

who will have been deferred this year as students, will fall back into that prime age group. In either case, they will be primary targets for induction.

"University graduate departments whose subject areas are not eligible for deferment will find themselves for a period of about two years trying to maintain their momentum with a student body consisting of women, those men who could not pass the physical requirements for the draft and a handful of returning veterans."

Research Proposals: Agencies, Academics Provide Suggestions

Is there an art to preparing research proposals? No, say the federal program officers who have processed countless proposals and the academic physicists who have submitted them. But there are many valid suggestions, self-evident and otherwise, that beginning researchers are apt to overlook when writing their proposals. What agencies to solicit, whom to contract, how to style the proposal—these and other questions were put to knowledgeable administrators by *PHYSICS TODAY*, and the following information was derived from their many comments and pieces of advice.

Informal contact first. Before actually sitting down to write the proposal, it is a good idea to contact agency program officers either by telephone or at scientific meetings. Says George Kolstad of the Atomic Energy Commission, "Informal discussion with an agency representative sometimes gives one a better feel for the content of the proposal and to whom it should be addressed in the current funding environment." And William Green of the National Aeronautics and Space Administration notes, "A phone call is highly preferable to a letter. By spending just a few minutes on the phone, a person can tell whether there are any possibilities for his proposal and whether it is worth while his coming to Washington or meeting our people elsewhere for further discussion of his problem."

By conferring with the proper program officer, the scientist can also find out whether his research is being duplicated by another person under agency contract. Though there is no central clearinghouse for proposals, an inter-

agency committee on high-energy physics meets regularly, and unofficial interagency groups for other physics subdisciplines also exist. In addition, program officers regularly review acquisition lists of all proposals received by the agencies.

The scientist should also obtain from each agency he is seeking support from a guide for submission of proposals. He can also ask others in his department and elsewhere how they present their own proposals to the agencies.

Writing. "In writing the proposal, you have got to convince your peers that you know the field and that you have something your peers would wish they were doing themselves," says Howard Etzel of the National Science Foundation. "Bring the reader who is not an expert in the field to the point where he knows what you are talking about," he notes. And Samuel Devons of Columbia University points out, "If you are an individual or small group, writing the proposals lucidly, forcefully and in a captivating way surely has some effect. When the proposal goes out to the agency and to the referees, it has to catch their imaginations a bit."

A common mistake of beginners is failure to explain exactly what they want to do. "I've seen a good many proposals come in with just the title, and then 'Let x equal . . . and they are off,'" says Green. "I've always advised people, the first thing they should do is to think out what type of project they want to do and then to write a first draft. Then afterward go back and rewrite it. In packaging the proposal, it is wise to lead off with an abstract and follow it up with a good technical description. This is the place where people often fall down. The reviewer is going to be a specialist in the field but he may have never heard of the researcher before. He has to get some kind of feeling that this chap knows what he is going to undertake."

Mission relatedness. "If the proposer shows an awareness of mission orientation as a factor in his research, he is several steps ahead of the game," says Green. And Kolstad says, "We are often pressed, particularly in basic research, for determining the mission relatedness of what we are

doing. It helps when the researcher includes it in his proposals, but he should not tailor his proposal to what he thinks the agency might support; there is a danger in overemphasizing mission relatedness."

What agency? For nuclear and high-energy physics, the agencies that currently do the most funding are AEC and NSF. For solid-state physics, three quarters of the support is provided by AEC, NSF and the Air Force Office of Scientific Research. For atomic, molecular and plasma physics, the funding is fairly well spread out

AIP ISSUES SUPPORT DIRECTORY

Detailed information on physics research support available from both federal and private sources can be obtained in *Directory of Physics Research Support for Academic Institutions*, compiled by the American Institute of Physics education and manpower division. The 33-page booklet describes how to select a sponsor, write a proposal, and prepare a budget and sample-cost estimate. In addition, data are provided on eight federal agencies and two private foundations. The *Directory* describes for each agency the various programs and activities that are of relevance to physics research, procedures to be followed in submitting research proposals as well as names, addresses and telephone numbers of program officers. John W. Barry of the University of Michigan prepared the text. Copies of the booklet can be obtained free of charge from AIP.

among the "big seven" agencies (NSF, AEC, NASA, AFSOR, Advanced Research Projects Agency, Army Research Office and Office of Naval Research). Particularly in the present depressed funding climate, it is wise to send the proposal to more than one agency. But you must indicate on each proposal to what other agencies you are sending it. If possible, try to obtain some partial local university or other nonfederal support for the project. "If one has such initial support, it shows one is interested in getting the project under way in any event," says Devons. With such support, an agency is often more agreeable to underwriting an otherwise costly experiment. Finally don't be discouraged

if the first few places you send your proposal to reject it.

Two-Campus Problems: NYU To Move Research Downtown

How much support and how many faculty members are required to build viable research centers on two campuses? The New York University physics department found that with 15 capable investigators at two locations, each group was too small and lacked adequate support to form really strong units. As a consequence and also because it seeks to transform a part-time majority of graduate students into a fulltime one, the department will in the future consolidate research activity at one campus, Washington Square.

The problem of two campuses, downtown at Washington Square and uptown in the Bronx, has long troubled the departments of the university. Actually, the university started downtown but in the early 1900's moved almost all of its offices uptown. Later, in the 1920's Washington Square's

campus began to grow again. As a result, two autonomous physics departments developed over the years, each based on its own undergraduate college, each offering graduate programs that were loosely coordinated.

Faculty at both campuses felt isolated from each other because of the distance between the two. Somewhat later, an informal coordination resulted in the development of complementary research programs at each center. The downtown branch developed its principal strength in theory, especially in high-energy physics, and the uptown branch in experiment, especially in atomic physics and cosmic rays. Of course, some experimental work was carried on downtown and some theory uptown. Nevertheless, many faculty members believed that, with a faculty of only 15 at each campus, each group was too small to form a really strong department. Seminars and colloquia were not particularly well attended; postdoctorals were difficult to attract; and students felt no great attachment to either campus. Another important factor contributing to the lack of cohesion of the graduate program was the fact that NYU took

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