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U.S.-China Science and Technology Cooperation Agreement

On January 31, 1979, weeks after the United States and the People's Republic of China (PRC, or China) established diplomatic relations, U.S. President Jimmy Carter and PRC leader Deng Xiaoping signed the U.S.-China Science and Technology Cooperation Agreement (STA), the first major agreement between the two governments. The STA was a part of U.S. strategy at the time to build ties with China to counter the influence of the Soviet Union. During the 1980s and 1990s, U.S. strategy shifted and science and technology (S&T) ties became part of a broader U.S. effort to integrate China into the global system and influence its development trajectory and behavior. President Barack Obama expanded S&T ties with China to address global challenges, such as health, energy, and climate. Since that time, U.S. views and strategy toward China have been shifting to protect and advance U.S. interests vis-à-vis China as a strategic competitor. STA proponents and critics both say that the current STA does not reflect these shifts or U.S. concerns about China's S&T practices and industrial policies. Some say the STA does not address China's growing research and technological capabilities and increasingly restrictive and risky operating environment for cross-border research.

Just before the STA was to lapse on August 27, 2023, the Biden Administration said it would extend renewal for six months to determine how to proceed. Congress might consider its oversight role with regard to the STA and any U.S. STA-related activities and negotiations with China.

STA Provisions

Stated objective: to provide opportunities for cooperation in S&T fields of mutual interest, thereby promoting S&T progress for the benefit of both countries. Cooperation is to be "on the basis of equality, reciprocity, and mutual benefit." Both parties are to promote, where appropriate, mutually beneficial activities.

Types of activities: exchange of scientists, scholars, specialists, and students; exchange of scientific, scholarly, and technological information; joint projects; joint research; and joint courses, conferences, and symposia; among others.

Implementing accords: may include information about the nature of cooperation, responsibilities for activity costs, and treatment of information derived from STA cooperation, including intellectual property rights (IPR). Information from STA projects is to be made publicly available unless otherwise agreed. Activities are subject to the laws and regulations of each country.

External participation: scientists, technical experts, and entities of third countries or international organizations at U.S. and PRC invitation.

Governance: a U.S.-PRC Joint Commission on Scientific and Technological Cooperation (JCM), with co-chairs appointed by each country, is to plan and coordinate activities. The JCM includes senior officials from the technical agencies of both countries. The U.S. executive agent is the Office of Science and Technology Policy (OSTP); the PRC agent is China's Ministry of Science and Technology (MOST). The JCM is to meet once a year, alternating between countries. Full meetings led by the heads of OSTP and MOST typically occur every two years, with other years limited to an S&T Executive Secretariat.

Duration: initially five years, subject to modification or extension by the parties. The STA was last extended on June 27, 2018, and was amended to address U.S. concerns about China's approach to technology, innovation, and practices of concern (e.g., lax IP enforcement, IP theft, and forced technology transfer).

Sub-agreements: an estimated 30 agency-level protocols and 40 sub-agreements accompany the STA in areas that include: agriculture; basic science; biomedical research and health; energy; environment; earth, atmospheric, marine sciences and remote sensing; standards and metrology; nuclear fusion and safety; and transportation. The Departments of Agriculture, Energy, and Health and Human Services have the most agreements.

Broad Functions of STAs

The U.S.-China STA is an umbrella agreement that governs U.S. government S&T work with China and is part of a broader S&T ecosystem of universities, firms, professional bodies, and nongovernmental organizations. The Department of State Office of S&T Cooperation, which negotiates and oversees U.S. STAs, says that STAs and related activities "strengthen international cooperation in scientific areas aligned with American interests, ensure open data practices, promote reciprocity, extend U.S. norms and principles, and protect American intellectual property." The United States has 60 bilateral and multilateral STAs—including with the European Union (and separately with certain EU member states), Japan, South Korea, Australia, Brazil, and Canada—and over 2,000 sub-agreements.

U.S. and PRC Views of the Agreement

The United States has used the U.S.-China STA as a tool to deepen diplomatic ties, address global challenges, and advance science. Advocates say it guides U.S. S&T work with China without mandating activity; provides access and protections for U.S. scientists in China, including in the social sciences (where access has been more restricted); and benefits U.S. researchers by providing access to large pools of research subjects and longitudinal health studies. China's cooperation has not been consistent, however, as Beijing developed domestic S&T competencies and has sought to restrict U.S. researcher access in certain areas. STA critics say that China is an unreliable or untrustworthy research partner, citing data restrictions and a lack of forthrightness in sharing scientific results. China reportedly withheld avian influenza strains required for U.S. vaccines and in 2019, cut off U.S. access to coronavirus research, including U.S.-funded work at the Wuhan Institute of Virology.

China takes a competitive approach to innovation and has used the STA to catch up in its S&T capabilities. The state's role in China's economic and research ecosystems has allowed Beijing to shape S&T ties with the United States to fill research gaps, develop competencies and IP in priority areas targeted in its industrial policies, and develop PRC talent. The STA has provided the framework for PRC students and scholars to study in the United States, a phenomenon that has been central to China's S&T

advances. An estimated 42.5% of the international graduate students in the U.S. are from China. Some say that the decentralized and open approach to S&T that characterizes the U.S. research ecosystem, while beneficial to U.S. innovation, has hindered the U.S. ability to develop a strategic approach to S&T ties with China, effectively oversee joint research, and restrict China from gaining sensitive capabilities. In 2017, U.S. patent and trademark officials identified over 400 PRC patents tied to STA projects that the PRC commercialized without U.S. benefit.

U.S.-China S&T activity increased in November 2009 with new agreements on joint projects in electric vehicles (EV), energy efficiency, renewable energy, coal, and shale gas, and the creation of the U.S.-China Clean Energy Research Center (CERC), a ten-year research effort between the U.S. Department of Energy and China's MOST. CERC involved over 1,000 participants from U.S. universities, national labs and industry. The former head of MOST said that CERC is a model STA project; U.S. proponents point to clean energy advances. The effort was controversial among some U.S. stakeholders, however. Some U.S. firms expressed concerns about sharing foundational IP; others said the efforts' focus on commercializing and deploying emerging technologies seeded PRC capabilities in areas such as EV batteries.

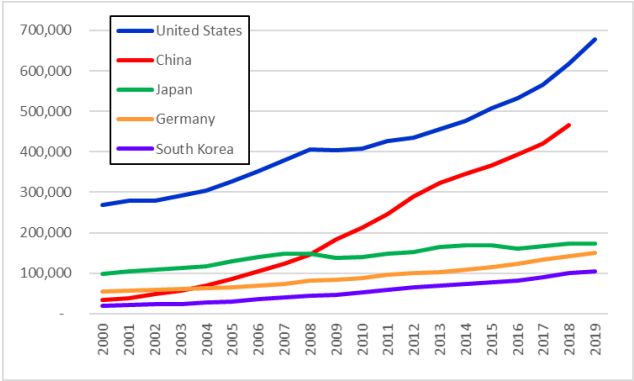
Rise of China: A Changing Global S&T Landscape.

China's global S&T position has changed substantially since 1979, when China lagged behind most developed nations in S&T. In 1991, China ranked seventh in research and development (R&D) funding among countries reporting data to the Organization for Economic Cooperation and Development (OECD). By 2019, the most recent year for which comprehensive data are available, China ranked second in R&D investments, behind the United States (**Figure 1**). China has emerged as a leading patent holder, source of academic papers, and home to technology-intensive industries, although some U.S. and PRC experts have questioned the integrity and quality of some research. Measured by co-authored scientific research papers, U.S. collaboration with China exceeds U.S. work with other partners, such as Germany, Japan, and the United Kingdom. China's trajectory has benefitted from its ties with advanced S&T partners in the United States, Japan, and Europe. China is also using S&T projects to deepen ties with lesser developed countries. China's 14th Five-Year Plan (2021-2025) prioritizes basic research capabilities to advance China as a global center for S&T research. It focuses on strengthening foreign research ties to achieve these goals.

National S&T and innovation capabilities are increasingly central to U.S.-China strategic competition. U.S. benefits and risks of joint research with China are different from those in 1979 due to the dramatic growth in China's S&T capabilities. STA proponents say that a more developed China has more to offer U.S. researchers and that cutting off access could affect U.S. S&T advances. Skeptics say that the agreement and the structure of joint research benefits China asymmetrically in S&T areas Beijing has identified as priorities. China's ambitions to become a global S&T leader, and to develop technology and military competencies, depend on U.S. ties. While U.S. leaders may see continued value in S&T ties, some say China may push the United States out of its S&T development efforts as it gains competencies, similar to its actions in other sectors.

Figure 1. Gross Expenditures on R&D for Top 5 R&D Funding Nations, 2000-2019

in millions of current dollars, adjusted for PPP



Source: CRS analysis of OECD data.

Notes: The data China provided for 2019-2021 is "under review" by the OECD. PPP is purchasing power parity, a methodology that uses a basket of goods and services to equalize prices among countries.

Issues and Options for Congress

U.S. options regarding the U.S.-China STA (not mutually exclusive) include: a) renew the U.S.-China STA as is; b) renew the STA and modify sub-agreements; b) modify and renew the STA; c) significantly rework and renegotiate the STA; d) let the STA expire; e) shift focus to deepen STAs with Europe, Japan and others; and f) work with allies and partners to develop a common approach to S&T work and with regard to China. Experts debate the extent to which canceling the STA would affect U.S.-China S&T ties, including sub-agreements and federally-funded research. Renegotiating the STA might or might not address specific concerns that Congress could address through legislation. It could allow Washington but also Beijing to set new terms. Congress might consider its preferred role in overseeing the U.S.-China STA and its negotiation. It is not a treaty requiring Senate ratification.

Section 1027 of the Bob Stump National Defense Authorization Act for Fiscal Year 2003 (P.L. 107-314) required the President to create an interagency process and a repository for S&T agreements with China. Section 1027 directed the Department of State to track all protocols and required the Departments of State, Defense, and Commerce and the Central Intelligence Agency to report to Congress biennially on how the U.S.-China STA benefits the PRC economy, military, and industrial base, including the role of technology transfer and compliance with U.S. export controls. To date these reports have not been public; some that have been made public through Freedom of Information Act requests mostly do not provide the required assessments. Congress might make STA-related reporting public, hold hearings, require the executive branch to conduct an assessment, or conduct its own assessment to evaluate the benefits and costs of U.S. research with China performed under the STA.

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