

PENNSTATE



Annual Report of Research Activity

Office of the Vice President for Research
Fiscal Year 2014

PENN STATE'S RESEARCH EXPENDITURES TOTALED \$813.1 MILLION IN FISCAL YEAR 2013-2014, REPRESENTING A FOUR PERCENT DECREASE OVER LAST YEAR'S RECORD-SETTING TOTAL. THIS PLATEAU IN EXPENDITURES AFTER TWO DECADES OF STEADY GROWTH COMES AS A DIRECT CONSEQUENCE OF FEDERAL BUDGET CUTS AND SEQUESTRATION. SIGNIFICANT REDUCTIONS IN FEDERAL SUPPORT HAVE STRAINED RESEARCH AND DEVELOPMENT AT ALL OF OUR NATION'S TOP-TIER INSTITUTIONS, AND AT A TIME WHEN OTHER COUNTRIES, INCLUDING CHINA, INDIA, AND SOUTH KOREA, ARE SUBSTANTIALLY INCREASING R&D FUNDING. IT IS IMPERATIVE THAT WE RESTORE OUR HISTORICALLY STRONG INVESTMENT IN THE NATION'S RESEARCH ENTERPRISE IF WE ARE TO MAINTAIN GLOBAL LEADERSHIP IN DISCOVERY, NEW TECHNOLOGIES, PROCESSES, AND PRODUCTS.

Given this background, Penn State is weathering the storm quite well. Our institutional resilience is due to several factors, including a diverse and well-balanced research portfolio, a strong and hungry faculty, and a strategy of cluster hiring in a variety of fields that enables the assembly of cutting-edge interdisciplinary teams that can successfully compete for multimillion-dollar research awards.

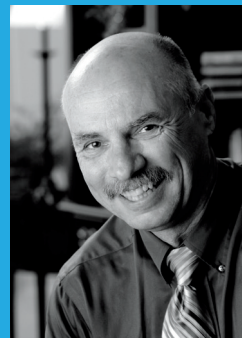
Our continuing efforts in the technology transfer arena provide further evidence of our forward thinking and leadership. Almost three years ago now, Penn State took the unprecedented step of altering its Intellectual Property policy so that we no longer insist on owning the IP that issues from industry-sponsored research. This year, the Penn State Research Foundation launched the Fund for Innovation to promote commercialization of new discoveries. Also this spring, we conducted an online auction of some of our research patents, the first of its kind ever conducted directly by a university.

According to a coalition of prominent university, scientific, and business organizations that submitted testimony this spring to the U.S. Senate Appropriations Committee, decreased federal funding has resulted in a growing "innovation deficit" that threatens the nation's international competitiveness. At the same time, as never before in our nation's history, research universities are called upon to be the engines of innovation. As Pennsylvania's land-grant institution, we take seriously our commitment to stewardship and economic development in a changing world.



NEIL SHARKEY

Vice President for Research



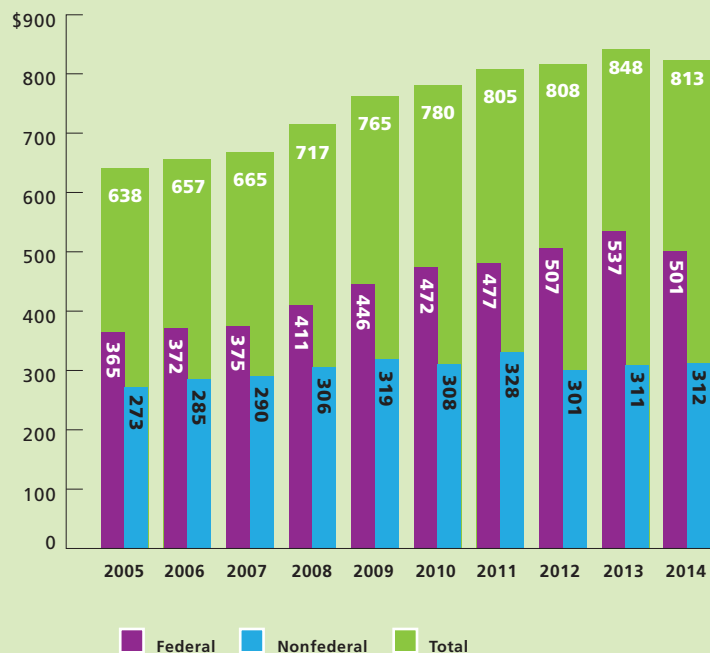
Total Research Expenditures, 2005–2014 (Federal and Nonfederal)

Expenditures for fiscal year 2014 totalled \$813 million, with federal support leading the way at \$501 million.

Research sponsored by industry, private foundations, and related sources, 2005–2014

Penn State typically partners with more than 400 companies annually.

In millions of dollars



In millions of dollars



Expenditures from Federal Agencies

1 **Department of Defense \$198,383,000**

2 **Department of Health and Human Services \$117,296,000**

3 **National Science Foundation \$66,930,000**

4 **DOE \$40,157,000**

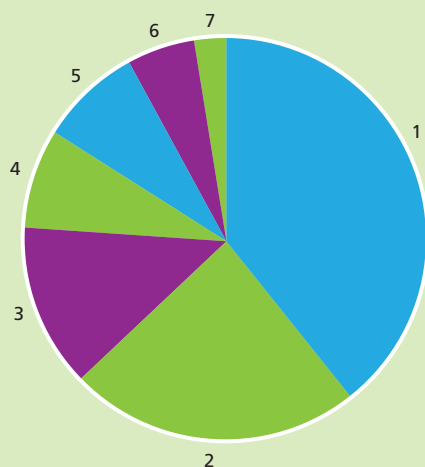
5 **Other \$39,602,000**

Commerce \$3,553,000
Education \$5,512,000
EPA \$1,368,000
Interior \$1,389,000
Transportation \$7,270,000
Other Federal \$20,510,000

6 **USDA \$26,948,000**

7 **NASA \$11,912,000**

Total \$501,228,000



Expenditures by Performing Unit

1 **Defense-Related Research Units \$195,641,000**

Applied Research Lab \$172,433,000
Electro-Optics Center \$23,208,000

2 **Engineering \$132,271,000**

3 **Eberly College of Science \$107,304,000**

4 **Agricultural Sciences \$104,102,000**

5 **Medicine \$95,774,000**

6 **Earth and Mineral Sciences \$64,695,000**

7 **Health and Human Development \$39,184,000**

8 **Liberal Arts \$30,287,000**

9 **Other Campuses \$15,942,000**

Altoona College \$1,267,000
Behrend College \$5,533,000
Berks College \$333,000
Capital College \$3,532,000
Great Valley \$331,000
Other Commonwealth Campuses \$3,643,000
Penn College \$1,303,000

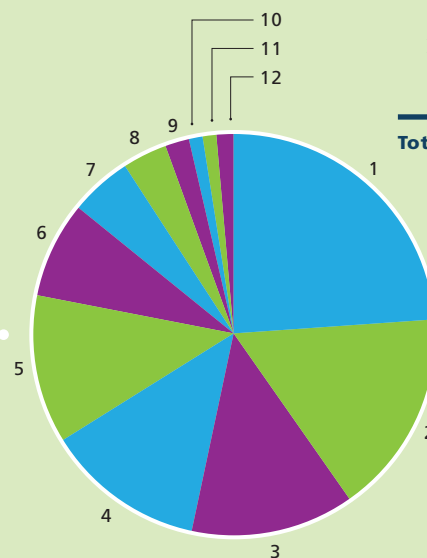
10 **Information Sciences and Technology \$8,372,000**

11 **Education \$10,201,000**

12 **Other Schools and Colleges \$9,352,000**

Arts and Architecture \$1,455,000
Communications \$232,000
Dickinson School of Law \$434,000
International Programs \$139,000
Nursing \$2,163,000
Smeal College of Business \$4,929,000

Total \$813,125,000



Sources of Research Funding

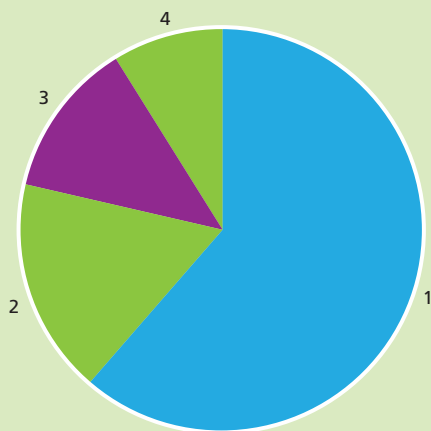
1 Federal \$501,228,000

2 University \$139,723,000

3 Industry and other \$100,909,000

4 Commonwealth of Pennsylvania
\$71,265,000

Total \$813,125,000



Penn State derives its research funding from a broad base of sources, depicted at left, reflecting a diversity of initiatives across academic disciplines. The \$501.2 million in federal support is especially noteworthy because it represents public dollars flowing back to Pennsylvania.

Federal and all other research funding provides an important economic boost to the Commonwealth, having direct and indirect impacts of approximately \$2 billion annually, according to a 2009 University-sponsored report, in such forms as new technologies, job creation and retention, and state and local tax revenues.

PENN STATE TECHNOLOGY TRANSFER AT A GLANCE

Total revenue: \$3 million



Invention disclosures
received:

159



U.S. patents issued:

41

Start-up companies formed:

10

(73 since 1991)



Licenses and options executed:

36



THE BREADTH AND DEPTH OF RESEARCH AND DISCOVERY AT PENN STATE

A sampling of major grants and awards received in 2013–14

— A grant from the National Institute on Drug Abuse supported development of leading state-of-the-art research and training to inform policy on the regulation of tobacco products.

— An award from the Defense Threat Reduction Agency further enhanced a network forged in 2004 to address human and animal disease in countries throughout the world.

— A U.S. Agency for International Development grant enabled development of new resilient beans in Eastern and South Africa, Central America, and the Caribbean.

— A National Science Foundation award extended support for the Susquehanna Shale Hills Critical Zone Observatory to predict the Earth's Critical Zone evolution in response to environmental stressors.

— Another NSF grant supported “visual cortex on silicon” research to realize computer systems that can understand complex scenes, increase energy-efficiency, and advance user interfaces and storage/retrieval.

— An Energy Advanced Research Projects Agency award advanced usage of shale deposits by engineering a bacterium to use methane as a liquid biofuel.

— Funds from the Department of Energy assisted researchers examining high energy/power lithium-ion batteries.

— The Environmental Protection Agency advanced Penn State's efforts to enhance decision-making capabilities through an innovative process for choosing nutrient intervention options in the Mid-Atlantic region.

— The Bill and Melinda Gates Foundation supported work on methods for identifying locally specific vaccination strategies for measles and rubella in humans.

— The U.S. Department of Education established an interdisciplinary training program to prepare educational scientists to conduct school-based interventions.

— Training programs supported by the National Institutes of Health emphasized a translational approach to understanding physiological adaptations to stress and innovative approaches to comparative, systems, and statistical and medical genomics.

— An Alfred P. Sloan Foundation award furthered Penn State's commitment to advancing research and education by establishing a Minority Ph.D. Center for Exemplary Mentoring crossing six STEM colleges.

— A grant from the U.S. Department of Agriculture expanded support for the Clearinghouse for Military Family Readiness at Penn State to aid in advancing the Department of Defense's Healthy Base Initiative for obesity prevention and development of a parenting education system.

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