

Immigration restrictions on foreign scholars do not serve the national interest

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Princeton Citizen Scientists

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Proponents of immigration restrictions against foreign STEM scholars, especially those targeting Chinese nationals, argue that these restrictions are justified by risks of intellectual espionage, which would threaten the economic interests of American citizens. We argue that these policies are, in fact, harmful to domestic STEM research and economic development and would not prevent intellectual espionage. Moreover, they burden foreign scholars in a manner that violates core American values and weakens our standing as an open society. We discuss alternative strategies to bolster American economic security, including greater investment in domestic education, protection against cyber threats to intellectual property, and retention of foreign talent. The supposed trade-off between national security and openness is a fallacy. Citizens and policymakers should embrace both academic collaboration and information security.

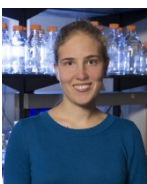
This memo proceeds as follows: first, we review the federal government's recent actions to restrict foreign graduate students. Second, we discuss the open science model and some of its inherent security issues, which immigration restrictions are unlikely to resolve. Third, we argue that immigration restrictions will harm the national STEM economy and American higher education. Fourth, we address the human costs of immigration restrictions and how the restrictions might impact global perceptions of the United States. Fifth, we discuss alternative strategies for protecting intellectual property and bolstering the American STEM economy.

About the Authors



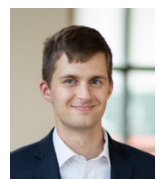
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1. The federal government is imposing restrictions on foreign graduate students

Over the past year, the federal government has discussed several measures designed to restrict immigration by foreign graduate students and scholars. Some of the proposed restrictions would apply broadly, and some are targeted particularly at Chinese nationals, driven by concerns that the Chinese government is systematically acquiring military technology, classified information, and commercial trade secrets from the United States.^{1,2,3} In fact, there is little evidence that academic espionage by Chinese nationals at American universities is widespread or that restricting study and scholarship opportunities for Chinese nationals would inhibit these programs.⁴ Still, Chinese graduate students have come under increasing scrutiny in recent years following the arrest of high-profile researchers suspected of espionage, and a general escalation in tensions between the United States and China. Restrictions on visa duration for Chinese students studying in “sensitive” fields were implemented in 2018,⁵ and in 2020, the Trump administration began restricting visas for certain Chinese students.⁶ Additional proposed immigration restrictions include barring Chinese nationals in sensitive fields from graduate studies in the United States, revoking visas from individuals already in the United States, and dismantling post-graduate training programs for foreign citizens. At the Congressional level, the Secure Campus Act of 2020 (H.R. 7033/S.3920), the Holding China Accountable Act (H.R. 7181), and the Keep STEM Talent Act of 2019 (H.R.4623/S.1744) highlight starkly differing visions of the costs and benefits of foreign STEM students and scholars to the national and economic security of the United States.

2. The open science model has many benefits and some inherent vulnerabilities

Most American academic research is not classified⁷ and becomes publicly available at the time of publication. In the open science model, published research and its underlying materials required for replication are globally available.⁴ This model is a core tenet of the American academic system. In fact, interdisciplinary collaboration and data sharing are considered critical for American leadership and innovation in fields like Big Data, medical treatment, environmental sustainability, and biotechnology.⁸ For example, in ongoing negotiations on the international governance of digital sequence information, western scientists have consistently emphasized the need to protect sequence database access, without use restrictions, as widely as possible, to facilitate advances in the emerging bioeconomy.⁹ Similarly, the most recent decadal survey of atomic, molecular and optical physics in the United States concluded that excessive visa application delays for international students, collaborators and conference speakers were directly limiting American progress in these fields essential for the development of quantum computing.¹⁰ Both the American scientific community¹¹ and the federal government¹² have embraced long-term strategic initiatives to strengthen the open science framework in domestic research funding, especially regarding open data availability. In our view, the ongoing discourse about restricting foreign access to American research conflicts with these strategic initiatives to maintain American STEM leadership.

In fact, there is little evidence to suggest that the use of published data and methods is a significant mechanism by which the Chinese government benefits from American research. We found no unclassified reports of specific instances where publication alone, absent human contact, was exploited for economic or military purposes by the Chinese government. This could be because, in practice, reproducing data and experiments from published papers still requires significant tacit knowledge, and because there are already mechanisms to prevent federal funding of research that would pose significant security risks if published, like the National Institutes of Health Dual Use Research of Concern criteria.

The most common form of intellectual property theft in the open science model is thought to be the sharing of ideas, software, prototypes and data prior to publication and without permission of the lead researcher.⁷ This can result in unfair academic competition between scientists. However, in our experience, confidentiality provisions for unpublished research are generally loose. Significant pre-publication dissemination occurs through global collaborations, invited talks, conferences and the peer-review process. Academic competition should not be mistaken for an economic national security risk and is likely to occur regardless of the presence of immigration restrictions. As scientists, we are wary of statements that equate open scientific sharing with intellectual espionage.

3. American STEM higher education and workforce depend on foreign scientists

The United States does not disadvantage itself by training and retaining foreign scholars. Access to opportunities in higher education is not a zero-sum game. The domestic STEM economy, which supports an estimated two-thirds of the national GDP, could not be sustained without foreign-born scientists and engineers.^{7,13-16} Highly intelligent individuals contribute disproportionately to innovation and to the generation of national income.¹⁷ Recruitment and retention of foreign STEM students and workers is a key area of economic competition between countries (“brain circulation”) and one where the United States excels.⁷ Historically, the percentage of foreign STEM graduate students who stayed in the United States after their studies was much higher for China (~90%) than it was for other regions like Europe (~70%).¹⁴ By choosing to address intellectual espionage with restrictions on immigration, the United States risks becoming less attractive to the foreign STEM talent upon which our economy depends.¹⁸ This could have profound economic, military and cybersecurity implications, including a loss of competitiveness in the strategically critical Industries of the Future.¹⁹⁻²⁰

Immigration restrictions also pose risks for our higher education institutions. Over the past several decades, the rising importance of the STEM economy has been accompanied by a systematic decline in public funding for higher education²¹ and increasing dependency of American universities on foreign undergraduate students capable of paying full tuition.²² Immigration restrictions on foreign STEM students will result in greater financial insecurity for American higher education institutions. Greater federal or state funding (tax dollars) or higher domestic tuition rates will have to fill this gap at a cost to American citizens, thereby further weakening the future STEM workforce.

For American researchers, Chinese graduate students also provide critical opportunities for collaboration. On average, international collaborations result in more successful research projects and higher impact publications than domestic research.²³⁻²⁴ Chinese researchers contribute to a third of annually published global papers²⁵ and make up the largest fraction of international collaborations with American researchers.²⁶ Examples of collaboration include the 30-year old Harvard-China project for climate change research;²⁷ the China-US Joint Research Center for Ecosystem and Environmental Change at the University of Tennessee, Knoxville;²⁸ and the recent establishment of the EU-China Co-Funding Mechanism.²⁹ While such joint research ventures have occasionally been categorized as mechanisms of illegitimate technology transfer,³⁰ as practitioners of scientific research we are doubtful that collaborations to prevent industrial pollution, improve environmental quality, and develop climate solutions are truly a greater economic risk to the United States than the potential academic, environmental, and economic benefits they can offer in return. Participation in global scientific networks is key for American researchers, and it is critical that we ensure that American scientists are not left out or left behind in future global discourse.

4. Immigration restrictions have a human cost and foster perceptions that the US is not an open society

Immigration restrictions have made research institutions in the United States less desirable for foreign scholars as individuals face uncertainty about whether they can continue to pursue their studies, live with their spouses, or visit their families during their free time. Their ability to conduct international field work and attend conferences is also impeded. As Princeton graduate students, we have witnessed firsthand how our friends and colleagues from across the globe have had their studies and future plans impacted by restrictive, uncertain, and quickly changing immigration policies. Some students have confided in us that they are less likely to pursue post-doctoral positions in the US due to the uncertainty of their status. Others feel demoralized and socially isolated. These sentiments are increasingly common. Heightened suspicion of espionage is affecting both foreign students and American citizens who are ethnically Chinese,³¹⁻³³ even though talent recruitment programs funded by the Chinese government are not limited to those of Chinese nationality or ethnicity.³⁰ The United States would consider it unacceptable for other countries to treat American visiting students in the way we are treating our own international scholars.

Restricting foreign nationals from obtaining a higher education in the United States is likely to reinforce negative perceptions of our leadership and decrease the value of an American education. Chinese students considering studying abroad are increasingly less inclined to pursue an American degree, favoring other countries like the United Kingdom instead.³⁴ Overall, foreign perceptions of the United States have declined since 2016, with its median approval rating among 135 foreign nations sliding from half positive to only a third positive.³⁵ Although approval ratings can fluctuate, Americans should not discount the possibility that a long-term downturn in approval will undermine the United States' position as a global leader in research and security. Research collaborations, capacity building, and training foreign scholars are a common demand of developing countries³⁶ and could help reverse negative perceptions of the United States while also strengthening engagement on issues of mutual concern, like biosecurity.

5. More effective strategies to address intellectual espionage

Modern espionage may be intellectual in nature but is economic and military in purpose. Immigration restrictions for foreign STEM students will not prevent hacking and other cybersecurity risks or decrease American companies' dependence on foreign markets. We recommend that the federal government pursue alternative policies to address intellectual espionage without harming the American STEM workforce and research. These can include the following:

- *Increase funding for domestic STEM education, including undergraduate education and federal research funding*

In order to maintain our technological competitiveness, the United States should increase funding for basic research and STEM education. Systematic decreases in state and federal funding for education have increased college and university reliance on commercial and foreign funding, opening the door for potential conflicts of interest. Simultaneously, the persistent lack of gender and racial diversity in the American STEM workforce limits our ability to leverage domestic talent,¹⁰ something Congress could help address by providing greater support for research funding programs specifically geared towards minority students and researchers. In contrast, restrictions

on the flow of information within academia would merely slow the rate of domestic research progress and innovation, putting us further behind nations with strong education and research programs of their own.

- *Retain foreign STEM students and create programs to sustain collaborations with foreign students who study abroad in the United States*

Efforts to strengthen and diversify the domestic STEM workforce³⁷ are important but do not displace the current need for STEM talent in the United States. We must take steps to retain Chinese students who study in the US by creating a welcoming and friendly environment in American universities and research institutions. Maintaining strong cooperation and collaboration with foreign scientists who studied in the United States can be used to bolster an open science model around the world. Creating a welcoming environment for foreign scholars will require combatting ongoing xenophobia, attenuating the increase in hate crimes targeting Chinese and Chinese Americans, and allowing foreign graduates to work and become citizens in the United States⁴ as proposed by the Keep STEM Talent Act of 2019 (H.R.4623/S.1744).

- *Bolster modern cybersecurity protocols to defend American intellectual property and classified information*

Investing heavily in cybersecurity and deploying strong internet firewalls would protect intellectual property against online hacking. Although intellectual property theft is difficult to detect and measure, it is likely that the Chinese government and Chinese businesses would continue their online efforts to acquire American intellectual property even with the strictest immigration restrictions in place. By investing more in cybersecurity, the US government could protect against this threat without imposing negative externalities on foreign scholars.

- *Enhance training procedures for researchers to increase awareness of the risks of research misuse.*

The federal government should release training guidelines and programs so that researchers are aware of the broader societal implications of their work and can better recognize risks, whether these are inherent to the research itself or come from foreign governments or other non-state nefarious actors. These guidelines should bring researchers' attention to the risk of international espionage as is appropriate according to available evidence and minimize unwarranted suspicion of foreign researchers.

More specific policy recommendations can be found in a recent working paper on this topic, "Addressing the China Challenge for American Universities."⁴ Its suggestions include those described above, as well as prohibiting university employees from receiving compensation from certain entities in countries with strategic concerns and standardizing conflict of interest disclosures for faculty.

Conclusion

America's innovation, creativity, and excellence all benefit tremendously from infusions of talent from throughout the world. If we are concerned about competition from China, the solution is to invest aggressively in American research and innovation, not to close the country's doors to immigrants. The vitality of [Princeton] and other great American universities will depend on our continued ability to attract, welcome, and support outstanding students and researchers from every part of the globe and every sector of society.

- Princeton University President Christopher Eisgruber

In addressing the risks posed by foreign exploitation of our open science framework, America should not lose sight of the tremendous value that it provides. It is clear that the open American academic culture has helped make the United States the innovative and technologically advanced nation it is today. Restricting immigration to prevent intellectual espionage, a threat of poorly documented magnitude, is fundamentally at odds with this academic culture. Restrictions also risk isolating American researchers from global scientific networks and collapsing the multicultural and multinational STEM workforce upon which our economy depends. While the United States has, in its immigration policies, frequently failed to live up to its ideals as an open society, we submit that we are a stronger and safer nation when we engage with international partners, foster global cultural and intellectual exchange, and welcome immigrants to our workforce. Throughout history, nativism and isolationism have been the partners of war and social decline, not prosperity. Policymakers should step away from these self-destructive tendencies by welcoming Chinese students and the collaborative innovation that they offer.

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Disclaimer: This memo should not be read as an endorsement of the Chinese government or its policies. Many Chinese policies, such as the inhumane treatment of Uighurs in northwest China and the crackdown on pro-democracy protests in Hong Kong, do not meet internationally-recognized standards for basic human rights. But the response from the United States should not be treating Chinese citizens as extensions of their government's policies or shutting down productive relationships between citizens of two world superpowers. Constructive engagement with other global cultures and societies is a prerequisite for ameliorating xenophobia, minimizing international conflict and protecting American interests in an increasingly globalized and interconnected world.

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