



America COMPETES Act and DoD's Cybersecurity Workforce Demands

DOUGLAS HOLTZ-EAKIN, WHITNEY APPEL | JUNE 1, 2022

Executive Summary

- The Russian invasion of Ukraine and rising cyberattacks have increased concerns over high-tech threats to U.S. national security, especially cybersecurity; meanwhile, as the Department of Defense (DoD) steps up its cybersecurity efforts in response, the agency will require a larger pool of high-skilled workers with science, technology, engineering, and math (STEM) credentials from which to hire.
- A specific provision in the House-passed America COMPETES Act would allow non-citizens with a qualified STEM Ph.D. to bypass any green card backlogs and per-country limits, giving them a direct pathway to U.S. permanent residency—which is typically required for DoD employment.
- This specific provision alone could provide DoD with enough highly skilled workers to support current STEM hiring rates for the next three years.

Introduction

In February, the U.S. House of Representatives passed the America Creating Opportunities for Manufacturing, Preeminence in Technology, and Economic Strength Act of 2022, also referred to as the [America COMPETES Act of 2022](#) (COMPETES). COMPETES is a sprawling piece of legislation intended to bolster the United States' ability to meet global strategic challenges, particularly those from China. Among its provisions is a direct pathway to permanent residency, and later citizenship, for certain foreign nationals with a doctoral degree in science, technology, engineering, and math (STEM) fields from a qualified U.S. or foreign institution.

This provision provides a timely opportunity. The Russian invasion of Ukraine and rising cyber risks—from China, Iran, and other regional powers—have increased concerns over high-tech threats to U.S. national security, especially cybersecurity. Meanwhile, the Department of Defense (DoD) saw the departure of nearly 22,000 employees in STEM occupations between 2020–2021. As DoD steps up its cybersecurity efforts in response to the threats, it will require a larger pool of high-skilled workers with STEM credentials from which to hire. Of note, the federal government—including DoD—is typically precluded from hiring non-citizens, specifically those on temporary visas, thus disqualifying a valuable pool of highly skilled workers. The COMPETES provision's pathway to permanent residency for non-citizen STEM Ph.D. holders would allow the federal government to make use of these workers' knowledge. In fact, if the DoD's hiring rate persists, it could theoretically fulfill its STEM employment needs with highly skilled workers for the next three years based on COMPETES changes alone.

Filling National Security Workforce Demands

Cybersecurity attacks against U.S. agencies, defense, and major technology companies have become

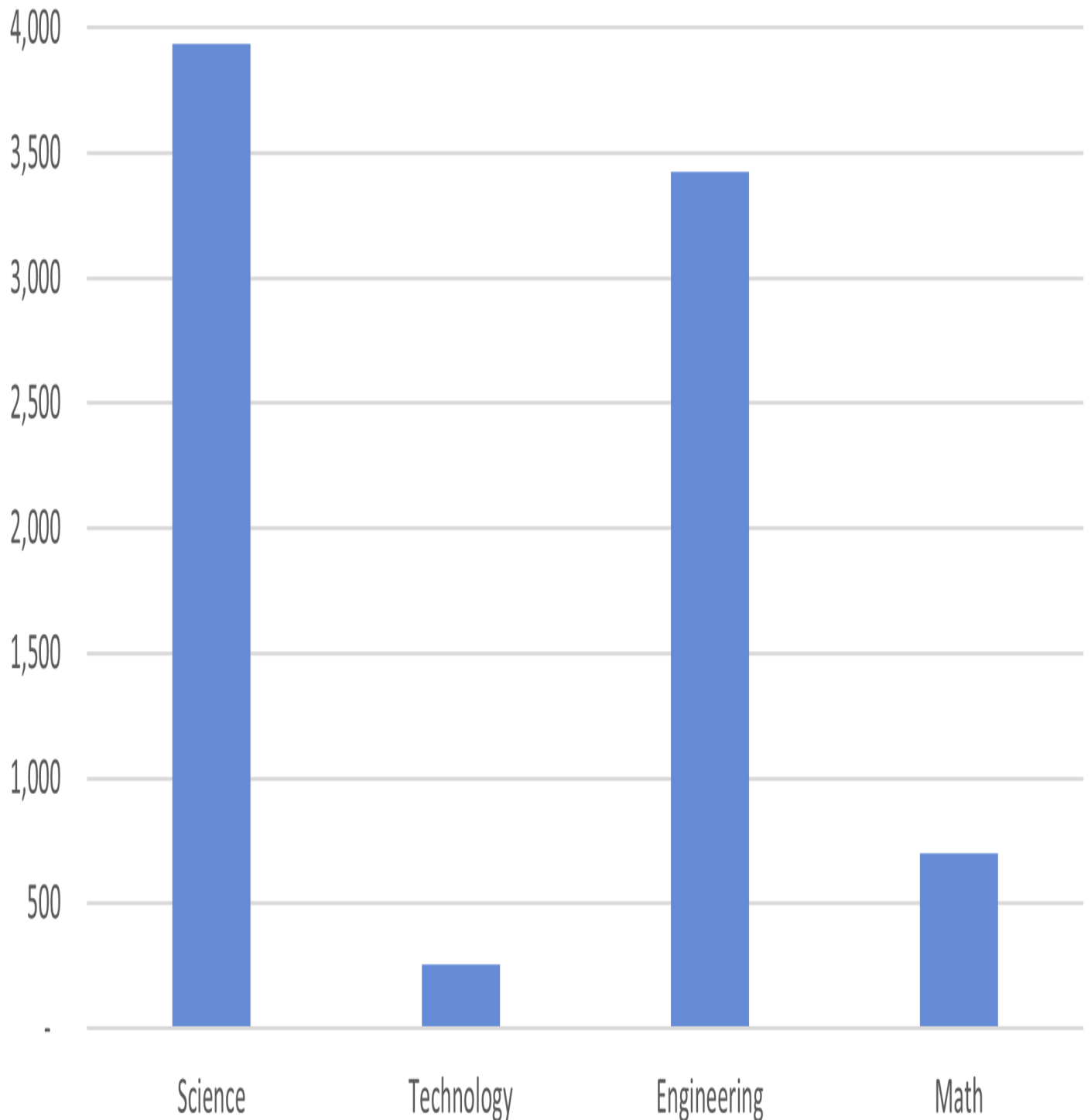
increasingly common over the past decade. The Center for Strategic and International Studies reports [33](#) significant cyberattacks in 2022 alone. As cybersecurity threats from countries such as Russia, China, and Iran grow, so, too, will the need for an enhanced national security workforce—from the U.S. military and its industrial base to the intelligence community, and other agencies.

To bolster U.S. cybersecurity efforts, President Biden’s fiscal year 2023 budget proposed almost [\\$10.9](#) billion to federal civilian cybersecurity capabilities, up 11 percent from his 2022 budget. [Testifying](#) before the Senate Armed Services Committee, General Mark Milley, chairman of the Joint Chiefs of Staff, underscored the need for enhancing U.S. cybersecurity capabilities, saying, “[W]e must increase our ability to compete in cyberspace and ensure all elements of informational power are integrated into operations, activities, and efforts to deter our adversaries and protect the U.S. homeland. This requires investment in partners and technology, building and maturing cyber operations and readiness, reducing risk to weapon systems and critical infrastructure, strengthening cybersecurity, and improving network resiliency.”

DoD hired [25,414](#) civilian STEM employees between 2020–2021—roughly three-fourths of the population of STEM Ph.D.s who would be covered under COMPETES. If that hiring rate persists, DoD could theoretically fulfill its STEM employment needs with highly skilled workers for the next three years based on COMPETES changes alone. Similarly, over the past two years, DoD saw the departure of 21,546 people with STEM credentials, a loss that could be made up fully by the COMPETES provision.

Data from the Office of Personnel Management indicate that DoD had about [8,300](#) STEM personnel with Ph.D.s employed in 2021. As Chart 1 shows, the highest number of DoD employees with a STEM Ph.D. were in the field of science, followed by engineering, math, and technology. The COMPETES provision provides the opportunity to generate a sizeable increase in the supply of highly skilled STEM workers in a very short time.

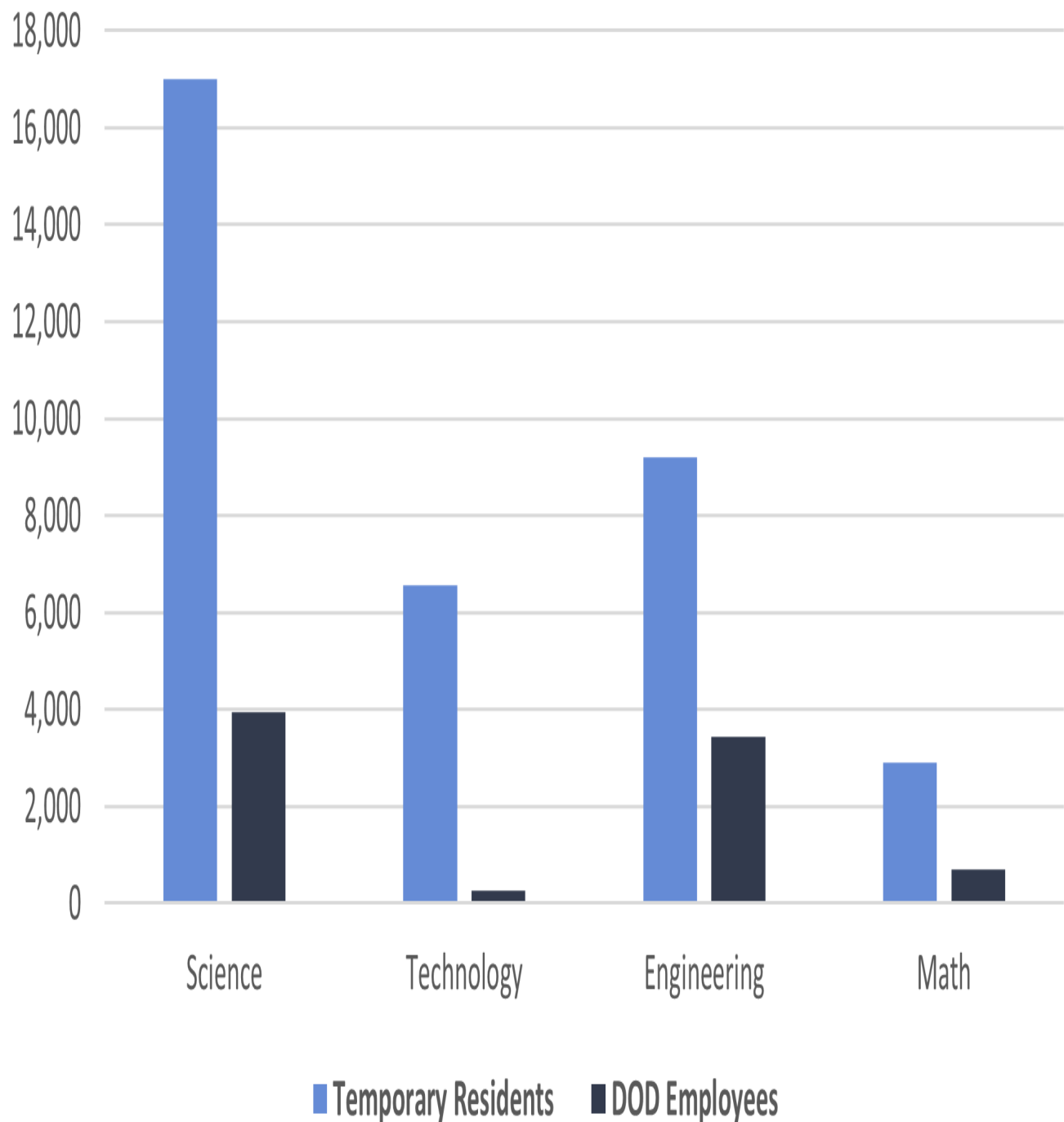
**Chart 1: DOD Employees with a STEM Doctorate Degree
by Occupation by Year (2021)**



Source: <https://www.fedscope.opm.gov/>

National Center for Science and Engineering Statistics (NCSES) [data](#) suggest that there is a supply of highly skilled non-citizens in the United States able to fill positions in demand from DoD, whether that demand be from general openings or from the cyclical nature of hirings and departures at DoD. (See Chart 2 for a comparison of non-citizens with a STEM Ph.D. in the U.S. workforce and DoD employees with a STEM Ph.D. by STEM field.)

Chart 2: Temporary Resident Workers (2019) vs. DOD Employees with a STEM Ph.D. (2021) by STEM Field



STEM Immigrants and the COMPETES Act

With the arrival of new and pressing national security concerns, DoD will require a greater talent pool of workers with the skills and education necessary to improve U.S. cybersecurity. The COMPETES provision could meet this need by exempting certain foreign nationals (and their families) from the numerical green card limits if they have a Ph.D. in STEM from a qualified U.S. institution or from an equivalent foreign institution with a STEM program. It would allow any qualified foreign national to bypass backlogs and per-country limits, ultimately giving them a direct pathway to permanent residency in the United States. After five years of living and working in the United States, these permanent residents could apply for U.S. citizenship.

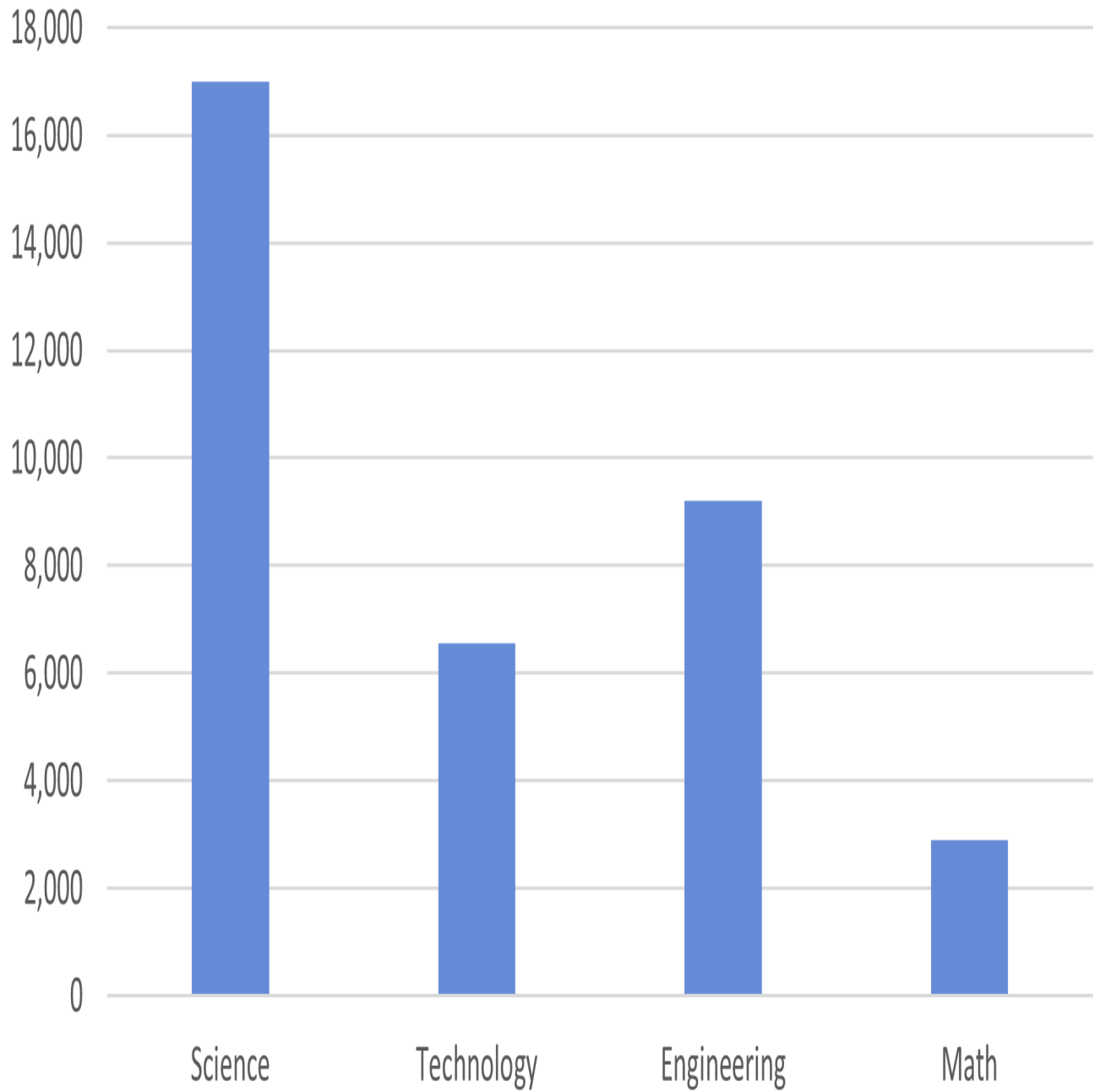
This provision would essentially create a new pool of residents that are highly skilled in STEM fields and could ultimately contribute their skills to U.S. national security, cybersecurity, and the economy in general. Of note, the Senate version of this bill, the United States Innovation and Competition Act does not include the STEM provision (or any other immigration provision).

The Affected Population

U.S. government agencies, including DoD, do not hire non-citizens on temporary visas unless there are no qualified U.S. [citizens](#) or permanent residents available for the job. If provided a pathway to permanent residency, the population of temporary resident STEM Ph.D. holders working in the United States could fill STEM defense demands, meeting DoD STEM hiring rates with high-skilled workers.

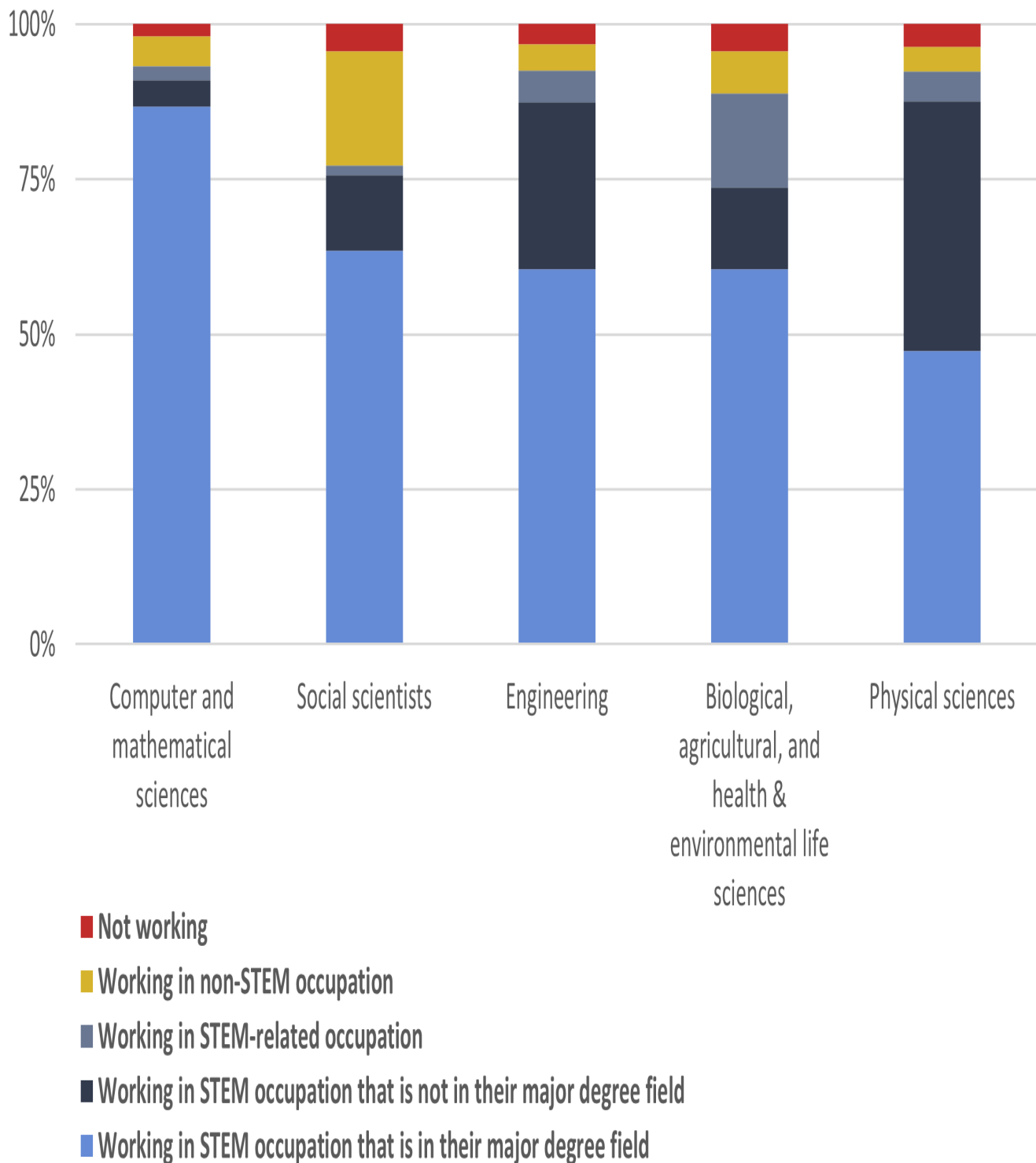
According to the NCSES, there were about [37,300](#) temporary residents with a STEM Ph.D. working in the United States in 2019. Temporary residents with this level of education make up about [1 percent](#) of the total STEM work force in the United States. Chart 3 summarizes temporary residents with STEM Ph.D.'s' fields of specialization, while Chart 4 displays the sectors in which they work.

**Chart 3: Number of Temporary Residents in the U.S.
with STEM Ph.D. by STEM Field (2019)**



Source: <https://nces.nsf.gov/pubs/nsf21320>

**Chart 4: Employment of STEM Ph.D. Temporary Residents by Degree and Occupation
(2019)**

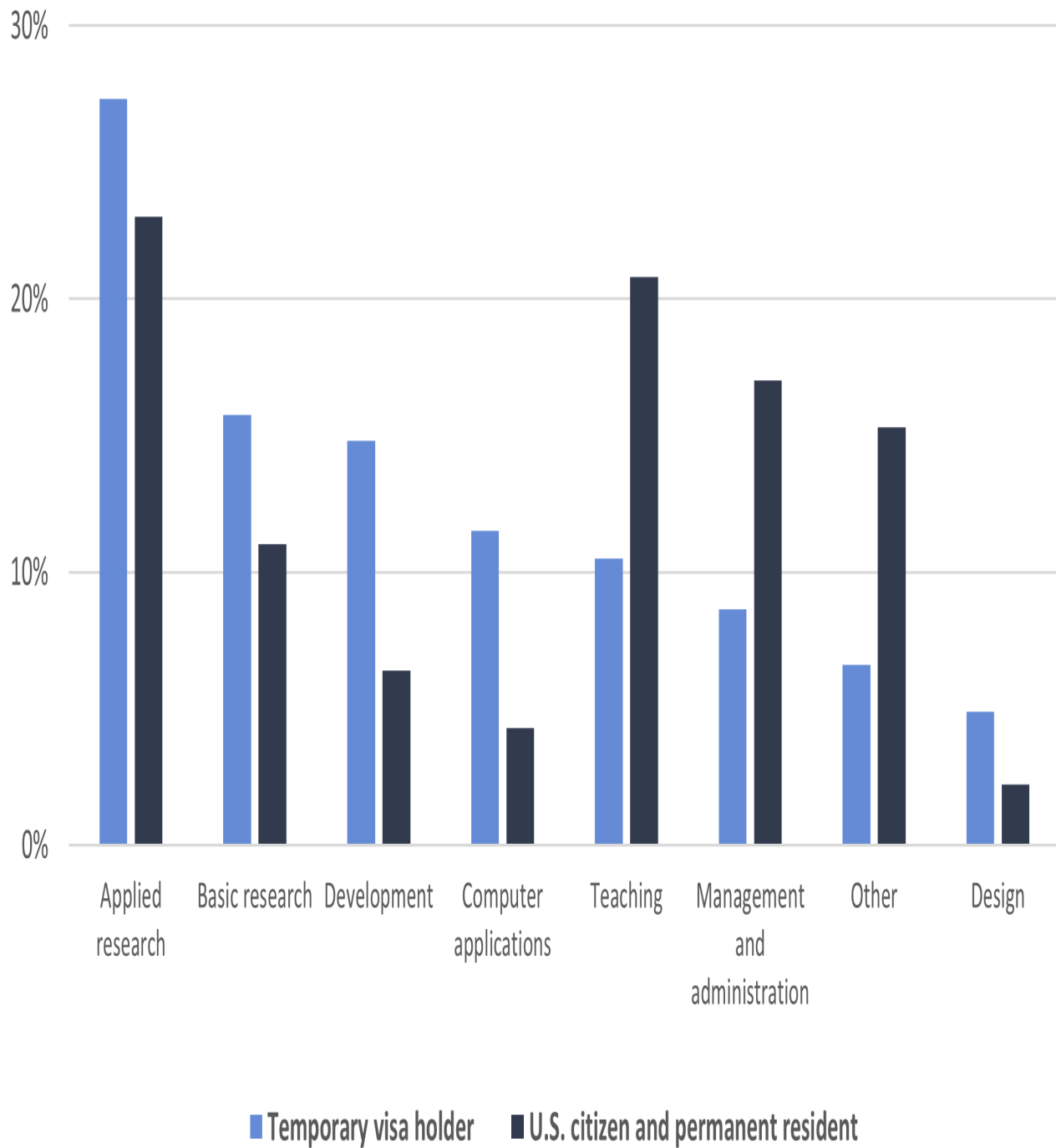


Source: <https://nces.nsf.gov/pubs/nsb20212/participation-of-demographic-groups-in-stem>

Upon graduation, most foreign nationals with a STEM Ph.D. turn to temporary visas, likely choosing among the [H-1B](#), [O-1](#), or [EB-1 or -2](#) categories, to legally live and work in the United States. Most seek employment in private-sector businesses or research institutions, as the federal government is unlikely to hire them. Yet these workers have no guarantee of permanent residency or citizenship, and the visa process is riddled with backlogs and bureaucratic obstacles. Further, the H-1B visa is a lottery system, meaning qualified STEM Ph.D. holders can lose out on obtaining a visa to a lesser-qualified, non-STEM job applicant because they weren't lucky enough to be chosen in the lottery.

The NSF and NSB study also shows that STEM Ph.D. holders on temporary visas following graduation from a U.S. institution typically go into applied research (27.31 percent) or basic research (15.75 percent). (See Chart 5 for a more detailed breakdown of where temporary visa holders tend to land after graduation.) If granted a pathway to permanent residency, these visa holders could provide their research, or other specialized skills, to DoD or other national security agencies.

**Chart 5: Percent of Temporary Visa Holders vs. Permanent Residents with STEM Ph.D.s
by STEM Occupation in the U.S. (2019)**



Source: <https://nces.nsf.gov/pubs/nsb20212/participation-of-demographic-groups-in-stem>

Finally, according to the Department of Education, [72 percent](#) of foreign nationals who earned their STEM Ph.D. in the United States are still in the United States 10 years after receiving their degree, indicating that this highly educated population is willing to stay, live, and work in the United States upon graduation, given the opportunity. Under the COMPETES provision, the population of immigrants affected would become permanent residents, and would therefore be more likely able to work for the federal government. Since this population of non-citizens tend to stay in the United States anyway, this provision would benefit the United States' national security prospects by allowing DoD to better meet its hiring demands with highly skilled workers. This provision would be especially helpful and timely since the current wait time for a green card for a STEM Ph.D. recipient is over [10 years](#).

Conclusion

The COMPETES Act's provision to grant foreign-born STEM Ph.D. holders a pathway to permanent residency—and eventually citizenship—could give DoD a competitive edge with a new supply of highly skilled STEM workers, which could give the United States a defensive advantage over other countries during a time of increasing cyber warfare. Providing a pathway to permanent residency for these workers would also present an opportunity for growth, innovation, and competitiveness throughout the U.S. labor force.

This provision would make available to the federal government a new supply of workers skilled in computer and math sciences, which could help fulfill DoD's demand for engineers, scientists, mathematicians, and other STEM professionals. The opportunity cost of not creating a pathway to permanent residency for these workers would be forgoing the enhancement of the STEM workforce that would provide better security against cyberattacks and useful skillsets to mitigate national security risks stemming from other world powers.