

5–10% inflation factor is built into the continuing projects reducing funds available for new projects to between say \$240,000–\$600,000. Perhaps 50% of the investigators with projects finishing will successfully compete for funding for new projects, reducing available funding for totally new investigators to perhaps \$120,000–\$300,000. At an average contract size of \$80,000 this means one to four new projects. Thus, although the overall budget for a program may seem large, the actual discretionary funds available for new principal investigators is comparatively small.

The advice given by Professor Trumbo is based on the perspective of a person who has served as program officer very ably a number of times. He deserves the

thanks of the community both for the service rendered as program officer at NSF and for sharing his insights in the present article. The reader may also be interested in several other references related to research funding, notably Solomon and Wegman (1985) and Wegman (1986, 1987).

#### ADDITIONAL REFERENCES

- SOLOMON, H. and WEGMAN, E. J. (1985). Military statistics. *Encyclopedia of Statistical Sciences* 5 494–501. Wiley, New York.
- WEGMAN, E. J. (1986). Midcourse musings. *IMS Bull.* 15 238–241.
- WEGMAN, E. J. (1987). Commentary on defense funding. *Notices Amer. Math. Soc.* 34 616–618.

## Rejoinder

B. E. Trumbo

The discussants have gone beyond the scope of my paper in several useful directions; it is a pleasure to thank them all for their thoughtful comments. Professor Wegman has given a clear account of the differences in philosophy and practice between NSF and the DoD agencies in the United States. Professors Zidek, Smith, Dall'Aglio and Bernardo have provided valuable insights into grants processes in Canada, the United Kingdom, Italy and Spain. Apparently, each national system for research support has attractive features that might profitably be emulated in other countries.

In addition to these descriptions of various funding programs, the discussions deal with a wide variety of important and controversial topics. On many of these I am content to let the discussants have the last word, but I have selected a few topics on which I would like to agree, disagree or speculate.

#### COST-BENEFIT ANALYSIS

Professor Zidek urges prospective applicants to consider whether the disadvantages of research support outweigh the advantages. This is valuable advice; the benefits of getting a grant are so clear that it is worthwhile to note the potential difficulties, both practical and philosophical. However, the overall tone of this section of his commentary is too negative for my taste. This is partly because not all of the potentially unfavorable factors in his long list are likely to affect any one applicant and partly because I think several of them are overdrawn, especially in the con-

text of the paper. I offer the following perspectives:

- It does take time and thought to write a good proposal, but (as I have already said and as Dr. Sunley reiterates) much of this work is beneficial to the applicants' research program—whether or not the proposal is funded.
- It is hard to imagine that the kind of grant a young investigator is most likely to get (e.g., summer salary, some computer time or equipment, a little money for travel, etc.) will impose onerous administrative burdens. Furthermore, grants administrators at some universities are really quite helpful in dealing with the paperwork that is necessary.
- Investigators need not pursue topic-oriented funding programs that might divert them from "free inquiry" into their real research interests, "erode the quality of education" in their universities or violate their consciences. Perhaps the ideal "strategy" is for each researcher to decide what kind of research he or she does most expertly, enthusiastically and proudly, and then to seek support for it from all available sources. The vast majority of NSF funding is for **unsolicited proposals** on topics of the applicant's choosing.
- As Professor Wegman points out, the mission agencies support a great deal of basic theoretical research, which from the investigator's point of view may be quite unrelated to any application, military or otherwise. (I strongly suspect that