

Testimony of
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Chairman, National Science Board
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Mr. Chairman, thank you for the opportunity to testify this morning on the mission of the National Science Foundation. It is an honor to be a part of this hearing, the first in a series on the health of research. I commend both you and Chairman Brown for taking on the difficult task of examining the implications of a new and possibly more comprehensive vision of national science policy.

The National Science Board is responsible for articulating positions on matters of national science policy as well as providing guidance in the ongoing development of science policy as it is expressed through the various programs at the National Science Foundation. However, in recent years the pace of change in science, to say nothing of the pace of change in domestic and world affairs, has required the Board to examine science policy against a background unlike anything in our past experience.

These rapid changes have made it desirable for us to take a fresh look at the rationale, the planning process, and the implicit assumptions in Federal support of mathematics, science, engineering research and education.

Walter Massey, Director of the National Science Foundation, acknowledged the need to confront a changing world when he requested that the National Science Board establish a commission to examine the future of NSF. The role of the commission was to provide an independent assessment of the effects of a rapidly changing world on NSF's mission.

The establishment of the Commission on the Future of the National Science Foundation and the coinciding request for comments from interested parties generated hundreds of responses from throughout the academic and industrial research community. Dr.

Danforth will speak more directly to the work of the Commission, but I should note that the Commission's report has been received by the Board and is viewed as a very important source of information and analysis.

At its February 12 meeting, the Board decided that, consistent with the recommendations of the Commission, we will further examine our own role and contributions in setting national science policy and directions. The Board also noted the importance of continuing the constructive dialogue established with the science and engineering communities as part of the Commission activities. Specific strategic planning issues identified by the Commission, such as the nature of NSF partnerships with other entities, have been designated for full discussion at future Board meetings.

In addition, language in the Commission Report on grant size and the importance of strategic research was referenced by Walter Massey to support the President's request for supplemental funding for NSF in FY 1993. So the Commission's work is already serving a very useful function.

The first issue that I want to address is whether we can conclude from these experiences and analyses that the mission of NSF should change. From one perspective, NSF's mission has changed every year since its inception. NSF has responded by providing increased resources in education, by expanding into engineering research, by creating mechanisms to engage in partnerships with other agencies, by developing ways to encourage the reform of entire state math and science educational systems, and by incorporating new areas of research -- and new models for conducting research -- into its portfolio.

From a broader perspective, NSF's mission has remained consistent and true to its initial charge -- to support science and engineering research and education in order to advance national health, prosperity, and welfare. A large proportion of this research is instigated at the level of the individual investigator based only on considerations of his or her best scientific intuition about a problem. Other research may be guided by a strategy that looks ahead to the possible utility of

the research. At the extremes, these are fairly easy to distinguish, but in the vast majority of cases the classification of research into one category or another is arbitrary.

The Commission recommended an appropriate balance between curiosity-driven research and strategic research. It is difficult to provide an exact metric for this balance if one takes the view that this distinction is somewhat subjective. Given NSF's current funding level, the mix is approximately correct. NSF's primary obligation is to maintain the excellence and health of curiosity-driven research. NSF's ability to respond to important new challenges and opportunities that contribute to the national interest depends on an adequate resource base. Under any circumstance, it is important that we seek mechanisms that will shorten the distance between new knowledge and its potential utility.

Right now NSF supports excellent research in a number of areas relevant to national needs, such as education, global climate change, advanced materials, biotechnology, high performance computing and communication, and advanced manufacturing.

Some of these programs are also part of an effort to provide a more coherent research policy within the government, and as such represent one area where NSF has developed effective working partnerships. Over the years NSF has been at the forefront of establishing long-standing partnerships with consortiums of academic institutions, with small businesses, the states, industrial concerns, and various combinations of these entities. The fact that NSF has had successful experiences in many varied partnership arrangements suggests an increased role for future partnerships when opportunities arise.

Concern has been expressed that future partnerships might entangle NSF in industrial research activities that are not driven by science. Such fears are unfounded. In areas where NSF can advance science and engineering by bringing together resources and talent in unique settings, it has an obligation to do so. Federally funded research can and should have identifiable economic and social benefits, but first and foremost it should represent excellence in science and engineering.

Given this focus on quality, the committee's concern about how we evaluate the overall quality of NSF's research is well taken. Programs at NSF are continually initiated, evaluated, re-focused, de-emphasized or terminated if need be. Every directorate is evaluated by a Committee of Visitors at least once every three years. These evaluations are based on the informed opinions of researchers from both academia and industry. In addition, the National Science Board, in its oversight of NSF, provides ongoing evaluations of its activities.

Before concluding my testimony, I would like to address the role of the National Science Board in developing a coherent national science and technology policy. The NSB has, in the years since it was established, assumed responsibility for health of the infrastructure of the nation's science and engineering research and education activities. As such, it has played a critical role in focusing attention on issues of math, science, and engineering education at all levels, the health of the academic research enterprise, national research facilities, and the link between science and engineering research and the nation's well-being.

This National Science Board is now looking at what its role should be in the future. As a more coherent national science and technology policy is debated, I think it is important that the NSB should continue as the focal point for deliberation on how any policy will affect and be affected by our science and engineering infrastructure.

Mr. Chairman, this concludes my testimony and I thank you for the opportunity to present my views to the subcommittee today.