POLICY FORUM: EUROPEAN POLICY

Science in Europe

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Last month, the newborn European Life Scientist Organization (ELSO) pulled itself onto its feet and took its first steps toward uniting the "grass roots" of European molecular life science research. ELSO held its first international conference in Geneva (ELSO 2000, 2 to 6 September), attracting more than 2000 researchers from all over Europe to participate in a program that placed as much importance on the poster sessions presented by graduate students and postdoctoral researchers as on the plenary lectures by Nobel laureates. ELSO 2000 was enthusiastically appreciated, not least by those more mature European researchers who, jaded by too many trips to the big conferences in the United States, were skeptical of the need for a large conference on European soil.

ELSO and ELSO 2000 are the manifestations of a growing need in European research. Since the fall of the Berlin wall in 1989, many more scientists can communicate with each other throughout Europe. Europe is growing together, with new member states joining the European Union from the north and the east. At the same time, the life sciences are growing together. This is especially true of the molecular life sciences—which ELSO aims to represent—those sciences that use molecular tools like DNA and proteins to investigate biology (see the figure). It is no longer possible to package the molecular life sciences into neat bundles called, for example, biochemistry, genetics, immunology, or neurobiology. The boundaries are breaking down, and this will become even more evident as we enter the postgenomic era.

However, there are too many scientists working in isolation under depressing conditions in the many European universities. Molecular life scientists across the breadth of the new Europe must feel included in the scientific community, especially the new generation of young and active scientists who will build the scientific Europe of the 21st century. Because science should not and does not have national borders, these young scientists will be a spearhead for collaboration in a wider sense in Europe.

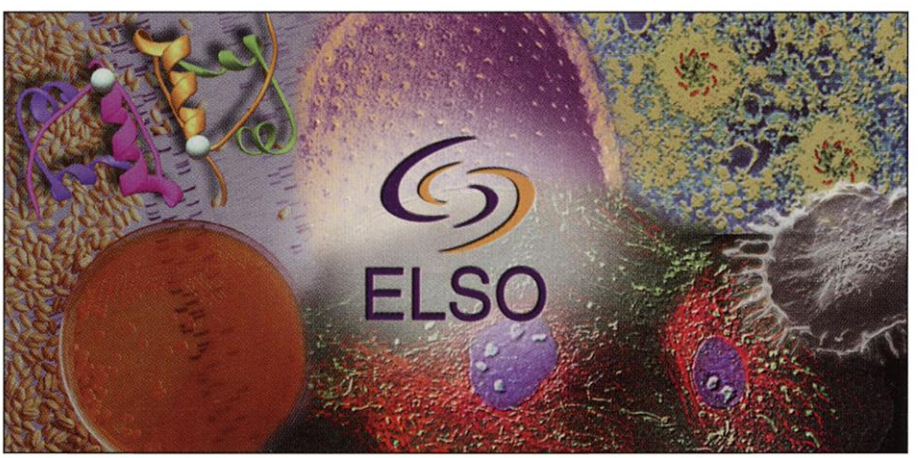
European science needs a sense of identity before it can start to speak with one voice about science policy and politics. However, this cannot be imposed from the top down; it has to be established at the level of the scientists doing the work. International organizations like the European Molecular Biology Organization (EMBO) and the Federation of European Biochemical Societies (FEBS) have existed in Europe for most of the past four decades, but there is no forum at the grass roots for scientists.

It is exceedingly important that we maintain the richness of cultures in Europe, bringing together the best of our diverse origins, but at the same time, we cannot hope to compete on an international basis as individual nations. The United States and Japan both have a much broader scientific base than we currently enjoy in Europe, both in terms of the number of scientists per capita and the investment in research as a percentage of gross national product (GNP). For instance, the number of graduate students in the United States is more than double the number in Europe; researchers account for only 0.25% of the industrial workforce in Europe, compared with 0.67% in the USA and 0.60% in Japan; and the European Union countries invest, on average, only 1.8% of the GNP in research compared with 2.8% invested by the United States and 2.9% by Japan (*1*). There are similar disparities between Europe and the United States and Japan in terms of number of patents and high-technology exports per capita. Just as the American Society for Cell Biology, the Federation of American Societies for Experimental Biology, and other organizations have lobbied so successfully for increased funding for research in the United States over the past 10 years, European scientists now need to take the initiative to persuade both national and European governments of the value of investment in basic research for the future prosperity of our communities.

Today, ELSO wants to be a leader in this lobbying process. Through its annual meeting, its subgroups such as the Career Development Committee (*2*), and its electronic magazine the *ELSO Gazette* (*3*), ELSO aims to nurture a sense of identity among molecular life scientists working in Europe, and to begin the process of discussion, consultation, and negotiation that should help to improve our environment for research.

The vast majority of funds for research in Europe come from the individual national governments and national charities. Funding through the European parliament (the European Commission) in Brussels currently amounts to only 5.7% of the total budget for research over the whole of Europe. Nevertheless, it is very valuable money, as it is available for research directly and does not go on fixed salaries and infrastructures. Furthermore, the amount of centralized funding through the European Commission is bound to increase in the coming years. Thus, lobbying will be most effective, and is arguably most urgently needed, at the level of the European Commission.

The European Union has had its successes with research funding. The programs to improve the mobility and training of Ph.D. and postdoctoral scientists, for example, have improved collaboration across frontiers. However, there is broad dissatisfaction about many aspects of the wider funding program. The European Life Sciences Forum—a consortium of European scientific organizations including ELSO, EMBO, FEBS, the European Molecular Biology Laboratory, the European Atheroscle-



Life sciences research is exploding, and European scientists are joining together to influence policy-makers and funding strategies.

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rosis Society, and the European Plant Sciences Organization—has identified many problems that the European Commission urgently needs to tackle to make its expenditure on research funding more valuable (*4*). The foremost priority is to influence structuring of the next 5-year program for research (the Sixth Framework Programme), which begins in 2003, to better meet the needs of researchers at the bench [see the Executive Summary of the European Commission's Fifth Framework Programme 5-year Assessment Reports (*5*)].

Most important, the current European funding strategy is much too heavily based on a top-down prescription of research directions by the European government based on perceived political and social necessities. Too little freedom is given to the researchers themselves to decide on their future scientific priorities. In addition, most European funding goes to "networks" of researchers, and the current restrictions on what constitutes a network are too rigid, requiring the participation of members from a certain number of nations, as well as the inclusion of an industrial partner. Scientists should be free to choose their network partners based on scientific affiliation and competence. Basic research needs to be science-driven, and as in the United States, the private sector should then develop the resulting technologies and intellectual properties for commercial purposes.

The rigidity of the research strategy is reflected in the complexity of the application procedures and application forms (*6*). This deters the top scientists from applying for funding, because they are more likely to receive support from an application to their national funding agencies in return for much less investment of time and effort. As a result, Europe is not funding many of its top echelon of researchers. Adding to this question of quality is the lack of transparency of the peer-review process for grants (*6*).

Still, the signs are hopeful that these problems will be rectified in the Sixth Framework Programme. The European Commission's research commissioner Philippe Busquin and research director Achilleas Mitsos are making a considerable effort to listen to the concerns and requests of the community of researchers, which has not happened before.

ELSO and the other European groups are working to define the problems and to propose new ways of working that are more responsive to the needs of researchers. These measures include the following:

(i) modifying the research network grants to give freedom to researchers to define their research themes and how their funds should be distributed;
(ii) creating career awards for outstanding young researchers to establish their independent research teams;
(iii) starting a European graduate school program to train doctoral students at centers of excellence throughout Europe;
(iv) providing support for key infrastructural elements and major scientific facilities in, for example, bioinformatics, DNA and protein chip technologies, proteomics, genetic databanks, and electronic publishing.

At the first open meeting of the ELSO Career Development Committee, a lively discussion between the committee and participants singled out as most urgent the plight of investigators who reach the end of their postdoctoral training and should go on as independent researchers, but who find it too difficult to obtain these positions in Europe. It is crucial for the health and viability of European research that we nurture these highly trained and motivated young people with tenure-track positions that will give them the opportunity to prove their worth as independent group leaders. In the coming months, ELSO will be lobbying the European Commission to establish Career Development Awards that help postdoctoral researchers make this first step onto the tenure-track ladder. These awards should guarantee a minimum of 5 years' funding for outstanding postdoctoral scientists setting up independent laboratories, and there should be a sufficient number that all member states can benefit from the initiative.

ELSO will also be highlighting the dramatic absence of women from top academic positions. For example, as described in the report of the European Technology Assessment Network (ETAN) for the conference series on Women and Science (*7*), in 1998 in Germany, fewer than 6% of full professors at the universities, and only 2% of those at this level in major research institutes, were female (see the table on this page). Although there are now equal numbers of women and men entering science as undergraduates, the "glass ceiling" shows no sign of cracking by sheer force of numbers. There is still considerable bias against women in science, as demonstrated most recently by the study carried out at the Massachusetts Institute of Technology (*8*). The challenge will be to recognize these biases and to change the culture in science. The ELSO Career Development Committee is drawing up a broad spectrum of proposals to this end including these:

(i) removing arbitrary age limits for career development awards, taking into account career breaks for maternity or other family reasons;
(ii) ensuring that European conferences have a fair representation of women speakers and chairmen;
(iii) mentoring schemes to help career development;
(iv) putting in place a code of ethical practice for individual laboratories and institutes and collecting gender-based statistics.

All these measures should benefit men as well as women.

ELSO was founded to improve the conditions for molecular life scientists in Europe. But life scientists in many parts of the world face similar problems. These global aspects also belong to ELSO's future agenda.

WOMEN PROFESSORS IN EUROPE

Country	Year	Female full professors (%)
Finland	1998	18.4
Portugal	1997	17.0
France	1997–98	13.8
Spain	1995–96	13.2
Norway	1997	11.7
Sweden	1997–98	11.0
Italy	1997	11.0
Greece	1997–98	9.5
UK	1996–97	8.5
Iceland	1996	8.0
Israel	1996	7.8
Belgium (Fr)	1997	7.0
Denmark	1997	7.0
Ireland	1997–98	6.8
Austria	1999	6.0
Germany	1998	5.9
Switzerland	1996	5.7
Belgium (Fl)	1998	5.1
Netherlands	1998	5.0
For comparison		
Australia	1997	14.0
USA	1998	13.8
Canada	1998	12.0
New Zealand	1998	10.4

Percentage of faculty that are women (all disciplines). Taken from the ETAN Report discussed at the Third Conference on Women and Science (*7*). (Fl, Flemish speaking; Fr, French speaking.) See Web site for sources of data and further details.

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