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Enlightened enlargement

At last, the European Union is to be joined by eastern countries, many of which have strong scientific traditions. But whether they can recapture past glories depends on the wisdom of new investment.

This is a historic moment for Europe. When ten countries in central and eastern Europe (including Malta and Cyprus) join the European Union (EU) this week, the old continent will reach a level of integration that the EU's founding fathers could only have dreamt of in the 1950s. But will it also be a historic day for European research? Up to a point. After all, the EU will gain tens of thousands of scientists. But a look at the recent past highlights the enormous challenges to be faced.

In the hardship that followed the fall of communism, science in central and eastern Europe came close to extinction. As recently as 2000, when *Nature* held a meeting in the former East German city of Dresden on the perspectives of science in the region, the survival of many post-communist science communities was hanging by a thread. Isolation, paltry salaries and funds, obsolete laboratories and lack of equipment were pervasive problems. Liberty, it seemed, had also brought poverty.

That science did not collapse was due to a strong determination to survive, good improvizational skills and considerable western aid. Furthermore, researchers in the new member states have been eligible to participate in the EU's Framework Programmes of Research since 2002. In the past few years, a number of EU-funded centres of excellence — in fields from molecular biology to materials research, social sciences and humanities — have been set up across the region, from Tartu in Estonia to Ljubljana in Slovenia.

But although the transition process in the new EU member states has gathered pace, strong universities and research institutes there are still few and scattered. Progressive science managers in Warsaw, Prague, Budapest and elsewhere have invested in better conditions for competitive research, including peer-reviewed grant agencies, a stronger role for university research and collaborations with western groups and organizations. But the speed of change is limited by scarce funds and by the inertia of senior scientists who are unwilling to adapt.

Poland, which alone accounts for half of the 120,000 researchers who will now become EU citizens, currently has the fastest annual growth in gross domestic product (GDP) in Europe. But its total research expenditure has fallen in real terms over the past few years. Even worse, a legacy of under-performing institutes and 'industrial labs', employing more than 10,000 researchers, continues to produce poor results. Domestic funding is proportionately better in smaller countries, such as the Czech Republic, Slovakia and Hungary. But given the relative weaknesses in the east, the EU as a whole will fall further behind schedule in achieving its nominal goal of spending 3% of GDP on science by 2010.

The biggest obstacle is the short-sightedness of governments who tend to invest in areas that promise immediate returns. Scientists in the east do not stand to benefit as they should from the tens of billions of euros in structural funds — the EU's subsidies to poorer regions — that will now flow into the new member states. Research managers in Brussels would like to see more of this money being spent on capacity-building in research, but the EU has little control over its deployment. This should change. A historic period of enlargement is an appropriate time for European citizens' taxes to be spent in a more far-sighted fashion. ■

Robots in space

NASA should support the development of robots for use in space exploration — and we would all share the benefits.

Robots are, according to their more optimistic builders, on the verge of entering widespread public use, just as personal computers were in 1980. We've heard this before, of course: by 2001 we were all supposed to have personal robots cooking our meals and doing our cleaning. But other than the robots on factory floors, most have remained research projects or curiosities, like Sony's humanoid Qrio, which — impressively, we admit — can run, dance and conduct the Tokyo Philharmonic.

Yet the list of jobs tackled by robots keeps getting longer. Autonomous or nearly autonomous machines can now vacuum your living room, perform some surgery, and, if the organizers of the Robocup soccer tournament get their way, will take the World Cup from humans by 2050. And although it's not yet clear which, if any, of these applications might move robots into the mainstream of everyday life, it is reasonable to expect that within 20 years, by the time people are ready to land on the Moon again, robots will be more of a presence in society than they are today.

NASA can help bring this about. The ambitious goal of extending human presence to other worlds — the only goal that now makes sense for astronauts, because nearly all scientific data collection will soon be done more cost-effectively by robots — could be a welcome spur for robotics research (see page 888). Current US government investment in robotics is modest. If NASA adds billions of dollars to the research pool, engineers could go a long way towards solving fundamental problems in control algorithms, mechanisms and components, leading to the next generation of robots.

Not all the US work needs to be done at the space agency. One can imagine the National Science Foundation, the National Institute of Standards and Technology, and other agencies funding some of the basic research, while NASA builds and demonstrates advanced robotic systems for, say, the construction of an automated lunar base.

What is most needed, though, is a full recognition that robots are central to NASA's new plan to send people to the Moon and Mars. In the past, the task of simply keeping astronauts flying has consumed most of the resources allocated to NASA's human spaceflight programme. The robots were seen as promising technologies for the future, but were not really necessary today.

By raising the profile of robotics research, the space agency will better achieve its goals while advancing an important area of technology. NASA needs robots, and robotics researchers need NASA. ■