Bright Spot, Closing Door: Encouraging Innovation, Restricting Foreign Talent

Yiguang Zhu, ScM, BS, Megan Weil Latshaw, PhD, MHS, and Paul A. Locke, DrPH, JD, MPH

ABOUT THE AUTHORS

Yiguang Zhu is a doctoral candidate in the Department of Environmental Health and Engineering at the Johns Hopkins Bloomberg School of Public Health, Baltimore, MD. Megan Weil Latshaw is an associate teaching professor in the Department of Environmental Health and Engineering at the Johns Hopkins Bloomberg School of Public Health. Paul A. Locke is a professor in the Department of Environmental Health and Engineering at the Johns Hopkins Bloomberg School of Public Health.

See also *AJPH* Student Think Tank, pp. 447–481.

Even in an era marked by political divisions, a remarkable consensus cutting across party lines has emerged within federal public health agencies: the future of preclinical and toxicological research lies in human-relevant, technology-driven New Approach Methods (NAMs). The Food and Drug Administration's (FDA's) April 2025 announcement to phase out animal testing requirements for monoclonal antibodies and other drugs, followed by the National Institutes of Health's (NIH's) historic commitment to prioritize human-based research technologies, represent a significant shift in health research under the current administration.[1]

THE BRIGHT SPOT: PUSHING HUMAN-RELEVANT RESEARCH

The shift is more than just administrative rhetoric. FDA Commissioner Martin Makary released the Roadmap to Reducing Animal Testing in Preclinical Safety Studies; NIH Director Jay Bhattacharya established the Office of Research Innovation, Validation, and Application to "expand funding and training in nonanimal approaches and awareness of their value" (https://bit.ly/46c1hvE); and Environmental Protection Agency (EPA) Administrator Lee Zeldin also revived previously shelved plans to phase out animal testing.[1] At a July 2025 FDA–NIH workshop, Acting NIH Deputy Director Nicole Kleinstreuer announced that the agency will no longer seek research proposals limited to animal experiments. Instead, all new funding calls will require the inclusion of nonanimal methods, finally lifting a long-standing constraint on innovation.

These initiatives promise to improve drug development and chemical safety assessment through NAMs (e.g., organ chips, 3D organoids, computational modeling). NAMs have the potential to offer more human-relevant predictions than traditional animal models, addressing the reality that more than 90% of drugs entering clinical trials fail to gain regulatory approval despite passing preclinical animal tests, with lack of efficacy and unexpected toxicity being primary reasons for attrition.[2]

For next-generation public health leaders, this shift necessitates a specialized workforce, creating training and employment opportunities across academia, government, industry, and nonprofit organizations. Expertise in human-relevant methods will be needed to develop assays, interpret nonclinical evidence, and support regulatory decision-making. Integrating NAMs concepts into public health curricula will ensure trainees are well-positioned to break through institutional inertia that favors animal experiments and move toward nonanimal approaches that can lead to innovative cures, save lives, and better protect public health. However, this bright spot faces a looming threat.

THE CLOSING DOOR: MOBILITY CRISIS FOR INTERNATIONAL TALENT

As federal agencies embrace alternatives to animal testing, success hinges on developing expertise throughout public health and allied science, technology, engineering, and mathematics (STEM) fields. International trainees, who earn 36% of all US STEM PhDs, are poised to play an essential role in this transformation. In fields critical to NAMs development, they account for 31% of PhD recipients in biomedical fields, 44% in NAM-relevant engineering, 56% in computational disciplines, 34% in toxicology and pharma, 21% in biology and physiology, and about 20% across public health majors.[3] Yet, just as the United States needs to widen this talent pipeline, immigration and visa rule changes and practices are narrowing access to a talented pool of students.

In May 2025, right after foreign students received their admission decisions from US institutions, the US Department of State directed embassies and consulates worldwide to halt scheduling new visa application interviews. After a month-long pause, overseas posts

resumed appointments and added stricter screening requirements including social media review. Many in STEM fields were diverted into open-ended "administrative processing" that can take months. Starting October 2025, most interview waivers ended, pushing more applicants into longer queues.[4]

Enrolled international students find themselves on shifting sands, too. In May 2025, Secretary of State Marco Rubio announced that the United States would start revoking visas held by students of certain nationalities.[5] According to an April 2025 Associated Press report, more than 1200 international students had their legal status terminated since late March. Documented cases also show valid visa holders denied reentry at US ports, which fuels a fear of traveling abroad for conferences, fieldwork, or even family visits.[6] The Department of Homeland Security (DHS) also proposes replacing "duration of status" with fixed four-year limits for F and J visa holders, imposing uncertainties for multiyear projects common in STEM fields.[7] Compounding these pressures, the current administration had already terminated billions of dollars in NIH and National Science Foundation funding, resulting in deep cuts to higher-education and research opportunities.

At the same time, international trainees who finish their degrees face a narrowing path to employment. The first bottleneck appears in public-sector employment. Executive Order 14170 imposed a hiring freeze across the Executive Branch in January 2025, extended twice through October 15, 2025.[8] The Department of Health and Human Services is restructuring with a downsizing from 82 000 to 62 000 full-time employees.[9] EPA is eliminating its 1500-employee Office of Research and Development, the agency's core scientific branch, through a reduction in force, firing up to 75% of its staff and reassigning others.[10] These actions create a cascading effect. Thousands of displaced federal scientists are now flooding the private-sector job market, effectively reducing opportunities for new graduates. International jobseekers bear the brunt. They comprise 19% of today's STEM workforce, rising to 37% of the workforce at the master's level and 43% at the doctorate level.[11] If the trend continues, these percentages will likely shrink considerably.

In this increasingly intense competitive environment, international graduates face a unique disadvantage. The visa programs designed to retain US institution-trained talent are being dismantled. US Citizenship and Immigration Services director Joseph Edlow has discussed ending the Optional Practical Training (OPT) program, which would close the door for new graduates who rely on this program to start their careers in the United States.[12] DHS drafted a rule to change the H-1B working visa selection from a lottery to a wage-ranking system, potentially disadvantaging early career professionals in emerging fields like NAM development.[13] Furthermore, record-high green card processing time and multiyear backlogs for certain countries have made the immigration pathway increasingly unstable, jeopardizing international trainees' job security, research continuity, and career opportunities. If the path from student to employee narrows, the talent pool narrows with it.

These mounting pressures are already driving young professionals away from US universities. A report estimates that new international student enrollment could drop by 30% to 40% in fall 2025.[14] Because international students earn a disproportionate share of US STEM advanced degrees, even a single-year decline can cause long-term losses in research and innovation capacity. This "brain drain" risks not only humane research alternatives but also the entire American scientific research infrastructure that depends on diverse, global expertise. Foreign-born scientists have earned 40% (45 of 112) of US Nobel Prizes since 2000.[15]

MOVING FORWARD: ALIGNMENT OF POLICY WITH PURPOSE

As international students and professionals committed to public health education and practice, we urge policymakers to establish a transparent, fair, workable system so that international students have opportunities to learn, practice, and add to US scientific research and innovation. International students who came to the United States deserve the chance to contribute their passion, knowledge, and energy to advancing science and public health here. This better way forward starts with three recommendations.

Science Roadmap–Workforce Pipeline Alignment

Federal agencies embracing scientific advancements like NAMs should explicitly acknowledge the need to retain international talent. Create funded traineeships and bridge positions accessible to competitive foreign-born professionals, with structured pathways that serve US scientific priorities while maintaining some flexibility in immigration requirements. Publish scientific initiatives alongside plans for international recruitment, specify the required skill sets, and advocate for visa allocations to match. In this way, the United States can

continue to attract the best and the brightest from around the world.

Stabilize the Channel From Campus to Career

International students are investing time, effort, and resources in the US education system and as a quid pro quo deserve predictability. Keep OPT and STEM OPT extension policy transparent and stable. Align H-1B cap season timing with academic calendars so that new graduates and employers can make informed decisions. When new visa vetting procedures are introduced, agencies should provide clear guidance and timelines so affected individuals can plan accordingly. Clear, consistent guidelines for nonimmigrant visa holders would allow them to organize life events and research commitments without living in constant fear of denial at ports of entry or visa revocation over minor administrative or technical infractions.

Let Science and Scientists Inform Policy

Safeguard the specific government units that translate scientific advances into regulatory practice and prioritize essential research activities including method validation, guidance development, and educational events. Agencies' roadmaps toward human-relevant research can succeed only if federal research branches have the capacity to review and adopt NAMs, and widespread imposition of reductions in force and position cutbacks will narrow this channel. Researchers, including international trainees, should not watch their efforts become obsolete because the regulatory system lacks qualified personnel.

The bright spot of NAMs innovation need not dim behind closing immigration doors. It is time to explicitly acknowledge that scientific roadmaps require corresponding talent pipelines, bolstered by concrete plans to welcome and retain international talent. Better public health innovation demands access to global talent, not barriers that drive it away. The path forward is clear. AJPH

CORRESPONDENCE

Correspondence should be sent to Yiguang Zhu, 615 N Wolfe St, W7034J, Baltimore, MD 21205 (e-mail: yzhu99@jh.edu). Reprints can be ordered at https://ajph.org by clicking the "Reprints" link.

PUBLICATION INFORMATION

Full Citation: Zhu Y, Latshaw MW, Locke PA. Bright spot, closing door: encouraging innovation, restricting foreign talent. *Am J Public Health*. 2026;116(4): 482–484.

Acceptance Date: December 12, 2025.

DOI: https://doi.org/10.2105/AJPH.2025.308384

ORCID iDs:
Yiguang Zhu https://orcid.org/0000-0002-7954-9105

Megan Weil Latshaw https://orcid.org/0000-0001-5291-7644

Paul A. Locke https://orcid.org/0000-0002-5350-2819

CONTRIBUTORS

Y. Zhu originated and drafted the article. M. Weil Latshaw and P. A. Locke provided conceptual guidance, helped frame the problem and writing strategy, and contributed to substantive revisions of the article's structure and language.

CONFLICTS OF INTEREST

The authors report no conflicts of interest.

REFERENCES

1. Reardon S. The US wants to phase out animal research. Are the alternatives ready? *Science (1979)*. 2025;389(6761). https://doi.org/10.1126/SCIENCE.Z37GLKY
2. Smietana K, Siatkowski M, Møller M. Trends in clinical success rates. *Nat Rev Drug Discov*. 2016;15(6):379–380. https://doi.org/10.1038/NRD.2016.85
3. National Center for Science and Engineering Statistics. Doctorate recipients from US universities: 2024 data tables. 2025. Available at: https://ncses.nsf.gov/surveys/earned-doctorates/2024. Accessed September 7, 2025.
4. US Department of State. Interview waiver update September 18, 2025. September 18, 2025. Available at: https://travel.state.gov/content/travel/en/News/visas-news/interview-waiver-update-sept-18-2025.html. Accessed January 22, 2026.
5. US Department of State. New visa policies put America first, not China. May 28, 2025. Available at: https://web.archive.org/web/20251026135411/https://www.state.gov/releases/office-of-the-spokesperson/2025/05/new-visa-policies-put-america-first-not-china. Accessed January 21, 2026.
6. Ma A. More than 1,000 international students have had visas or legal status revoked. *Associated Press*. April 18, 2025. Available at: https://apnews.com/article/f1-visa-international-college-student-trump-9d4d900d328a0c205503c1178e70f1d5. Accessed September 6, 2025.
7. US Department of Homeland Security. Establishing a fixed time period of admission and an extension of stay procedure for nonimmigrant academic students, exchange visitors, and representatives of foreign information media. *Federal Register*. August 28, 2025. Available at: https://www.federalregister.gov/documents/2025/08/28/2025-16554/establishing-a-fixed-time-period-of-admission-and-an-extension-of-stay-procedure-for-nonimmigrant. Accessed September 6, 2025.
8. The White House. Ensuring accountability and prioritizing public safety in federal hiring. Presidential Memoranda. July 7, 2025. Available at: https://www.whitehouse.gov/presidential-actions/2025/07/ensuring-accountability-and-prioritizing-public-safety-in-federal-hiring. Accessed September 8, 2025.
9. US Department of Health and Human Services. HHS announces transformation to Make America Healthy Again. March 27, 2025. Available at: https://www.hhs.gov/press-room/hhs-restructuring-doge.html. Accessed September 7, 2025.
10. Lofgren Z, Amo G. Letter to Administrator Zeldin. Congress of the United States, House of Representatives. Committee on Science, Space, and Technology, Subcommittee on Environment. May 27, 2025. Available at: https://democrats-science.house.gov/imo/media/doc/SST%20RM%20Lofgren%20Amo%20-%20Letter%20to%20Administrator%20Zeldin%20-%20ORD%20Labs%20-%205.27.25.pdf. Accessed September 8, 2025.
11. National Science Board, National Science Foundation. Science and engineering indicators 2024: the state of US science and engineering 2024. 2024. Available at: https://ncses.nsf.gov/pubs/nsb20243. Accessed September 8, 2025.
12. Senate Judiciary Committee. Nomination of Joseph Edlow to be director of the United States Citizenship and Immigration Services questions for the record. 2025. Available at: https://www.judiciary.senate.gov/imo/media/doc/2025-05-21_qfrresponses_edlow.pdf. Accessed September 6, 2025.
13. US Department of Homeland Security, US Citizenship and Immigration Services. Weighted selection process for registrants and petitioners seeking to file cap-subject H-1B petitions. 2025. Available at: https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=202504&RIN=1615-AD01. Accessed September 7, 2025.
14. NAFSA: Association of International Educators. Fall 2025 international student enrollment outlook and economic impact. 2025. Available at: https://www.nafsa.org/fall-2025-international-student-enrollment-outlook-and-economic-impact. Accessed September 7, 2025.
15. National Foundation for American Policy. Immigrants and Nobel Prizes: 1901–2023. 2023. Available at: https://nfap.com/research/immigrants-and-nobel-prizes-1901-2023. Accessed September 10, 2025.