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ORO VALLEY OPINION

Local opinion:

## The American scientific brain drain

*Joseph Alexander Special to the Arizona Daily Star*

*The following is the opinion and analysis of the writer:*

The United States has been the global leader in science and technology for decades. Working at NASA, I saw firsthand how government investment in research yielded unrivaled achievements. Now, I fear current policies will cause us to surrender our leadership position to the detriment of our greatness.



Joseph Alexander

In the years before and during World War II, many European scientists, including Albert Einstein, Niels Bohr, and Enrico Fermi, fled their home countries to escape Fascist governments and come to the United States. One direct consequence of this European “brain drain” was the interaction of these immigrant scientists with their American-born colleagues in the Manhattan Project that created the atomic bomb. Regardless of one’s feelings about the moral dimensions of that project, the weapon that ended the war with Japan was a remarkable feat in atomic physics made possible through the collaboration of U.S. and foreign-born scientists.

Since the end of WWII, the United States has seen extraordinary growth in science and technology. This was jump-started, in part, by the entry of scientists from abroad and, importantly, by government investment in research institutions such as the National Science Foundation, the National Institutes of Health, and the National Aeronautics and Space Administration and our robust system of research universities.

Consider space research. The Apollo moon landings in the 1960s and 70s and the flights of the piloted space shuttle in the 1980s to 2010s were early cases of U.S. dominance in human space flight. By 2015, the U.S. had sent a space probe past every planet in the solar system and had even sent one (Voyager 1) out of the solar system into interstellar space. Current programs involving rovers on Mars and the amazing Hubble and James Webb space telescopes are contemporary examples of unmatched capabilities that are paying dividends from the investments of earlier years.

But today, there is a problem. The Trump administration, enabled by its DOGE chain-saw wielders and Project 2025 budget slashers, is proposing a savage attack on the foundations of U.S. science and technology. The cuts are drastic, lacking in either logic or nuance, and debilitating to the people in and out of government who have made the nation's past accomplishments possible. American scientists are being forced to consider moving abroad to find more supportive environments for their research. Yes, a brain drain out of the U.S. is beginning to form.

The emerging brain drain is just one of several consequences of the current attack on U.S. science and technology. When a nation cedes its position of leadership, one certain outcome is that another nation will step in to take its place. The very real threat for the U.S. today is that China is poised to take those steps.

Look again at an example from the space program. In 1984, I was part of a small delegation of U.S. scientists to visit China on behalf of the Reagan White House. We found that although the Chinese had great enthusiasm for space, their capability then was clearly 20 years behind us. But consider China's space accomplishments today. China landed its rover on Mars in 2020 and made its first robotic sample return from the moon in 2024. China has its own space station occupied by Chinese astronauts. China has demonstrated that it certainly has the capability to be a major player in space.

We should not mistakenly view the comparative strengths of the U.S. and China as simply a contest about bragging rights. The stakes are higher because a nation's global position in any scientific or technical field has very real implications for industrial competitiveness, national security, and the general well-being of its people. For example, a nation does not restore its manufacturing capability by firing the researchers and closing the labs that lead to production innovation, new products, and international sales growth.

The current attacks on the U.S. system of scientific research will have real and debilitating consequences for our nation and its international position that will not be easily turned around if they are allowed to continue.

*Joseph Alexander spent more than 50 years in scientific research, management, policy analysis, or advisory roles at NASA, the U.S. Environmental Protection Agency, and the National Academies of Science, Engineering, and Medicine. He lives in Oro Valley.*