

NIST to introduce restrictions on non-US citizens

The precision measurement and quantum communities are upset about the secretiveness of the move and its potential damage to US science.

By **Toni Feder**

Researchers at NIST who hail from outside the US are scrambling to find new projects, new labs, new jobs, and even new countries. They are responding to diffuse information that noncitizens are to be limited to three-year stints at NIST, and the clock is retroactive. James Kushmerick, director of NIST's Physical Measurement Laboratory, confirmed the new policy at a 4 February town hall meeting, according to several researchers at NIST's Boulder, Colorado, campus.

NIST, an agency under the Department of Commerce, is a world leader in precision and quantum

measurements. Some 2800 employees plus 3200 visiting associates work at its Gaithersburg, Maryland, headquarters; another 560 employees and 940 visiting associates are based in Boulder. Of those workers, several hundred are not US citizens, according to estimates by NIST researchers. (The campus totals are from NIST's website; the institute did not respond to questions about the numbers of directly affected individuals or about the new policy.) Given that obtaining a PhD often extends to five years and beyond, graduate students will be hardest hit by the restrictions.

As this article went to press, the

situation was still in flux, and NIST scientists and their colleagues say that hints of flexibility give them hope that the policy will be weakened.

Scarce communication

It's not only the new policy that has NIST researchers spinning. It's also the fact that they are hearing about it through the grapevine. Researchers from abroad are being told by their supervisors that they should start looking for other opportunities, says a graduate student at NIST who is a US citizen and who requested anonymity. (Nearly all the roughly dozen stu-



◀ Building 1 at the NIST research hub in Boulder, Colorado, in an undated agency photo. (Photo by R. Jacobson/NIST.)

dents and scientists interviewed for this story requested anonymity: They include federal employees who don't have permission to speak publicly, researchers on visas, NIST researchers who want to protect their behind-the-scenes attempts to ameliorate the situation, and researchers at NIST or collaborating universities who fear retaliation from the government.)

Multiple sources said they had heard as early as January that the new time limits would be implemented in three steps. Reviews would begin in late March for people from "high-risk" countries: China, Cuba, Iran, North Korea, Russia, and Venezuela. "Medium-risk" countries would follow in the fall, and the review would wrap up by the end of the year with people from Australia, Canada, New Zealand, and the UK.

NIST scientists say they have yet to see anything in writing about the new policy. But termination dates of research agreements for noncitizens have been moved up in computer databases, and some graduate students and postdocs have heard from their principal investigators that their permission to work at NIST would expire on 31 March.

Alarm and desperation

A mood of fear and outrage pervades beyond those who are directly affected. "Everyone is upset," says an outside researcher who collaborates with NIST scientists. "People are desperately seeking new positions. There are group leaders who are losing eight or more members of their teams." The anonymous graduate student says that "a lot of the research currently being done by foreign nationals simply won't get done." They point to a tabletop experiment that a noncitizen colleague had built over years; the experiment "will go unoperated for many months or even be pillaged for



▲ The NIST administration building in Gaithersburg, Maryland, in an undated agency photo. (Photo by J. Stoughton/NIST.)

parts by those of us who remain."

The uncertainty and dearth of information create a chilling effect, according to many researchers associated with NIST. "People are leaving, and it will be harder to recruit even US citizens," says Maya Miklos, a graduate student at JILA who is a US citizen. "The productivity of the system will suffer."

Scientists point out that if students and postdocs leave on short notice, knowledge will be lost. A senior NIST scientist notes that they and their colleagues have been told by higher-ups "that if we have someone who is important to the lab's mission, we should bring on a US citizen, have a foreigner train them, and then get rid of the foreigner." That attitude, the scientist says, "sees people as interchangeable. It's very shortsighted."

Graduate students who do their research at NIST get their degrees from a partner university. The Uni-

versity of Colorado Boulder and the University of Maryland in College Park combined have 33 international students doing their research at NIST. UMD has another 20 postdocs and 11 senior scientists who would be directly affected. NIST scientists say they understand that the new policy applies even to green-card holders. A physics professor at Boulder says the campus is working to find new labs for its graduate students. It's also scrambling to find money for the students to cover rent and food. "Those are the most immediate crises," says the professor.

"We are trying to work to avoid this policy becoming reality," says a senior NIST researcher. As to exactly how they are doing that, scientists are mum. "The most senior management are getting a notion of how alarmed we are, and why," says a NIST physicist. Graduate students have run phone banks to call

their representatives in Congress. And several researchers point to industry as being likely to have the most clout. The Boulder area is home to a bustling quantum industry, and many of its employees come from NIST and JILA. “Industry is appalled,” says the physicist. “If industry chimes in, that could get more traction.”

House letter unanswered

On 19 February, Zoe Lofgren (D-CA), the ranking member of the House Committee on Science, Space, and Technology, and fellow member April McClain Delaney (D-MD) wrote to Craig Burkhardt, acting undersecretary of Commerce for standards and technology and acting NIST director. The letter stated that the “rumored policy

change . . . would severely damage NIST’s ability to conduct cutting-edge research with world-class talent.” And Lofgren and Delaney blasted the organization for “secretive, slapdash policy changes that pull the rug out from visiting researchers.” The policy change, they wrote, would not only “be destabilizing for bright scientists who seek to bring their talents to the United States, it would have deleterious consequences on the country as a whole.”

In the letter, Lofgren and Delaney requested responses to questions about the existence of the NIST policy, how it was developed, how it’s been communicated, whether an appeals process has been established, and more. Specifically, they requested a briefing on the issue by 25 February. By the

end of that day, they had heard nothing from NIST.

Still, the letters and phone calls, publicity about the situation, and other pushback may be making a difference. The NIST physicist who commented on connections to industry says that on 24 February, senior management told scientists that decisions are not final. According to the physicist, the new understanding is that deadlines and restrictions may be open for discussion. That could mean exemptions for graduate students, for people from specific countries, or for those who work in certain research areas, the physicist says. “We interpret it as, We don’t have to kick people out the door,” they say. “No one really knows. But I would call this an improvement of sorts.”

PT

Science inspires, but does not limit, Andy Weir’s fiction

Spreadsheets littered with calculations motivate the science-fiction writer’s stories, including *Project Hail Mary*.

By **Jenessa Duncombe**

Editor’s note: This story contains minor spoilers about the plot of Project Hail Mary.

Amount of fuel required. Mass of ship. Distance, in light-years, to destination. Those are some of the values in the Excel spreadsheet Andy Weir made when writing his 2021 novel, *Project Hail Mary*. The book centers on an astronaut who wakes up in a star system 12 light-years from Earth with little memory of how he got there. A series of misadventures follows. A movie adaptation hit theaters on 20 March.

Weir says he enjoys making his novels’ spreadsheets more than writing. “I set things in motion very specifically,” says Weir, who also wrote *The Martian* (2011) and *Artemis* (2017).

To generate story ideas, Weir muses about what-ifs and lets the answers determine whether the story is

worth telling. “I try to set up an interesting scenario and then just see where it goes,” he says. *The Martian* began with the question of how an astronaut could survive alone on Mars. Weir solved the problem iteratively, posting his drafts online for readers to weigh in. He created a spreadsheet to calculate launch windows according to orbital trajectory calculations. “If you say Sol 417, I could look it up in my spreadsheet and find the calendar date [in the story],” Weir says. The book and the 2015 movie earned praise for the realistic depictions of space engineering and the Martian environment.

In *Project Hail Mary*, a light-eating space microbe dims the Sun, which cools Earth’s surface by 6 to 8 degrees Celsius and throws the planet into an extinction-