Pros and Cons of United States S&T Collaboration with China
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Introduction
In 1979, China opened up to the United States for the first time in the form of a collaboration in science and technology. This was the first opportunity for the United States to look into the once closed-off nation. This collaboration originally began as an opportunity for the United States to gain a political insight into China, institutionalizing a relationship, adding stability, satisfying curiousities, and gaining access to Chinese records while simultaneously providing aid to a developing country. China's primary motivation was in development to modernize and become more competitive as a nation during its demaoification process. Since 1979, however, China has greatly advanced in the areas of science and technology and made national commitments to research and development and science and technology. As China continues to exponentially propel forward in areas of science and technology, it is vital that the United States evaluates China's progress, future prospect, and areas of potential collaboration in science and technology as well as their implications on the United States and the world as a whole.

Question
What are the pros and cons for the United States in collaborating in S&T with China? What forms of cooperation are currently occurring? For what reasons? Given the goals of the United States, what mode(s) of collaboration is (are) most suitable? How is this collaboration affecting new institutions? What types of responses is it evoking from the national and regional governments?

Methods
Data collection
Collect information on large scale science and technology collaborations with China. Investigate modes of collaboration (i.e. funding, facilities, knowledge), subject of collaboration (i.e. mechanical engineering, agriculture, computer science), and collaboration policies through web search, literature review, and interviews. Focus on collaborations involving government agencies and public universities. Compile information into a database.

Qualitative Analysis
Evaluate pros and cons of existing collaborations between the US and China by interviewing key members of the collaborations. Determine what each country is benefiting from and sacrificing or contributing for the collaboration. Determine what values were given to each benefit or sacrifice that led to the initiation and continuation of the collaboration.

Quantitative Analysis
Estimate number of large-scale US-China collaborative projects. Calculate change in economy, S&T competitiveness, and innovation competitiveness over time. Through annual reports and interviews, record benefits to the US group(s), foreign group(s), both national governments, and individual citizens or communities involved. Evaluate spillover effects and estimate the number of people directly, indirectly, and peripherally affected using statistical analysis of population statistics and compiled data.

Preliminary Data Collection

Data Collection
We organized a roundtable discussion of experts in United States and China science and technology policy. These experts came from industry, academia, and government. During the four hour discussion, we collected information about U.S.-China collaboration in S&T. This included, for example, information that the original motivation for U.S.-China collaboration in S&T was mainly political and humanitarian based for the United States, while it was focused on development and scientific progress for China. Over the years, China has reached a state where they are in less and less need of aid from foreign researchers and institutions and are looking more to collaborate and become a leader in science and technology. The United States, however, still seems to consider China as an enemy or country far behind and in need of aid rather than viewing them as an equal or as a partner.

While US scientists may have adequate understanding of Chinese S&T in their specific area of interest, the overall understanding of Chinese S&T is inadequate and furthermore, there is a lack of infrastructure to seek better understanding of Chinese S&T. Executive agencies also have an adequate high-level understanding of specific pieces of the Chinese S&T ecosystem, but policymakers are likely to take note only if something big happens (such as China landing a man on the moon). According to the experts in the roundtable, Congress has an outdated understanding and apathy towards understanding S&T in China.

On a smaller level, we conducted preliminary interviews with locals in developing countries including Uganda and Kenya. Most modes of collaboration are occurring through the nonprofit sector of developed nations including the United States, but occurring through nonprofit, industry, government, and non-organized groups in the developing world. Many of these collaborations are not well-documented or evaluated.

Qualitative Analysis
Experts noted that the US may no longer be a "far and away" leader in all areas of S&T and could fall behind if we are not aware of what other countries (including but not limited to China) are doing. There are now global problems to be solved including environmental degradation, climate change, food safety, and pandemics that cannot be addressed unilaterally. The Chinese have laid out areas where they would like to collaborate and reached out to the United States, but the United States has not reciprocated these actions. Collaboration is important for innovation and intelligence gathering and often need to happen in a bottom-up fashion which requires the government to provide cohesive policy frameworks. The US needs to take advantage of other countries rising in science and technology to leverage its own S&T investment, both through better learning about these advancements, and through beneficial collaborations with counterparts in other nations, including China.

Experts suggest that while scientists must continue to use their own networks to learn about S&T in China, the US government's role is to understand enough S&T to provide a policy framework and enabling environment for optimal collaboration or competition. The main action items involve aggregating and analyzing current work and disseminating this information to policymakers. The European Union has already taken a step ahead of the United States and formed official government collaboration in science and technology with the Chinese government.

According to a radio personality in Kampala, Uganda during an interview, a major con of collaboration in innovation for development between a developing country and a developed country is the lack of

communication and power struggle. A stereotype has developed in the Ugandan communities that most foreign nonprofit workers are not in fact in country to help, but rather to have a cushy job, have an adventure, put on a façade, or to act as a spy. We will evaluate whether this stereotype is held by others.