

There is no specific system for “young researchers” in the context of United Kingdom project grant funding. However, the nature of the Complex Stochastic Systems Initiative described above is such that one anticipates comparatively little of the funding going to the more senior members of the community and most going to an up-and-coming younger generation, who combine traditional mathematical and

statistical skills with equal expertise in computation and graphics.

I happen to be the current Chairman of the Mathematics Committee and so had better conclude by issuing the disclaimer that I am contributing this discussion as a private individual, rather than in my “official” capacity.

Comment

Giorgio Dall’Aglio

My first reaction on reading the paper by B. E. Trumbo has been to appreciate the mechanism for assigning grants by NSF. Possibly, the author’s attachment to that work has embellished his description of it; but even allowing for this, there remains the feeling of a well-organized apparatus, served by efficient and serious people, in which the allocation of funds is made on the basis of a thorough examination of the projects presented.

This is, I think, the first and most important piece of information for those who plan to apply. The knowledge that the decision will derive from a serious and accurate examination of the project automatically implies that the first requisite of the project must be a good idea, clearly described.

Many of the tips given in the paper are corollaries of this “main proposition,” and could be inferred by common sense. Of course they are not useless: even for people already trained in deduction in mathematics, deduction in real life is not easy.

In this context, I do not fully understand the practice of excluding as referees people who have worked with the applicant. They should be acquainted with the applicant’s competence. The fear of “conflict of interest” should be outweighed by reliance on the substantial honesty of the reviewer (the applicant’s honesty is taken for granted in the paper, not to mention that of the final judge). Moreover the final judge must appraise the judgments of the reviewers, and this includes, as hinted in the paper, an evaluation of the reviewer’s personality.

The remaining information in the paper relates to administrative aspects. Among these, I find that the most relevant is the usual size of the grants that are

awarded. This allows the potential applicant to evaluate the impact of the grant (if given) on the organization of his work and of his life.

The clear and thorough information given in the paper is not only useful for applicants, but also in general to understand the purpose, scope and way of operating this NSF program. (I wonder whether the real aim of paper is to instruct young applicants or rather to inform the scientific community and even to suggest how projects should be evaluated more generally).

From the paper it appears clear that this NSF program is intended to produce scientific results (and not to train students in research), operating on single, limited projects, and that this aim is pursued by allowing extra earnings to people who already have an academic position. The 1988 budget of 7 million dollars for probability and statistics is per se large, but it is difficult to appraise its real value with no reference to the sum spent for people who do permanent research work or (more importantly) to the part of the university salary, if any, which is usually intended for research as distinct from teaching.

My remarks on the paper are obviously conditioned by experience in my country, and some notes about the funding of research in Italy is not out of place.

One of the differences is that there is no separate program for probability and statistics, so that research in this field is administered in connection with other sciences, i.e., with mathematics or social sciences. There is a separation between probability and statistics, which goes back to the 1940s, augmented by war isolation but due chiefly to the strong personality of Corrado Gini. He gave the Italian statistical school a descriptive orientation connected with the social sciences, although probabilists such as Francesco Paolo Cantelli and Bruno de Finetti were more associated with actuarial science.

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The man who did the most for filling the gap between probability and statistics was Giuseppe Pompili. It is worth noting that his interest in probability and mathematical statistics (he was originally a geometer), arose while he was a prisoner of war in India. He sent many of his students (I was one of them) to study in France and the United States. Things have naturally changed with time; but the change (really not very fast) has not been effective on academic and research organizations. The separation between probability and statistics and their aggregation to other sciences still remains today, a heavy drawback of course for both of them.

Another big difference with the United States is that Italian grants do not provide salary for researchers, but only expenses, which may include books and equipment, computing, secretarial or technical help, publication charges, travel, visiting professorships or invited lecturers and (limited) fellowships for young collaborators. Added charges by universities are present, but they are usually low.

The exclusion of salary is not unjustified, because university teachers in Italy are paid for teaching and research. No allocation is established between these two objectives, but teaching duties are usually light compared, for example, with those in the United States.

From indications given by teachers themselves it appears that most of them devote more than half of their work time to research. In addition, research leave (maintaining the entire salary) is allowed more often than a sabbatical, i.e., 2 years out of 10. Almost no professor takes full advantage of this possibility; the strongest stimulus to a leave is probably to evade bureaucratic chores, which are very heavy (but not equally distributed).

One should add that the salary of university teachers, although a little lower than in other countries, is substantially higher than that of other civil servants.

Administration of research funds in Italy has not, alas, the same level of efficiency as shown in the paper.

There are in Italy two main sources of funds for research: the Ministry of Education (for universities) and the Consiglio Nazionale delle Ricerche (CNR). The Ministry directly administers a part of its research funds on a national basis for very large projects involving many people which are, consequently, usually generic in nature. These projects are open to young researchers only through participation in a group and in a program over which they cannot have great influence, so they are not very relevant for this discussion.

Another part of the Ministry funds are distributed to the universities, and this represents the major opportunity for young people who are associate profes-

sors or researchers in a university. (We have no assistant professors). In each university funds should be divided by areas of research, but often they are given through the consolidated organization of the "Facoltà," which are structures for teaching, not for research. In many Facoltà probabilists and statisticians are not sufficiently represented, and are not able to obtain a specific allocation, so projects in this field have to compete with others in different branches of research. The comparison is objectively difficult, and requests in our field do not always receive appropriate attention.

In the Facoltà of Statistics, to which I belong, there is of course a specific allocation for probability and statistics, so that projects may receive a better examination. However the screening of requests is often not very accurate, the narrowness of the environment and the continual exchange of roles between applicants and judges render it difficult to make severe decisions. Moreover, there is a general feeling that one should be given a chance. So attention is focused more on the quality of the applicant than on the program.

In the CNR there are committees for the various branches of research, including one for mathematics and one for statistics and social sciences. This again brings competition between unrelated fields, with its ensuing difficulties. Moreover, requests vary a great deal in dimension and, especially in the social sciences, budgets are often inflated by expenses for collecting data. The fact that CNR grants are not limited to the universities increases the numbers and the variety of requests and makes selection even more difficult. The quality of research programs becomes more important here, but knowledge, direct or indirect, of applicants still plays a relevant role, and of course nobody can assure that it is always limited to scientific capability.

Should I try to outline some suggestions to young researchers in Italy? I'm not confident that many young researchers here read *Statistical Science*. Maybe, however, it is useful anyway for comparison.

The first suggestion is to be confident. It is not certain that the project will get a serious and accurate examination, but the chances are not so bad, and some examination will always be made. The project should therefore be such that relevant aspects be clear and evident. Among these, as I have said, the way the candidate presents himself is very important. Bibliography and curriculum vitae deserve much attention. Even more important as said in Trumbo's paper, is the preparation over a longer time by participation in seminars and other research activities, so that the candidate becomes known to professors and "established" researchers. This of course is all the more necessary, and at the same time easier, when one plans to apply for funds in the Facoltà.

The research program must obviously be clear and of a type to attract attention. There is no necessity for a very specific project, nor for a bright single idea. What is needed, and must appear from the presentation, is some originality of the project and novelty of the results to be pursued. Connection with earlier applicant work is not strictly required, but appropriate reference to relevant literature on the subject will show that the project is not without a sound basis.

The budget should also be carefully considered. It is highly probable that the request will be cut, because this is one of the ways used to match requests with funds. Inflating the budget in view of that prospect is common; but if this is done beyond some reasonable

limits, it will be detected with high probability and bring discredit to the project.

Discussion with people who will examine projects is of course very useful, and is also easy in the Facoltà. For CNR it is not as easy; there is no specific service for that and contacts are better taken by personal acquaintance; but this is not very difficult through some professors.

As a conclusion for young Italian researchers: If you feel that your attitude to research deserves it, try and apply. If you do not succeed . . . well, there are several CNR postgraduate fellowships for universities in the United States. Go there and apply to NSF.

Comment

José M. Bernardo

I have found Dr. Trumbo's article to be very informative, and I am sure that it will be very helpful to those submitting their first research grant application. Although most of Trumbo's comments are pretty universal, specific details are bound to differ within countries; at the suggestion of the Editor, I will give some details on the situation in Spain. Due to the present drive of the European community toward common scientific policies, I would expect Spanish policies to be fairly similar to those in other European countries.

1. POSTGRADUATE GRANT SYSTEM

The Comisión Interministerial de Ciencia y Tecnología (CICYT) publishes research grants every year that allow young graduates to work toward a Ph.D., and young doctorates to pursue their line of research, in the country of their choice. Spanish nationality is required; applications are typically submitted by fall to Servicio de Formación de Personal Investigador, Ministerio de Educación y Ciencia, Serrano 150, 28006 Madrid, from where application forms may be obtained.

Those grants cover return flight, tuition when appropriate, health insurance and about US\$1300 monthly, depending on the destination country. The

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basic paperwork requires a short 2-page vita, a 1000-word summary of the research project, a description of the reasons why the candidate has chosen a particular research center, proof of command of the relevant language and three reference letters to be directly sent by the referees chosen by the candidate to the grants office.

Several state governments (Andalucía, Catalunya, Euskadi, Valencia) offer similar, alternative programs for those working within their territory.

2. RESEARCH PROJECTS

The Ministerio de Educación y Ciencia also provides funding for research projects very much along the lines of the NSF grants discussed in the paper. They are designed to promote quality research in any field, although specific topics designated in the National Research Plan get extra funding.

Research projects often span 3 years, and must be submitted by someone working in a nonprofit research center (typically universities and administration), but do not require Spanish nationality.

Applications are submitted by fall to the Dirección General de Política Científica, Serrano 150, 28006 Madrid, from where the appropriate forms may be obtained. As with NSF, projects may be personal or involve a group; the discussion in the paper on the relative merits of both alternatives is fully relevant.

The basic paperwork consists of a summary of the research project, which should be prepared along the lines discussed in the paper, and a detailed vita in a rather specific normalized format. As with NSF, the