



UNIVERSITY RESEARCH: THE ROLE OF GOVERNMENT FUNDING

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University research is a vital building block of the nation's R&D enterprise. While universities perform 14 percent of total national R&D, they perform 54 percent of the nation's basic research. Along with creating new knowledge and the foundation for new products and processes, U.S. universities use their research activities to educate students who will become the next generation's scientists, teachers, and leaders in government and industry.

Because there is broad consensus that university research is a long-term, national investment in the future, the federal government supports 62 percent of the research performed at universities. In 2004, federal research support to universities was \$26.1 billion: \$20.6 billion in basic research, \$4.9 billion in applied research, and \$543 million in development.

How Do University Research Projects Receive Federal Funding?

Most university research projects start out as funding proposals put together by one or more researchers. The individual who directs the project is the **Principal Investigator (PI)**. Although the principal investigator will handle the day-to-day work of the project, the funding proposal is submitted officially by the university.

Applications submitted by colleges and universities may request funds for support of graduate student **Research Assistants (RA)** to help carry out proposed projects. In fact, research assistantships provide nearly three-quarters of all federal funding for graduate students.

Funding proposals may be sent to federal agencies at any time of the year; these are called **unsolicited proposals**. Agencies generally consider such proposals on a regular cycle. For new areas of research or areas of new emphasis, a federal agency may issue a **program announcement**. For a more targeted program, the agency may issue a **Request for Proposals/Request for Applications (RFP or RFA)** to which researchers respond by a particular deadline.

The Funding Process and Merit Review

Funding decisions by the federal agencies are based generally on a process of **merit review** that examines the eligibility of proposals for awards and their scientific/technical merit. Once proposals have been reviewed by federal program managers for eligibility, they are sent to panels of outside experts for additional technical review. Depending on the agency and the program, review panels may be convened in-person or do their work through written correspondence. Reviewers are primarily scientists actively working in research. Agency conflict-of-interest and confidentiality of information policies for reviewers are aimed at ensuring an unbiased review process and restricting the use of privileged application information.

Grants. In general, most university-based research is funded through grants, not contracts. Grants provide money, equipment, or both to eligible researchers to carry out approved projects or activities. The grantee is responsible for conducting the project activities and for preparing the results for publication. The granting agency monitors the use of funds it disburses, but it normally has minimal involvement in the substance of the work.

Cooperative Agreements. In cases where federal agencies do have substantial involvement in the substance of a particular research project, they typically will enter into a cooperative agreement with the funding recipient. For example, the National Science Foundation uses cooperative agreements with organizations that manage national user facilities, such as astronomy observatories. The National Cancer Institute uses cooperative agreements to promote interaction among its own and outside basic researchers and investigators conducting clinical trials.

Contracts. Contracts are agreements between an institution and an awarding agency that generally involve creation of a tangible product or service. This may include testing or evaluation of a proprietary product, development of equipment, technical reports and evaluations, or consulting services.

Cost Sharing. The federal government defines cost sharing as that portion of project or program costs not borne by the federal government. Funding may come from other, non-federal sources or from the university's own resources. Except for cost sharing that is required by law, federal agencies vary in their approaches to cost sharing and most do not have explicitly articulated agency-wide policies. Some funding agencies require universities to share in the costs of a project.

Matching Funds. A granting agency may provide additional funding for a research project equal to private funds raised for the project. This generally is done on a dollar-for-dollar basis.

What Costs Does the Federal Government Cover?

Cutting-edge research is capital intensive, requiring investment in buildings and instrumentation. The federal government has traditionally recognized this necessity and shared these expenses with universities by providing some infrastructure reimbursement as part of funding for a research grant. The costs of research normally are divided into two broad categories:

Direct Costs. This portion of a grant, cooperative agreement, or contract includes the costs of conducting a specific research project, including summer salaries, specific equipment, and laboratory materials.

Facilities and Administrative Costs (F&A Costs). These costs, which have historically been referred to as "indirect costs" or overhead, include expenses that cannot be attributed directly to a specific research project, but are necessary for the conduct of research. Such costs include research facility construction and maintenance, utilities, libraries, and research administration and accounting. The federal government provides some reimbursement for these F&A costs as part of grant funding.

When a researcher submits a grant proposal to a federal agency, the total amount of funding requested includes both the anticipated direct costs and the amount determined for facilities and administrative costs. For example, if a researcher from a university with a 50 percent F&A cost rate submits a grant request of \$100,000, \$66,667 is what he or she expects to need for direct research costs and \$33,333 (which is 50 percent of \$66,667) supports facilities & administration costs.

How Does the Federal Government Determine Cost Reimbursement Rates?

The Facilities & Administrative Cost Rate. Based on documented historical costs and cost analysis studies, federal agency negotiators and university administrators agree on an overall percentage of allowed facilities and administrative costs to be reimbursed to a particular university. This is referred to as the university's facilities and administrative cost rate, or F&A cost rate. When a university obtains a grant, contract, or cooperative agreement from a federal agency, it generally receives overhead reimbursement at this negotiated rate, regardless of the particular funding agency.

Facilities & administrative cost rates vary from institution to institution because construction, maintenance, utilities, and administrative costs vary by institution and by region. The rate for each university generally is renegotiated every three years.

How Does the Federal Government Ensure Research Accountability?

The President's Office of Management and Budget (OMB) provides guidance for the use of federal research funds through two key management circulars:

Circular A-110 provides general management guidelines.

Circular A-21 provides spending guidelines for both direct research costs and for facilities & administration costs.

Over the years, OMB and federal agencies themselves have instituted or strengthened these guidelines to ensure that universities—as well as other research performers—fully account for and appropriately spend research funds they receive from the federal government. Universities, in turn, have developed sophisticated internal control systems to ensure they follow federal rules and guidelines.

Cost Reimbursement Rules Tightened. Over the past dozen years, OMB has tightened significantly the rules for university cost reimbursement: capping administrative costs, reducing or eliminating reimbursement for previously allowable charges, and requiring additional internal systems and reviews for construction and renovation costs.

The federal government monitors compliance with these and other federal regulations through a variety of audits conducted on a regular basis.

Policy Regulations and Safeguards. In addition to financial requirements, federal agencies require grantees to comply with specific public policy regulations. The Public Health Service (PHS), for example, has specific requirements for dealing with the use of animals in research and for safeguarding the rights and welfare of human subjects participating in research. An organization that wishes to use human subjects in NIH-supported research must file a written Assurance of Compliance with the PHS Office of Human Research Protections (OHRP), demonstrating its policies and procedures for protecting human subjects. The grantee organization must also show that an appropriate Institutional Review Board (IRB) has examined and approved the proposed activity no more than 12 months before the application was transmitted to NIH.

What Is the Process for Using Results of University Research?

Technology Transfer is the means by which research findings are transferred to the private sector for potential development into products and processes. Products developed from university technology transfer include the gene splicing technology that initiated the biotechnology industry, new Internet search engines, and improved building materials.

Since the 1980 enactment of the Bayh-Dole Act, the federal government has allowed universities and other nonprofit organizations to patent and retain title to inventions created from research funded by the government. Universities, in turn, must:

- license the rights to innovations to industry;
- use any remaining income, minus the costs of technology management expenses, for scientific research or education;
- share any future income from the patent with the inventor; and
- provide the federal government a nonexclusive, irrevocable license to the invention.

Some 567 new products based on university-licensed discoveries were introduced in Fiscal Year 2004, alone, according to an analysis by the Association of University Technology Managers (AUTM), an organization representing technology managers at research universities, nonprofit organizations, and teaching hospitals. Since 1980, AUTM reports, 4,543 companies have been formed based on a license to an academic invention, including 417 in Fiscal Year 2004.

Funding figures from:

--*National Patterns of Research & Development Resources 2004: InfoBrief*, January, 2006, National Science Foundation

--*Licensing Survey: FY 2004*, Association of University Technology Managers, 2005

--*Updated by the Association of American Universities, May, 2006*