

is exaggerated. Reviewers' concerns about replacement equipment are often exacerbated by the perfunctory justifications that applicants provide ("Replacement of worn-out equipment: \$????"). To decrease the vulnerability of such a request, use the same strategies to justify replacement equipment that are listed above, but with an added wrinkle: Get a letter from the company that made the old equipment certifying why it is worn out (e.g., lack of replacement parts, inability to provide a service contract, no longer providing repair service, etc.). Vendors will often provide such support, especially if you plan to purchase the replacement equipment from them. Include such a letter with your other letters of support. Refer reviewers to it in your justification.

EXAMPLE OF 'EQUIPMENT' JUSTIFICATION

D. EQUIPMENT

Centrifuge (Hettich Rotanta [Advanced Model]), Refrigerated, Large Capacity, with Swing-Head Rotor: \$2,088 (20% of \$10,440 [\$9,877 + \$563 shipping]). This centrifuge is required to conduct experiments described under each of the three aims, all of which require a bulk-processing step that has an extended run time. Estimated use over the course of the project will be 4-6 hrs daily on a 7-day-a-week basis, which is validated by the accompanying usage table that was generated during our preliminary studies. The centrifuge used for those studies is the only one to which the PI has access. It is used extensively by NSF-supported investigators in two other departments. During the time required to generate our preliminary data many of those investigators had to postpone use of this shared centrifuge, which negatively impacted their programs. To help alleviate such problems in the future, the centrifuge requested here will be made available as research infrastructure, i.e., shared with other investigators (see *Broader Impacts* section of the Project Description). In addition to conflicts related to usage, the centrifuge is located in another, unconnected building. This makes our use of it hazardous with respect to transport of samples to and from its location. The price of the centrifuge was established by competitive bid, the lowest one of which accompanies this proposal. It has an expected useful life of 15 years. Therefore, we are requesting 3/15ths (20%) of the cost in this 3-year proposal. The remainder will come from the PI's endowment funds (see accompanying letter of commitment from the Endowment Association).

Section E: Travel

Travel, including lodging and subsistence during the times of travel, can be requested on an NSF grant providing it contributes to the project's potential for success in a relevant way. How it will contribute needs to be described in the *Budget Justification* (see below).

This is one of the few sections of your *Budget* for which reviewers will often have a predetermined figure in mind. Unfortunately, this amount is usually much less than the real cost of proposed travel; if you haven't experienced the actual cost of attending a 3-day meeting in an urban setting lately, believe us, it is a significant amount of money. Therefore, unless you either have an alternative source of travel funds or are willing to re-budget from another category, you need to provide the kind of objective description in your *Budget Justification* that will persuade reviewers to recommend your full request for travel funds.

All costs for the travel, housing and *per diem* allowance of consultants should be included here. Consultants' *per diem* costs for food and lodging should be those allowed by your institution, a