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UNIVERSITY RESEARCH: THE ROLE OF FEDERAL FUNDING

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University research is a vital building block of the nation's research and development (R&D) enterprise. While U.S. universities perform just 13 percent of total national R&D, they perform 31 percent of the nation's total research—basic and applied—and 56 percent of the nation's basic research.

Because there is broad consensus that university research is a long-term national investment in the future, the federal government supports about 60 percent of the research performed at universities. In 2009, that amounted to the federal government supporting about $33 billion of universities' total annual R&D spending of $55 billion.

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 and engineers, teachers, and leaders in government and industry.

How Do University Research Projects Receive Federal Funding?

Most university research projects start out as funding proposals put together by one or more university researchers or faculty members. The individual scientist who directs the project is the ***Principal Investigator*** **(PI).** Although the PI handles the day-to-day management of the project, the funding proposal is submitted officially by the university.

Proposals submitted by colleges and universities may include requests for funds to support graduate student ***Research Assistants*** **(RA)** to help carry out proposed projects. In fact, nearly 70 percent of science and engineering graduate students funded primarily by the federal government are funded through academic research grants. (Graduate students also may receive funding through traineeships and individual fellowships.)

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 must respond by a particular deadline.

The Funding Process and Peer Review

Funding decisions by federal agencies are based generally on a process of ***peer 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 scientific experts, or "peers," for additional technical review. Depending on the agency and the program, review panels may be convened in-person or do their work through written or electronic 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. 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, reporting on progress, and 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 astronomical observatories. The National Cancer Institute of the National Institutes of Health 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. Contracted activities include testing or evaluation of a proprietary product; development of equipment, technical reports and evaluations; and consulting services.

How Does the Federal Government Manage Research Accountability?

The White House Office of Management and Budget (OMB) provides guidance for the use of federal research funds through two key management policy documents. *Circular A-11* provides general management guidelines, and Circular *A-21* provides spending guidelines for both direct research costs and for facilities and administrative 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 the research funds they receive from the federal government. Compliance is monitored through a variety of audits conducted on a regular basis.

What Costs of Research Does the Federal Government Cover?

Direct Costs. This portion of a grant, cooperative agreement, or contract includes the costs of conducting a specific research project, such as salaries, graduate student stipends, travel to scientific meetings, specific equipment, and supplies. Although universities are reimbursed by the federal government for most of these costs, sometimes they are asked by agencies to share in paying for, or *cost share*, these direct research expenses.

Facilities and Administrative (F&A) Costs. These costs, which historically have been referred to as "indirect costs," include expenses that cannot be attributed to a specific research project, but which are necessary for the conduct of research. Such costs include research facility construction and maintenance, utilities, research administration and accounting, and compliance with federal regulations in areas such as human research subject protection, animal care, privacy and security of health information, export controls, disposal of hazardous materials, and other health, safety and security-related requirements. The federal government does not pay F&A costs directly; instead, it reimburses universities for money they have already spent.

How Does the Federal Government Determine F&A Cost Reimbursement?

The F&A Cost Rate. The rate of F&A cost reimbursement is not specific to individual grants. Instead, federal agency negotiators and university administrators predetermine an overall percentage of allowed F&A costs to be reimbursed, based on documented historical costs and cost analysis studies. F&A cost rates vary from institution to institution because construction, maintenance, utilities, and administrative costs vary by institution and by region. (For example, winter heating costs in Boston presumably are different from those in San Diego.) The rate for each university generally is renegotiated every three years.

When a university obtains a grant, contract, or cooperative agreement from a federal agency, it is supposed to receive F&A reimbursement at this negotiated rate, regardless of the particular funding agency. However, in practice, universities may receive a much lower rate of F&A reimbursement.

Cost Reimbursement Restricted as Administrative and Compliance Requirements Increased

In the past 20 years, OMB has significantly restricted university cost reimbursement by capping reimbursable administrative costs at 26 percent of direct costs, reducing or eliminating reimbursement for previously allowable charges, and requiring additional internal systems and reviews for construction and renovation costs.

This tightening has come even as the federal government has significantly increased the research compliance and administrative responsibilities of universities and faculty. A survey of faculty principal investigators by the Federal Demonstration Partnership in January, 2007, illustrates this point. The survey showed that faculty members were spending 42 percent of their federally funded research time on compliance and administrative matters associated with the grant, compared to 18 percent two decades before.

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 effectively created 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:

- offer to 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 658 new products based on university-licensed discoveries were introduced in Fiscal Year 2009 alone, according to an analysis by the Association of University Technology Managers. That same year, 596 new startup companies were launched based on licenses from academic inventions.

INFORMATION SOURCES:

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2. Science and Engineering Indicators, 2010, National Science Foundation.
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4. *AUTM U.S. Licensing Activity Survey: FY2009, Association of University Technology Managers, 2010.*
5. *Federal Demonstration Partnership Faculty Burden Survey.*

--Association of American Universities, January, 2011