

in Germany. Instead, we want to have brain gain," she said. "Germany must become more international. Only science and research of the highest level can ensure our future."

Last year, a program linking individual German research groups in related fields went international, starting with hadron physics. The graduate colleges, as they're called, aim to give PhD students more guidance, networking opportunities, and international experience than is typical in Germany. Yet another development is the International Max Planck Research Schools for PhD students (see box below).

All this recruiting is limited to neither students nor foreigners: For example, France and Germany have new fellowships for postdocs and faculty—including returning citizens. And France, despite having less brain drain than Germany or the UK, has offices in the US to help French scientists find jobs back home.

The flux should continue at all levels, says Vincent Courtillot, director of research in France's research ministry, "from the youngest students to professors. People learn another culture and language. It generates new ideas, links, and tolerance. And when they go back, they should be ambassadors."

Problems of varying degrees

More than anything else, it's the internationalization of higher education that led to the Bologna Declaration. With university exchanges in-



STUDENT UNION REPRESENTATIVES from 31 European countries met in Göteborg, Sweden, in March to discuss the Bologna Declaration.

creasingly popular, it's become necessary to compare systems that are often opaque to outsiders. The declaration's intellectual birthplace is France: In 1998, Claude Allègre, then the minister for education, research, and technology, brought his colleagues from Italy, Germany, and the UK together at the Sorbonne on the occasion of its 800th anniversary, and they penned a declaration that formed the basis of the Bologna Declaration a year later. That may be Allègre's most far-reaching legacy; he was sacked last year.

Since the Bologna Declaration was signed in 1999, says Lewis Purser, a program manager at the European University Association (EUA) in Geneva, "there is much greater awareness of the need to have coherent reform. It's a jungle of different types of study programs and diplomas. Before, each country was doing things in its own way, in its own time."

The plan is to follow "3-5-8" schedules so that it takes about three years to earn a bachelor's degree, two more for a master's, and a total of eight for a PhD, making it easy to switch fields or universities, or to return to school later in life—a new idea in Europe. Of shorter duration than degrees in most of Europe now, the bachelor's is supposed to reduce the dropout rate by serving as a stopping point that prepares graduates for jobs. Because higher education is free in most of Europe, the motivation for governments is clear: Save money both by reducing the number of years students are subsidized and by herding them into the job market faster.

In fact, dovetailing with the job market is something that still needs to be sorted out. "Bachelor's degrees are not very popular in Finland," says Tapio Markkanen, secretary general of the Finnish council of university rectors. "The problem is, How do we design our first degrees so that they become labor-market relevant? We don't see the solution yet." Hendrik Ferdinande, a physicist at the University of Ghent, Belgium, and coordinator of EUPEN, which is comparing the physics curricula across more than 100 departments in two dozen countries, agrees: "For many of us, it's a big question mark how industry will react when we deliver the first bachelor's degree on the continent." Will industry hire people holding only a bachelor's degree? Will that lead to a shortage of more highly trained work-

Max Planck Society Launches International PhD Programs

The International Max Planck Research Schools (IMPRS) fit right in with the vigorous efforts by Germany and its neighbors to woo foreign students. Launched last year by the Max Planck Society (MPG), Germany's foremost research organization, the new PhD programs are intended to stanch brain drain, combat plummeting enrollments in science, and forge long-term international collaborations.

The schools are also intended to tighten the ties between Max Planck Institutes and partner universities, which will bestow the degrees. The idea, says MPG president Hubert Markl, "is to join forces and produce synergies. This offers opportunities from two sides: University doctoral students get easier access to research resources and the Max Planck Institutes get more access to students."

The first 10 IMPRS programs started up last fall. Half are in physics and related areas: astrophysics (Munich), biomimetic self-organization (Potsdam), cell membrane structure and function (Frankfurt), plasma physics (Greifswald), and polymer physics (Mainz). The plan is to open a total of 25 or 30 schools



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in the next few years, with space for 500–600 top-notch students; about half of the scholarship money will be tagged for foreigners.

"The format of the schools is rather flexible and each school can develop its own structure," says Reinhard Lipowsky, the spokesman for the IMPRS for biomimetics. "However, the main goal is always the same: to attract good PhD students from abroad."

In addition to prestige, the schools offer a broader education and more personal attention than is typical in Germany at the PhD level, and courses are in English. In Germany, says Werner Becker, coordinator of the IMPRS for astrophysics, it's common for PhD students to become "top experts in their field but often at the cost of the broadness of their education. We intend to make our students more competitive for the international market by giving them a broader education."

The MPG is spending about DM 3 million (\$1.4 million) on the schools this year, and plans to increase that, but the bulk of costs are paid by the host Max Planck Institutes and their partners. For more information, see <http://www.mpg.de/english/institut/imprs>.

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