

The changing nature of US physics

Ever since 11 September, 2001, United States immigration authorities have subjected foreign scientists and students to a battery of interviews and background checks. The frustration and delays caused by these checks has led to fears that students and postdocs may no longer seek to study and work in the US (see, for example, ref. 1).

The issue is of particular importance for the field of physics, which is among the disciplines most dependent on foreign students. If the predictions of some policy watchers are correct, then physics in the US might be at the beginning of a decline towards mediocrity, while other, more immigration-friendly countries could see the quality of their students, and their next generation of physicists, on the rise.

Four years on, no clear signal has emerged from the data collected on undergraduate and graduate student enrolment. Earlier this year, the nation's largest survey of undergraduate international students showed a 2.4% decline in enrolment in the 2003/04 school year — the first such decline in over thirty years. A second survey by the Washington-based Council of Graduate Schools² showed that first-time enrolment of foreign graduate students decreased by 6% in 2004, the third straight drop in as many years (although enrolment in the physical sciences, a broad category that includes physics, astronomy and chemistry among others, was up slightly).

On the other hand, surveys conducted by the American Institute of Physics (AIP) show that although the number of foreign graduate students enrolled in physics has dropped steadily since 2001, the overall number of first-year graduate students in physics reached a ten-year high in 2003 (ref. 3). Many policy watchers attribute this rise in overall enrolments to the collapse of the internet bubble around the same time as September 11. The end of the IT boom may have caused many domestic physics students to look more favourably on the stable, but less lucrative, life of a graduate student.

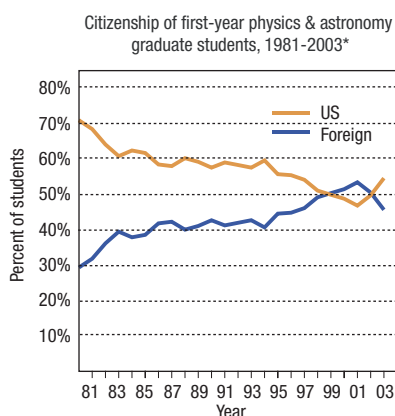
If the steady rise in domestic enrolment continues, the character of the physics community inside the US is likely to change. According to a second AIP survey⁴, US students tend to favour some fields over others. They are, for example, more likely to study astrophysics and particle physics than condensed-matter physics and optics. For the latter fields to remain competitive, more aggressive recruitment within the US may be necessary.

At the same time, selectivity across all fields is likely to suffer. Even though the council of graduate schools noted a slight rise in first-year foreign graduate students admitted to study in the physical sciences this year, the overall number of applications was down sharply, especially from countries like China that have, in the past, supplied large numbers of students. Fewer applications mean that researchers must be less picky, and the overall quality of physical sciences in the US could slip as a result.

The corollary of this trend is that European and Southeast Asian nations are seeing their foreign enrolments rise sharply. Between 2001 and 2002, postgraduate enrolment in England surged by 17% to 111,000 according to the Sutton Trust. And in Australia, foreign enrolment in higher education programs jumped 25% to 56,000 between 2001 and 2003, according to IDP Education Australia Limited, a quasi-governmental group that promotes foreign enrolment. Similar trends have been reported in France and Germany.

These numbers are significantly smaller than the 280,000 post-graduate students now enrolled in US schools, and there are plenty of reasons why aspiring physicists would continue to choose the US over other destinations, even in the face of lengthy and sometimes invasive security procedures. The US is home to more top institutions than any other country in the world. And whereas federal research funding suffered badly this year due to the ongoing war in Iraq, basic research funding in the US continues to outpace that of many other countries. This is particularly true in nanotechnology, where the government spends nearly one billion dollars every year.

The decline thus far could hardly be called an exodus, and for now it seems that the quality of US physics is safe. But to prevent a further slump in foreign enrolment, US government officials and university administrators should consider taking a more active role in recruiting students from abroad. This could include stepping up activities at existing university recruitment centres overseas or establishing new organizations to promote the study of science and technology in the US. Without such moves, it may be up to American physicists to find more fresh talent at home in order to keep up with their rivals abroad.



*Data from survey of enrolments and degrees

AIP Statistical Research Center: Graduate Student Report

IN 2003, THE NUMBER OF DOMESTIC STUDENTS ENROLLED IN GRADUATE PROGRAMS OVERTOOK THE NUMBER OF FOREIGN STUDENTS FOR THE FIRST TIME IN YEARS.

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References

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