



What The CHIPS and Science Act means for Artificial Intelligence

Introduction

On July 27, 2022, Congress passed the [CHIPS and Science Act](#) to spend \$280 billion focused on boosting the United States' scientific research and advanced semiconductor manufacturing capacity to boost U.S. competitiveness against China. This policy explainer describes the CHIPS and Science Act (hereafter, the "CHIPS Act") and its impact on artificial intelligence (AI), including funding allocated to AI-related research and activities and provisions related to new AI capacity-building and development programs.

Budgetary Allocations on AI

The bill's spending is broadly [split](#) into two categories—allocating \$52 billion in subsidies and tax credits for chip manufacturing companies, and \$200 billion for research into AI, quantum computing, and robotics, among other areas. Much of this investment impacts AI—such as investments in developing semiconductors, which companies use to power research and development (R&D) for machine learning and AI—and some of the investment is focused on AI specifically. The following chart provides a breakdown of some of the bill's investments that relate to or will impact AI:

AMOUNT	SPECIFIC ALLOCATION	AGENCY	IMPACT ON AI
\$50 billion (over 5 years)	CHIPS for America Fund	Department of Commerce	Incentives for companies to develop “domestic manufacturing capacity” for chips; funding for R&D and workforce development programs related to chips.
\$2 billion	Chips for America Defense Fund	Department of Defense	Funding for “microelectronics commons,” an initiative to help the domestic industry and academia move novel technologies from the laboratory to the commercial production line, and workforce training.
\$500 million (over 5 years)	CHIPS for America International Technology Security and Innovation Fund	Department of State (coordinating with USAID, Export-Import Bank, and US International Development Finance Corporation)	Cooperation with overseas partners on semiconductor development and security, as well as trust in “other emerging technologies” (which could ostensibly include AI).
\$200 million (over 5 years)	CHIPS for America Workforce and Education Fund	National Science Foundation	Domestic workforce build-out to develop and manufacture chips.
\$9 billion	National Institute of Standards and Technology (NIST) work on Critical Technology Research and Standards	National Institute of Standards and Technology	R&D, particularly advancing research and standards development, on AI, semiconductors, quantum information science, and other “industries of the future.”
\$16.5 billion	Department of Energy and Office of Science R&D	Department of Energy	R&D on AI and machine learning, advanced energy and industrial efficacy technologies, high performance computing, and other areas.
\$20 billion	Creation of National Science Foundation (NSF) Directorate for Technology, Innovation, and Partnerships (TIP)	National Science Foundation	Domestic development of national and economic-security critical technologies (e.g., artificial intelligence, quantum computing, and others).
\$13 billion	NSF Funding for STEM Education	National Science Foundation	AI Scholarship-for-Service, among other programs.

Sources: [CHIPS and Science Act of 2022, Section-by-Section Summary](#), [CHIPS and Science Act of 2022 Division A&B Summary](#).



Developing better semiconductors has the potential to enable even faster and more sophisticated computation for AI and machine learning, as do related R&D areas funded in the bill such as high-performance computing and quantum information science. Many other investment allocations throughout the bill also mention AI as a subcomponent, such as the Department of Energy work on clean energy and the Energy Department’s Emerging Biological Threat Preparedness Research Initiative.

Programs Related to AI

The CHIPS Act also creates several programs and expands existing programs related to AI R&D and workforce development. Section 10232 of the [bill](#) specifically addresses AI, requiring the NIST director to “continue to support the development of artificial intelligence and data science, and carry out the activities of the National Artificial Intelligence Initiative Act of 2020,” part of the 2021 National Defense Authorization Act. For the director, this includes building out current AI work and expanding a focus on AI safety, security, and risk:

- “expanding the Institute’s capabilities, including scientific staff and research infrastructure;
- supporting measurement research and development for advanced computer chips and hardware designed for artificial intelligence systems;
- supporting the development of technical standards and guidelines that promote safe and trustworthy artificial intelligence systems, such as enhancing the accuracy, explainability, privacy, reliability, robustness, safety, security, and

mitigation of harmful bias in artificial intelligence systems;

- creating a framework for managing risks associated with artificial intelligence systems; and
- developing and publishing cybersecurity tools, encryption methods, and best practices for artificial intelligence and data science.”

The bill also amends the NIST Act to allow the NIST director to establish virtual “testbeds”—in coordination with other agencies, the private sector, and higher educational institutions—for “the development of robust and trustworthy artificial intelligence and machine learning systems, including testbeds that examine the vulnerabilities and conditions that may lead to failure in, malfunction of, or attacks on such systems.” This represents an additional policy focus on the need to further examine flaws in AI technologies.

Other AI-related programs and provisions include:

- Sec. 10224: directs NIST to establish a program for AI-enabled defense research;
- Sec. 10313: authorizes NSF to create a federal AI scholarship-for-service program, similar to the CyberCorps Scholarship-for-Service (where students receive scholarships to study in cyber-relevant programs and commit to a period of government service);
- Sec. 10316: clarifies that cybersecurity-related AI issues are part of the CyberCorps scholarship;
- Sec. 10360: directs NSF to conduct or support a public study on AI research capacity at universities, what enables research success, and the geographic distribution of successful AI research; and
- Sec. 10771: authorizes appropriations for AI and information technologies in the Energy Department’s Office of Environmental Management.



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Conclusion

Signed into law by President Biden on August 9, 2022, the CHIPS and Science Act will allocate billions in federal government spending toward semiconductors, technological development, and artificial intelligence, among other areas—intended to boost American tech competitiveness. The implications for AI R&D and policy, from enhancing the hardware used to develop machine learning and AI systems to creating a scholarship program for AI experts to enter into federal service, could help reshape the U.S. AI landscape for years to come.

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