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Submitter Information

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General Comment

See attached file.

Attachments

Response to Docket ID No. NSF-2025-OGC-0001

National Science Foundation (NSF)

Development of a 2025 National Artificial Intelligence (AI) Research and Development (R&D) Strategic Plan

Request for Information (RFI)

Docket ID No. NSF-2025-0GC-0001

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1 Introduction

The following document highlights areas where the federal artificial intelligence (AI) research and development (R&D) investment is positioned to complement private sector efforts:

- Long-term, high-risk fundamental research
- National security and critical infrastructure applications
- Shared research infrastructure
- Cross-disciplinary integration

Based on our analysis, we suggest recommendations for the Strategic Plan that support the executive order (EO) 14179 mandate to sustain and enhance America's AI dominance through bias-free, merit-based research. These include:

- Establishing a National AI Research Reserve
- Launching security-focused grand challenges
- Creating new models for public-private partnerships that prioritize national security, economic competitiveness, and human flourishing

1.1 Background

The National Science Foundation (NSF), on behalf of the Office of Science and Technology Policy (OSTP), issued this Request for Information (Docket ID No. NSF-2025-OGC-0001) to inform the development of a revised National AI R&D Strategic Plan. This request comes in the context of EO 14179, signed January 23, 2025, which established a policy framework for "sustaining and enhancing America's AI dominance in order to promote human flourishing, economic competitiveness, and national security."

The current AI R&D landscape is characterized by developments that provide important context for federal strategic planning:

1. Rapid advances in foundation models: Since 2022, large language models (LLMs) and multimodal AI systems transformed the AI landscape. These models, initially developed by private industry, demonstrated emergent capabilities that were not anticipated in previous federal R&D plans. The computational resources required to develop state-of-the-art models increased by orders of magnitude, creating barriers to research participation.
2. Expanding international competition: China publicly committed to becoming the world leader in AI by 2030 through its New Generation AI Development Plan, while the European Union (EU) established its AI Act regulatory framework alongside research investments. Other nations including the United Kingdom, Japan, South Korea, and Canada also launched strategic AI initiatives with funding commitments.
3. Changing public-private dynamics: Private sector investment in AI R&D reached approximately $120 billion in 2024, exceeding federal investments. This created an ecosystem where cutting-edge research happens in corporate labs rather than universities or government facilities, inverting the historical pattern of government-led fundamental research preceding commercial application.
4. Evolving regulatory landscape: The transition from AI Executive Order 14110 to EO 14179 in January 2025 reflects a shift in federal AI policy priorities, with the new

framework emphasizing American AI leadership and reducing regulatory barriers to innovation. This policy change creates opportunities for federal R&D investment to focus on areas that enhance US competitiveness in the global AI landscape. Internationally, the EU AI Act, China's generative AI regulations, and other emerging frameworks continue to create a complex global regulatory environment, with different jurisdictions adopting varying approaches that balance innovation promotion with risk management considerations.

5. **Increasing AI capabilities and risks**: Recent advances demonstrate new capabilities in AI systems and potential risks that were previously theoretical. These developments necessitate consideration around safety research, alignment techniques, and responsible development practices within federal R&D planning.

2 Analysis

The current AI landscape includes gaps that federal R&D investment may address:

Gap	Description
Long-term, high-risk fundamental research	• Commercial entities focus on near-term applications with clear monetization paths, creating funding gaps for foundational AI research with 5+ year horizons. This includes AI safety research, interpretability methods, and next-generation architecture that historically produced breakthroughs like neural networks and reinforcement learning. • Federal investment in these areas is essential for maintaining America's technological leadership over decades, not quarters.
National security and critical infrastructure resilience	• The private sector lacks incentives to fully develop AI capabilities designed for national security applications, critical infrastructure protection, and emergency preparedness. This includes AI for autonomous defense systems, offensive/defensive cybersecurity capabilities, supply chain resilience monitoring, and technologies that maintain US export control advantages over adversaries. • These areas require specialized research that addresses unique government requirements including robustness against adversarial attacks, operation in degraded environments, and compliance with specialized protocols.
Research infrastructure and shared resources	• The exponentially increasing computational requirements for innovative AI research have created significant barriers to entry. • Government investment in shared research infrastructure democratizes access to computing resources, enabling smaller institutions and varied researchers to contribute to AI advancement.

Gap	Description
Cross-disciplinary integration	• The most transformative AI applications often emerge at the intersection of AI with other disciplines - from materials science to biology to climate science. • Interdisciplinary research areas frequently fall between traditional funding sources in industry, requiring federal coordination and support.
AI Security and Resilience Research	• Private sector AI security focuses on commercial applications. This creates gaps in research for adversarial robustness in high-stakes government environments, AI system integrity under attack, and secure deployment in classified environments that require specialized protocols and threat models.

A key concern is that current federal AI R&D efforts remain fragmented across agencies, with insufficient coordination mechanisms for strategic alignment. Additionally, the current research funding model struggles to match the pace of AI advancement, with typical grant cycles too slow to respond to rapidly evolving research opportunities.

3 Recommendations

Based on the analysis, the following priorities are recommended for the 2025 National AI R&D Strategic Plan:

Recommendation	Description
Establish a National AI Research Reserve	• Create a dedicated, sustained funding pool specifically for long-term, high-risk AI research projects with 7–10-year horizons. This would provide the stability needed for truly transformative research while insulating these efforts from short-term political or budget pressures.
Launch focused AI Security Grand Challenges	• Develop a series of ambitious, mission-driven grand challenges focused on AI applications for national security, critical infrastructure protection, and emergency response. These challenges should include substantial funding, access to unique government datasets, and pathways to operational deployment.
Implement an AI Commons Program	• Develop shared research infrastructure including computing resources, standardized MLOps pipelines, federated learning frameworks, reference datasets, and automated compliance validation tools. Emphasize democratizing access for smaller institutions while enabling rapid transition from research to operational deployment.

Recommendation	Description
Create AI Interdisciplinary Research Centers	• Establish and fund interdisciplinary research centers that bring together AI researchers with domain experts in fields of national priority including climate science, healthcare, advanced manufacturing, and quantum information systems.
Develop Agile Research Funding Mechanisms	• Design new funding models that can respond more rapidly to emerging research opportunities, including rolling submissions, fast-track review for time-sensitive proposals, and staged funding approaches that quickly test concepts before scaling promising directions.
Enhance Public-Private Research Partnerships	• Create new models for collaboration between government, industry, and academia that address intellectual property concerns while ensuring research output benefits the broader ecosystem. This could include pre-competitive research consortia, public challenge grants with private matching, and shared governance models for research infrastructure.
Establish Hybrid Research-to-Operations Pathway	• Create structured mechanisms for transitioning AI research into operational government systems, including rapid prototyping environments, government-industry collaboration frameworks with clear IP arrangements, and AI-as-a-Service pilot programs for testing research outcomes.

4 Conclusion

The 2025 National AI R&D Strategic Plan represents an opportunity to align federal research investments with America's long-term AI leadership goals. By focusing federal resources on long-horizon fundamental research, national security applications, shared infrastructure, and cross-disciplinary integration, the government can complement private sector investment while safeguarding AI development for broad national interests.

The recommendations outlined above—establishing a National AI Research Reserve, launching focused security grand challenges, implementing an AI Commons program, creating interdisciplinary research centers, developing agile funding mechanisms, and enhancing public-private partnerships—together form a comprehensive approach to maximizing the impact of federal AI R&D investment. This strategy will help secure America's position as the global AI leader while ensuring AI advances promote human flourishing, economic prosperity, and national security.