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General Comment

America stands at a pivotal juncture in maintaining its global leadership in scientific discovery and technological innovation. The National Science Foundation (NSF), since its establishment 75 years ago, has been an indispensable driver of our nation's success in fostering groundbreaking research and development. The strategic planning underway for the national artificial intelligence (AI) research plan presents an opportunity to modernize and reinforce NSF's strengths, ensuring that our nation remains at the forefront of scientific innovation and technological advancement.

NSF-funded research has historically generated innovations such as the internet, GPS, Google, and transformational advancements in AI and quantum computing. Each of these breakthroughs has laid the groundwork for entire industries and transformed the everyday lives of Americans. The NSF's unparalleled success stems from core ingredients outlined below, which have consistently yielded transformative discoveries.

With regard to NSF, we recommend incorporating the attached foundational pillars into the forthcoming National AI Research and Development Strategic Plan.

Attachments

5.29.25 RFI Response NSF 2025 OGC 0001 NSF Study Group Tent Poles (6)

May 29, 2025

Subject: Response to Request for Information on the 2025 Development of a National Artificial Intelligence Research and Development Strategic Plan (Docket ID No. NSF–2025–OGC–0001)

America stands at a pivotal juncture in maintaining its global leadership in scientific discovery and technological innovation. The National Science Foundation (NSF), since its establishment 75 years ago, has been an indispensable driver of our nation’s success in fostering groundbreaking research and development. The strategic planning underway for the national artificial intelligence (AI) research plan presents an opportunity to modernize and reinforce NSF’s strengths, ensuring that our nation remains at the forefront of scientific innovation and technological advancement.

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With regard to NSF, we recommend incorporating the following foundational pillars into the forthcoming National AI Research and Development Strategic Plan:

1. **Support for STEM Pathways in Rural and Underserved Communities:** Rural and underserved communities represent untapped reservoirs of potential scientific talent. The NSF should expand its programs that offer innovative STEM pathways, particularly those that leverage local strengths, such as aerospace education and outdoor recreational learning environments. Supporting these programs can significantly expand the national talent pool and ensure equitable access to STEM careers for young people nationwide.
2. **Strategic Integration of Artificial Intelligence and Human Potential:** AI is beginning to transform scientific research much like the steam engine once transformed industry—compressing timelines, amplifying human expertise, and revealing new frontiers of possibility. NSF investments should prioritize initiatives in fields critical to America’s future, such as AI, quantum computing, nuclear energy, and biotechnology, where AI-driven tools can dramatically enhance human productivity. By strategically leveraging human-AI collaboration, NSF can ensure that each grant funds greater scientific exploration, deeper insights, and higher-quality, reproducible research outcomes. Such integration multiplies human attention and creativity, democratizes scientific capabilities, and positions the U.S. to lead globally in innovation, economic productivity, and national security.
3. **Increased Strategic Investment in NSF:** AI, quantum computing, biotechnology, and nuclear research are fields on the brink of transformative breakthroughs. History shows that

decisive, strategic investments during critical junctures yield exponential returns. Today, the integration of AI in science mirrors the impact of the steam engine in industry—accelerating discoveries, amplifying human ingenuity, and dramatically expanding what’s possible within a single NSF funding cycle. At this pivotal moment, reducing NSF budgets risks unilateral technological disarmament, which could threaten talent migration abroad and inadvertently boost international competitors. Instead, a robust surge in NSF funding would harness AI-driven efficiencies, fortify America’s competitive edge, and create a systemic cycle of innovation, reinforcing advancements across interconnected scientific domains. Enhanced federal, academic, and industry partnerships, combined with increased investment in basic and applied research, are not merely prudent—they are essential to secure America's continued global leadership, economic prosperity, and national security.

4. **Restoring and Expanding Graduate Fellowships:** Restoring and expanding this prestigious program is paramount for maintaining our competitive advantage and leadership position in artificial intelligence and other critical scientific domains. The GRFP has historically fostered scientific breakthroughs by enabling talented graduate researchers to pursue innovative, high-risk, high-reward projects. It should be funded in both priority areas and across a broad range of scientific disciplines.
5. **Broadening of Participation in STEM:** NSF's statutory mandate to enhance participation in STEM is essential. A STEM workforce that reflects all Americans contributes directly to improved economic competitiveness. NSF must intensify its efforts to create STEM opportunities across all communities, ensuring that talent from all corners of our nation contributes fully to our collective prosperity.
6. **Rotating Experts and Professional Staff ("Science National Guard"):** NSF’s innovative model of rotating scientists and engineers from academia, industry, and government has continuously rejuvenated the organization with cutting-edge insights and fostered critical collaborations. These "rotators" provide agile responses to national emergencies and ensure rapid deployment of innovations. This structure must be expanded and strengthened to protect America’s scientific edge with AI, quantum, nuclear, and biotech.
7. **Elevating Intellectual Merit:** Intellectual merit must remain a central criterion in all NSF funding decisions. Maintaining the rigor and integrity of merit-based funding ensures investments consistently yield transformative and high-quality outcomes. The history of breakthroughs in AI, quantum, biotech, and nuclear demonstrates support for projects that may initially seem abstract, often leading to groundbreaking, applied innovations.
8. **Enhanced Outreach:** The NSF must reinforce its efforts in clearly and broadly communicating the societal benefits of its funded research. Enhanced outreach initiatives will strengthen public understanding and appreciation of science.
9. **Sufficient Indirect Costs:** In strategic areas critical to America's future, such as AI, quantum computing, nuclear energy, and biotechnology, sufficient indirect cost rates are essential to sustain our global leadership and safeguard national security. Underfunding these costs undermines proven bipartisan policies that reimburse universities for necessary

research infrastructure. Adequate indirect cost recovery is especially vital in these high-stakes fields, as it funds state-of-the-art laboratories, advanced computational resources, robust cybersecurity measures, and health compliance systems. Imposing untenable limits risks shifting essential costs onto research institutions, reducing our nation's capacity for groundbreaking innovation, weakening economic competitiveness, and jeopardizing U.S. technological leadership precisely when rivals are intensifying their investments.

10. **Commitment to Curiosity-Driven Basic Research:** Basic research driven by scientific curiosity, particularly in strategic areas such as AI, quantum computing, nuclear energy, and biotechnology, consistently yields transformative breakthroughs, often some time after initial discoveries. For example, foundational molecular biology research led directly to technologies like CRISPR gene editing, dramatically reshaping health and agriculture. Fewer than 7% of U.S. basic research dollars originate from private firms, primarily due to the extended timelines and inherent financial risks associated with this type of research. While concerns about transparency and reproducibility warrant targeted improvements, they should not justify budget cuts that compromise foundational research. Reducing administrative burdens is necessary, but must complement, not replace, essential investment. Robust federal support for curiosity-driven research remains critical.

Finally, the bipartisan congressional consensus recently demonstrated in celebrating NSF's 75-year legacy provides a strong mandate for continued and increased investment in science and technology. Such support is crucial for ensuring that the United States maintains its global scientific and technological leadership, particularly in rapidly evolving fields like artificial intelligence.

As OSTP develops the next National AI Research and Development Strategic Plan, we urge a decisive commitment to a robust, innovative, and inclusive NSF. America's future prosperity, security, and leadership in the global economy depend upon it.

Respectfully,

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