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Submitter Information

Organization: SRI International

General Comment

SRI International is pleased to respond to the National Science Foundation's (NSF) Request for Information (RFI) on the Development of a 2025 National Artificial Intelligence (AI) Research and Development (R&D) Strategic Plan. Drawing from decades of leadership in AI research and innovation, we hope to inform and strengthen the national strategy to ensure the United States remains at the forefront of leading AI design, research, and development.

Please see attached file.

Attachments

NSF AI RFI Response from SRI May 2025 FINAL

Docket ID: NSF-2025-OGC-0001

Submitting Organization: SRI International

Title: Request for Information on the Development of a 2025 National Artificial Intelligence (AI) Research and Development (R&D) Strategic Plan

Introduction

SRI International is pleased to respond to the National Science Foundation's (NSF) Request for Information (RFI) on the Development of a 2025 National Artificial Intelligence (AI) Research and Development (R&D) Strategic Plan. Drawing from decades of leadership in AI research and innovation, we hope to inform and strengthen the national strategy to ensure the United States remains at the forefront of leading AI design, research, and development.

SRI supports the federal government's continued leadership in advancing leading AI research that benefits the public and strengthens the United States as a leader in innovations. As an independent, nonprofit research institute headquartered in Menlo Park, CA, and with offices across the country, SRI has had the privilege of supporting the federal government on cutting-edge technologies and the development of AI in applications across multiple disciplines for many decades. We leverage SRI-developed technologies in AI; speech recognition; video-based analytics and multi-sensing behavior analytics; and cyber security. SRI has been a leader in the development of personal assistants, intelligent tutoring systems, and communication systems that deliver and integrate solutions to our society's most pressing problems.

Core Recommendations

Cross-Sector Partnerships and Investments

To fully harness the transformative potential of AI, the United States must strengthen its national R&D ecosystem through strategic investments in a variety of forms. Federal agencies, including NSF, should prioritize funding that supports a broad range of institutions: nonprofits, small businesses, academia, and for-profit companies. Innovation flourishes when ideas are cultivated across sectors, and to stay globally competitive in AI, the U.S. must explicitly support nonprofit-led and cross-sector R&D partnerships. These collaborations can unlock breakthroughs, accelerate responsible innovation, and ensure that all types of institutions have access to resources, data, and opportunities, regardless of the size or type of organization.

Nonprofit organizations play a critical and often underutilized role in America's R&D infrastructure. As mission-driven entities, they are uniquely positioned to pursue high-risk, high-reward initiatives that may not offer immediate commercial return but carry significant potential for long-term societal benefit. Nonprofits can act as innovation incubators, exploring bold ideas, testing ethical frameworks, and developing foundational AI tools well before market demand or policy clarity emerges.

To remain a global leader in AI and technology, the U.S. must ensure that its R&D ecosystem is modern and collaborative. This includes fostering interdisciplinary research that brings together STEM experts and social scientists to address the complex social and ethical challenges of AI. Cross-sector collaboration should be encouraged to ensure innovation is both cutting-edge and grounded in public value.

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Infrastructure

A shared, robust U.S. R&D infrastructure will not only drive technological progress, but will also prepare the workforce and support economic resilience in the face of rapid global change. Partnerships across sectors and with government can only go so far without infrastructure. This must include the development of robust systems for computational power and access to high-quality datasets, software tools, and advanced models. These resources should be made widely available to ensure researchers can fully participate in AI development regardless of their institution, location, or financial capacity.

Equally important is the creation of knowledge-sharing platforms and community hubs that foster collaboration and expertise exchange. Shared digital repositories should house datasets, methodologies, and research findings across disciplines to promote interdisciplinary discovery and innovation. Additionally, investments must be made in training programs and infrastructure development to ensure broad participation in leading-edge research.

Investing in Human Capacity

While AI is touted as an innovation that will reduce the burden of human effort, for the U.S. to play a critical role in the development, use, regulation, and advancement of AI, we must invest in our human capacity as much as our technological one. Americans need to think computationally, understand data and statistics (an often ignored part of the mathematics curriculum), become proficient in the use of AI within their own lives and workplaces, build a fundamental understanding of how AI works, and prepare for careers involving building AI systems or working with AI designers and researchers to advance the next generation of technological tools and augmented human environments.

Workforce Development and Education

To prepare a future-ready workforce and ensure the responsible use of AI, the U.S. must invest in a robust education ecosystem where AI is a key component of how students learn and prepare for work. This means expanding access to high-quality learning with and about AI across all stages of education from K–12, through higher education, and into the workforce. Academic pathways ending in college or careers (such as Career and Technical Education [CTE] programs) must be updated regularly and with increased frequency to represent the updated approaches and tools common across disciplines. Updates to state standards, accreditation requirements at colleges and universities, and frameworks for high-quality workforce preparation will need continuous review and engagement from employers and researchers.

With the rapid advancements anticipated, educators and curricula will need support for rapid integration of new skills, technologies, and assessments. Supporting career readiness for learners also requires sustained support for educators and institutions to integrate AI into curricula, professional development, and applied learning experiences. Workforce micro-credentials and nano-degrees can ensure students and educators can continuously reskill and upskill.

Finally, public funding must support the development and refinement of new theories that help us understand how AI is shaping learning, identity, and development inside and outside the classroom. Together, these investments will ensure that AI becomes a driver of educational opportunity, innovation, and human achievement and fulfillment.

Work-based learning, apprenticeships, and fellowships across nonprofits, academia, government labs, and industry should be expanded to provide students and workers with the

knowledge and experience needed to succeed in AI-related careers. Investments in reskilling and upskilling are critical to support workers transitioning into AI and adjacent fields. Dedicated funding should support the development of AI education pathways that include interdisciplinary curriculum, paid internships, and hands-on learning experiences.

AI-Powered Education

In addition to learning pathways about AI and how it is used, the nation must invest in developing AI tools that can support all aspects of the educative process. This includes professional development of educators, assessment of students and teachers, and student learning. For example, AI tools can be used to assess learning in real time and provide personalized support. This existing work can be expanded to provide teachers real-time insights into student learning and support group assignments, enrichment, and additional support in classrooms. AI allows natural language processing that can generate customized, open-ended assessments that are adaptive and accessible for diverse learning needs. Further, it could support assessment of difficult-to-measure skills such as creative and critical thinking.

Secure and Trustworthy Environments and Ecosystems

Beyond working well for individual educators and students, AI tools must be able to function in complex educational settings that have high standards for data privacy, data accuracy, and student safety. Thus, attention must be given to developing trustworthy tools and ways to assess trustworthiness. Investment in coalitions, standards and standardization, and transparency for teachers, parents, and administrators for how AI is being used and what decisions are being made about students is critical for creating trust. Developers, solution providers, and researchers need clear guidance for implementation of laws, not just in the U.S., but across borders for true scale of impact. Child privacy laws such as COPPA can be difficult to navigate, and AI can support the developers and researchers as well to help navigate compliance as well as transparency.

Teacher Preparation and Capacity Building

Educator preparation across the P-20 continuum must be supported to ensure teachers are equipped to integrate AI concepts, tools, and real-world applications into their instruction. This includes adopting competency-based frameworks, providing micro-credentials for emerging skills, and offering professional learning opportunities. As AI education is still an emerging field in K-12, significant investment is necessary to develop learning progressions, standards, and a robust research agenda. This includes identifying key AI concepts and competencies appropriate for each grade level and designing curriculum frameworks informed by research. Applying effective pedagogy is central to successful AI education. Instruction should incorporate hands-on, inquiry-based, and project-based learning, while encouraging students to engage in critical analysis, design thinking, modeling, and data-driven decision-making. Teachers need professional development not only on effective teaching strategies for AI, but also on helping students cultivate a healthy skepticism toward AI systems and understand their limitations.

Schools of education will need to provide significant faculty development, create and share models of updated methodology and pedagogy courses, and ensure that updated frameworks for teacher fieldwork and student teaching prioritize experience with AI in classroom settings. New books, publications, and case studies will need to be produced to guide teacher and administrator preparation programs to see AI as a fundamental part of the classroom, not an optional add-on.

Interdisciplinary Learning and Collaboration

AI should also be integrated across disciplines to give students meaningful context and connect new knowledge to what they have learned in other subject areas. Research is needed to inform the design of integrated AI curricula, assessment tools, and competency-based evaluation methods suited for interdisciplinary, project-based learning. Insights from learning sciences and STEM education can guide the development of AI learning progressions and inform teacher training by considering students' cognitive development and prior knowledge.

Collaboration across disciplinary experts, educators, and the AI education community is essential. NSF should fund intermediaries to bring together stakeholders across sectors and disciplines including educators, policy makers, AI experts, industry partners, curriculum developers, and human-computer interaction researchers. Conferences and workshops can serve as platforms for national thought leadership, where diverse voices collaborate, share ideas, and advance the future of P-20 AI education.

Advancing AI capabilities for Learning Environments

In addition to building educational pathways, we must invest in the development of AI capabilities that are specifically designed for teaching and learning environments. Traditional classrooms are complex and noisy, requiring AI tools to interpret multimodal signals such as speech, gestures, and real-time interactions. These capabilities are essential to providing teachers with actionable insights into their practice and students' needs. Further research is needed in speech recognition technology, naturalistic observation, and the detection of nonverbal indicators of engagement that are focused on the educational contexts. With such advancements, AI systems could begin to identify and respond to the key elements of instruction and learning as they unfold.

The development of such tools will provide unimagined opportunities to better understand what students know and are able to do. The best of current student assessments are limited proxies for the cognitive and behavioral processes that constitute learning. AI has the potential to help identify the building blocks of learning, including signs of engagement, confusion, and comprehension. Future systems may even be able to detect the neurological and affective states associated with learning and link them to observable expressions on students’ faces and bodies. This would make it possible for human or AI-based educators to recognize, in real time, when a student needs additional support or is ready to move forward.

Theoretical Foundations for AI Connected to Education

These technical investments must be in development and refinement of theory that explores how AI shapes learning and development inside and outside of schools. Students today interact with AI tools in ways that seem familiar—solving math problems, organizing ideas, or asking questions—yet the underlying relational dynamics are fundamentally different. AI agents are endlessly patient, emotionally neutral, and unconditionally supportive. Unlike human teachers or peers, they place no demands on the learner. These qualities may influence how students approach tasks, interpret feedback, and form their sense of self in the learning process.

As Einstein observed, *“A theory can be proved by an experiment; but no path leads from experiment to the birth of a theory.”* To ensure responsible innovation, we need public investment in the development of new theories that explain how AI affects learning, motivation, and identity. This includes funding interdisciplinary research that connects AI design with developmental psychology, learning sciences, and human-computer interaction. These

conceptual foundations are critical for guiding the next generation of AI tools and the policies that shape their use in education settings.

Evaluation and Sustainability

Clear performance metrics and benchmarks should align with national priorities such as public service innovation, economic competitiveness, educational opportunity, national security, health, prosperity, and scientific advancement. To be effective, benchmarks must be tied to measurable outcomes. For example, this could include tracking how AI research is translated into public or private sector applications, measuring indicators of workforce development, or evaluating increases in access to AI education. Importantly, performance metrics should go beyond technical achievements to include societal impacts, ensuring that AI R&D investments improve outcomes for communities.

To ensure long-term success and impact, sustainable funding and operational models are key. This includes targeted support for nonprofits and other mission-driven organizations to pursue early-stage, high-risk innovations that may not yield immediate commercial returns but have the potential for significant societal benefit. Funding models should include incentives for translating research into real-world solutions, while embedding robust mechanisms for evaluation and learning.

Security and Privacy

To ensure transparency, accountability, and reproducibility in AI research and development, it is essential to develop clear provenance tracking guidelines and mechanisms that also respect data privacy laws and regulations. This includes implementing and promoting the use of privacy-preserving technologies such as federated learning, differential privacy, synthetic data generation, and trusted execution environments. These approaches enable data to be used responsibly while safeguarding sensitive information. To advance these capabilities, sustained funding should support research in these technologies, helping to build a foundation of trust and integrity in AI systems without compromising data utility. Publicly funded projects should be required to release their deliverables under open licenses to enhance transparency, reproducibility, and the broad reuse of tools and knowledge.

Conclusion

SRI believes AI holds potential to enhance education, expand economic opportunity, strengthen national security, and prepare a competitive workforce for the future. To harness this potential and to further or maintain U.S. dominance, the country must build a robust, modernized education and workforce R&D ecosystem. To build its national plan, we recommend that NSF consider investing in (1) research roadmaps for high-risk, high-reward research areas and learning models; (2) an R&D network that funds prototyping and rapid testing of breakthrough ideas; (3) public-private partnerships that bring ideas to market, connect research teams with schools and industry, and accelerate scaling and adoption; and (4) establishment of an impact assessment framework to measure success of funding directed toward projects demonstrating real learning improvements and scalability.

Please contact Todd Grindal if we can help or support this effort.

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