

The Boston Globe THINKING BIG

The brain drain

US colleges losing foreign students

By Debra W. Stewart | May 8, 2005

For decades, the United States benefited from ready access to the most talented graduate students on the planet. Our nation's campuses have welcomed students like Krastan Blagoev, who came from Bulgaria to study physics at Boston College, Tadatoshi Akiba, who came from Japan to study mathematics at MIT, and Mario Molina, who came from Mexico to study chemistry at the University of California, Berkeley.

These international students often helped teach undergraduates, adding to their universities' intellectual capital. They also conducted research while in graduate school, adding to our total knowledge base. Following graduate school, many of these students remained in the United States, becoming experts in their fields. Others returned home, often maintaining their ties to the United States and becoming leaders in their own countries.

After earning his graduate degrees, Blagoev became a director of research at Los Alamos National Laboratories. Akiba taught in the United States and then returned home to become mayor of Hiroshima, Japan. Mario Molina joined the faculty at MIT and won the 1993 Nobel Prize in Chemistry.

Until recently, so many foreign students flocked to US graduate schools that, overall, graduate programs were receiving five international applications for every position. However, a tightening of the visa process since the terrorist attacks of Sept. 11, 2001, has discouraged many international graduate students, either through visa delays or the misapprehension that they would no longer be welcome in the United States.

As a result, foreign graduate school applications for 2005 have dropped 5 percent, following a 28 percent decline last year (see chart). Although the magnitude of the decline is not as dramatic as last year, application volume has not returned to 2003 levels, and the direction overall remains negative. If the trend continues downward, the lack of foreign graduate students could seriously affect the continued quality of America's academic research. Such a trend may also signal a change in the nation's status as the destination of choice for international students.

Concern about declining enrollments of foreign students in US graduate programs goes well beyond university walls. Of the 1.4 million graduate students studying in the United States, 17 percent are international, but, more significant, in engineering non-US citizens make up over 50 percent of graduate enrollment, and in the physical sciences over 40 percent. As research assistants, these international students are key players in producing the research and innovation on which a prosperous US economy and domestic job creation depend. And many of these students who have remained in this country compose a significant portion of US research faculty; others work in research and development in the private sector. Students who return home often emerge as political and business leaders who are well-inclined toward US interests.

The federal government has a daunting challenge. In an era of global terrorism and anti-American sentiments abroad, it must balance national security measures with the need to create a more hospitable climate for foreign-born scholars. Recent federal changes that extend foreign student

visas from one to four years are a promising sign, but even so, it's possible that the period of easy access to international students in the physical sciences and engineering is simply over.

Thirty years ago the United States annually produced the vast majority of the world's doctoral degrees. But in 1999, Europe surpassed US production of PhDs in science and engineering by more than 2,000 scholars. Asia, too, is rapidly closing its gap in doctoral production, with the governments of China, India, and Korea heavily investing in capacity at the graduate level. Meanwhile, European countries are harmonizing their systems of education to make their degrees even more portable, flexible, and accessible to students in countries from which the United States has traditionally drawn students.

This competition is one of many reasons why we as a nation must actively recruit the best and the brightest from across the globe. But, because competition from abroad will only grow stronger over time, we must also redouble our efforts to develop our own domestic talent pool. Whereas in the mid-1970s, domestic students earned over three-quarters of the nation's PhD degrees in science and engineering, today they earn a little more than half. If we are to change this trend, universities must develop better strategies for the recruitment, retention, and degree completion of US students. This is particularly so for minorities and women, who are underrepresented in the fields most likely affected by a drop in international enrollments.

One way to increase the number of graduate students, domestic or foreign, is to lower the dropout rate. Right now, nearly 50 percent of all students who begin doctoral programs do not earn degrees. The reasons for such high attrition rates are numerous: uneven program funding, uncertain post-degree career options, or a poor fit between student and chosen field of study. But think of this: Even if the United States graduates only those students we admit to PhD programs, our nation will make great progress in building a stronger workforce and continuing the flow of US-trained R&D leaders and entrepreneurs.

Today, graduate deans addressing the double challenge of low numbers and high attrition are being joined in their efforts by corporate America. For example, Pfizer, one of the nation's leading pharmaceutical companies, has helped launch the PhD Completion Project, a joint effort on behalf of US universities and corporate America to increase the PhD completion rates of students from underrepresented groups, especially minorities and women.

The project has provided awards averaging \$70,000 to 21 universities to create intervention strategies and pilot projects designed to boost doctoral completion rates. To do this, graduate schools and programs are implementing new practices in several areas, such as: student selection and admissions, financial support, and mentoring and advising. One anticipated result of this project will be replicable strategies for increasing the production of minority PhDs in sciences, engineering, and mathematics.

But this is not enough. The proportion of the US college-aged population earning degrees in science and engineering in 2004 was lower than 16 countries in Asia and Europe. For the United States to improve, a long-term vision is needed to address the many issues surrounding the international flow of human capital. We must invest at all levels of our educational system, but graduate education in particular is key to preparing the country's workforce to succeed in this new knowledge economy.

If manufacturing and service jobs are now migrating off-shore, research may not be far behind. If we are to succeed in the new global economy, the United States must maintain its claim to R&D leadership. With an expanding immigrant population, a large pool of underrepresented minority talent, and progressive movement in the direction of gender equity, the United States has the diverse population and the social infrastructure to remain a leader in the knowledge-based economy. But to sustain that leadership, we must redouble our efforts, recognizing that graduate

education is the engine that will drive our economic competitiveness.

During the Sputnik era, Presidents Eisenhower and Kennedy launched the National Defense of Education Act, which aimed to increase our national security and economic competitiveness through funding of a variety of programs, particularly graduate fellowships. America's leadership in scientific discovery and innovation for the last 50 years is due in part to this program. Today we must develop a new National Defense Education Act for the 21st century, one that renews our national commitment to science, scholarship and security.

Proposals along these lines are emerging. The Department of Defense's 2006 budget request includes \$10.3 million for a new National Defense Education Program to provide scholarships and fellowships to undergraduate and graduate students entering critical scientific and foreign language fields. Fellowships would be awarded in return for a commitment of national service after the completion of studies.

But a more comprehensive, long-term agenda is still needed. Enhanced public diplomacy abroad should be combined with aggressive steps at home to broaden participation. Only by assuring that we continue to attract the best international students and expand opportunities for domestic students will we have the brainpower to sustain our prosperity.

Debra W. Stewart is president of the Council of Graduate Schools in Washington, D.C. ■