

EUROPE SLOW IN STEMMING 'BRAIN DRAIN' TO AMERICA

By Michael Woods, Pittsburgh Post-Gazette
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BARCELONA, Spain -- The United States sucks in people and products from the rest of the world like a swirling drain. But while other nations love to sell their wares to affluent Americans, they do not enjoy losing to the United States one of their most valuable resources: scientific brainpower.

U.S. companies and educational institutions, such as Carnegie Mellon University and the University of Pittsburgh, are chock full of notable scientists who were born overseas and moved to America. Their creativity helps keep the United States No. 1 in science, medicine and technological innovation.

Poor countries are hurt worst by this "brain drain" because their underdeveloped economies provide little in the way of resources to provide decent pay or facilities for top researchers. But even advanced industrial nations with first-rate educational institutions have trouble holding on to their scientists, and those in Europe are beginning to fight back.

Europe has long been concerned about losing scientific talent to the United States. When the future Nobel laureate John A. Pople left England for a job at Carnegie Mellon back in the 1960s, it prompted a no-confidence vote in Parliament that almost brought down the British government.

Since then, the problem has done nothing but grow, from the European point of view, so the European Union has begun to implement an ambitious plan aimed at keeping top minds at home and luring others back to their native countries.

Last year, the European Council of Ministers, meeting in Barcelona, adopted what has become known as "the Barcelona objective." The plan calls for the 15 EU countries to devote 3 percent of their gross domestic products to research.

Currently, the EU spends less of its GDP on research (1.9 percent) than its main competitors -- the United States (2.8 percent) and Japan (3 percent). Raising its commitment to 3 percent would finance some 400,000 new jobs for scientists each year.

But so far, only a handful of countries, including Sweden and Finland, have met the pledge. Stagnant economies have stalled the initiative -- to the point where France actually reduced spending on research and recruitment of young scientists in 2003.

Dr. Philippe Busquin, the EU's chief of scientific research, believes Europe should be No. 1 in science, noting its educational prowess. "Europe is the world's biggest brain factory," he said.

About 2.14 million EU students got university degrees in 2000, more than in the United States (2.07 million) or Japan (1.1 million). The EU awarded a higher percentage of degrees in science and engineering (26 percent) than the United States (17 percent) or Japan (21 percent).

However, the EU employs far fewer researchers per 1,000 workers in the labor force (5.4 percent) than either the United States (8.7 percent) or Japan (9.7 percent).

"Foreign-born recipients of science and engineering degrees from U.S. institutions are staying here because the United States is where the jobs are," reported Jean Johnson of the National Science Foundation in a study of the situation.

Measured in numbers, the trans-Atlantic brain drain is small. Only 4 percent of European scientists -- 400,000 of 11 million -- work in the United States. But they are the *creme de la creme*, ranging from brilliant young students to world-renowned superstars.

"Real innovation in science depends less on the many 'worker bees' in the enterprise than on the presence of a decent sprinkling of the very best minds," noted William Zumeta and Joyce S. Raveling of the University of Washington in a report they wrote last year for the Commission on Professionals in Science and Technology.

"What I really liked about the United States was the opportunity to do your own research," said Andrew Connolly, a Pitt astronomer who left England in 1992. "I could work with the top people in the world. Once you get into the States, you [also] realize that the differential in salaries is really substantial."

Connolly described a friend who plans a move back to Britain next year to a comparable position -- at half the salary.

The scope of the brain drain is global, of course, with the United States drawing in top scientific talent from India, China, the former Soviet Union and elsewhere. The National Science Foundation estimates foreign students earn 40 percent of U.S. advanced degrees in chemistry and biology, 50 percent in math and computer science, and 58 percent in engineering.

"Those foreign students are essential for much of the federally funded research carried out at academic laboratories," noted Dr. Bruce Alberts, president of the National Academy of Sciences.

They tend to stay in the United States after completing their studies, as well. The science foundation estimates more than 60 percent remain in the United States, filling positions

as professors and researchers in universities, physicians in medical schools and private practice, and scientists in industry.

Reasons for staying in U.S.

What's so attractive about being a scientist in the United States?

Common themes emerged from interviews with U.S. scientists born overseas:

- The chance to work with the world's best scientists and equipment.
- Universities that provide financial support for graduate students and other scientists-in-training.
- Good jobs with starting salaries often triple those available elsewhere.
- Plenty of money from government and private grants that allow young scientists to work independently.
- A defined career path that allows academic scientists to rise, step-by-step, based on achievement.
- A culture that welcomes and accepts people of all nationalities.

"It is a wonderful system for the U.S., but a real problem for Europe," said Dr. Alberta M. Sbragia, director of Pitt's European Union Center and Center for West European Studies.

U.S. universities and companies have good reason to welcome foreign-born scientists.

"This nation has never trained enough American-born scientists and engineers," science policy guru Daniel S. Greenberg observed in a report in *The Scientist*. "When it comes to science and technology prowess, the United States has historically cherry-picked the world."

The need is growing, according to recent studies, because talented American students are choosing non-science careers that don't involve long years of study and financial hardship.

Getting a doctorate degree in most fields of biology, physics, math and computer science usually means six to eight years in graduate school, according to the Zumeta-Raveling study for the Commission on Professionals in Science and Technology.

Many freshly minted "doctors" in science then continue in two- to five-year post-doctorate fellowships, working with established scientists. Annual pay may be less than \$30,000 with no health insurance or other benefits. As result, new scientists may be 30-something before applying for real jobs. Those who want to be college professors have to wait several more years to become fully established with tenure.

In the meantime, undergraduate classmates who got degrees in business, law, medicine and other fields have been prospering, buying homes and starting families.

"Love of science is a powerful motivator to be sure," Zumeta and Raveling concluded. "But at some point, the yawning gap in the relative career prospects of the professional path compared to the Ph.D path must surely become big enough to dissuade distressingly large numbers of highly able students from pursuing careers in science."

The U.S. system looks far different to wannabe scientists from overseas.

U.S. salaries and financial support are powerful lures, according to Dr. Simon Pickin, who worked in several European universities and discussed the topic in the journal *Nature*.

The EU's lack of investment in research means jobs are scarce when students finish. Many work for a decade on short-term grants and then land a permanent job that pays less than \$20,000 a year, Pickin said.

In some countries, old-boy networks flourish and jobs are awarded not on merit, but on the basis of cronyism and nationality. "Nationality matters a great deal," agreed Sbragia, citing Europe's language and cultural differences and the medieval heritage of many of its universities.

Inside-dealing and academic in-breeding -- when universities favor their own graduates or hometown applicants over those from elsewhere -- can stifle the free exchange of ideas so important in science, while making outsiders uncomfortable.

Only 7 percent of newly hired professors in major U. S. universities graduated from the same institution. That figure is 17 percent in Britain, 50 percent in France and 95 percent in Spain.

Difficulty getting universities in one country to recognize degrees from another also hinders scientists looking for jobs within Europe. In the United States, a college degree from any accredited institution is considered valid by all the others, although some are considered more valuable than others. In the EU, credits and degrees earned in one country may be worthless in another.

Pickin described an honors math graduate from Cambridge University with an international reputation who spent four years trying unsuccessfully to get his degree recognized by one Spanish university.

As part of the stop-the-brain-drain effort, EU education ministers agreed that universities eventually will have to confer degrees that are recognized throughout the EU.