ William B. Bonvillian, [Ensuring Manufacturing USA Reaches Its Potential](#), Federation of American Scientists (2021).

in translating these priorities into the 2025 National AI R&D Strategic Plan and propel the nation forward into a new era of American prosperity.