

OFFICE OF THE VICE PRESIDENT FOR RESEARCH / FISCAL YEAR 2015

ANNUAL REPORT OF RESEARCH ACTIVITY



PennState

Penn State's research expenditures totaled \$801 million for the 2014–15 fiscal year, marking the fifth consecutive year topping the \$800 million mark. The total included \$510 million in funding from a variety of federal agencies and departments, reflecting the balance and breadth that have long characterized Penn State's research enterprise. We have a very diverse portfolio, a reflection of our broad base of expertise across all domains.

Our balance is demonstrated by multimillion dollar awards for new or ongoing work in areas as diverse as a Department of Energy-supported program for designing energy-efficient buildings, a national data coordinating center for asthma research sponsored by the National Institutes of Health, a federal bus-testing program conducted for the U.S. Department of Transportation, and the design and development of an anti-torpedo torpedo for the U.S. Department of Defense.

Due to our very talented and tenacious faculty, we continue to maintain a strong overall portfolio despite the continued effects of ongoing budget constraints in Washington.

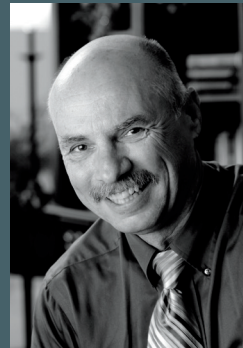
I'm also pleased to report a positive trend in the University's technology transfer operations, with increases over the last two years in the numbers of licenses executed and start-up companies formed based on Penn State's intellectual property. The former have grown from 18 to 30 annually, the latter, from 5 to 10.

These increases are one early outgrowth of President Barron's Invent Penn State initiative, which emphasizes expanding Penn State's role as a major economic-development engine for the Commonwealth.

With the new focus on building industrial partnerships, and new incentives and support in place for our faculty and student inventors, we are beginning to see the increased fruit of our discoveries, which translates to jobs and economic growth.



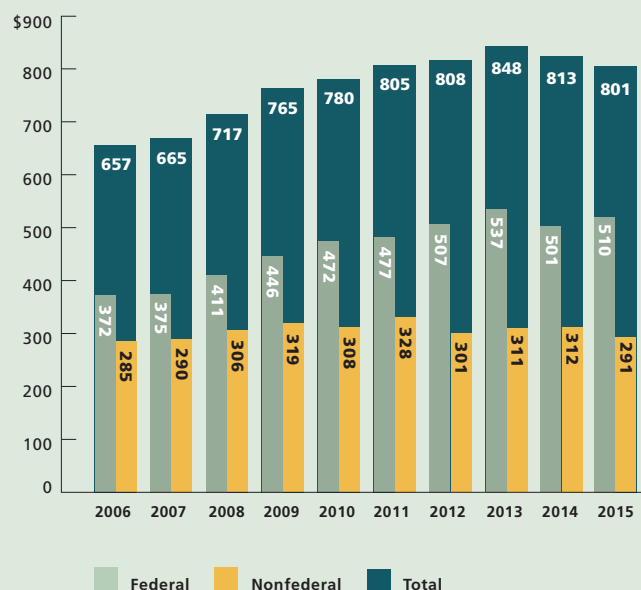
NEIL SHARKEY
Vice President for Research



Total Research Expenditures, 2006–2015 (Federal and Nonfederal)

Expenditures for fiscal year 2015 totalled \$801 million, with federal support leading the way at \$510 million.

In millions of dollars

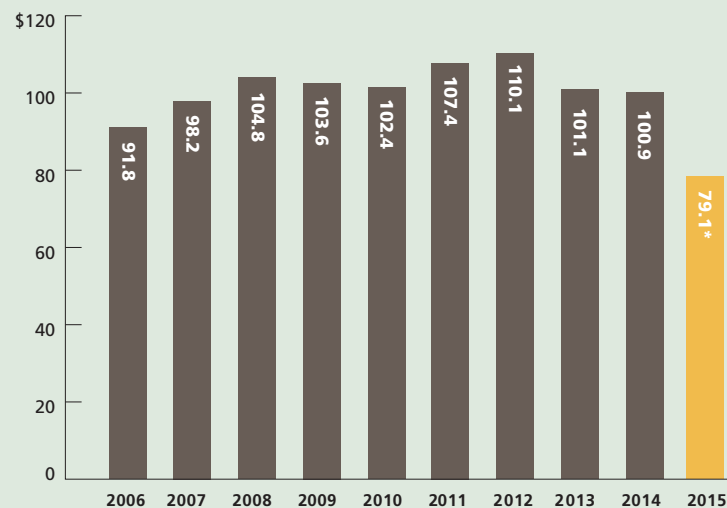


Research sponsored by industry, private foundations, and related sources, 2006–2015

Penn State typically partners with more than 400 companies annually.

** In order to enable precise tracking of industry sponsorship moving forward, in FY15, for the first time, federal flow-through dollars were removed from industry awards and allocated back to the prime federal sponsor.*

In millions of dollars



Expenditures from Federal Agencies

1 **Department of Health and Human Services \$118,212,000**

2 **National Science Foundation \$67,793,000**

3 **NASA \$10,534,000**

4 **Other \$44,059,000**

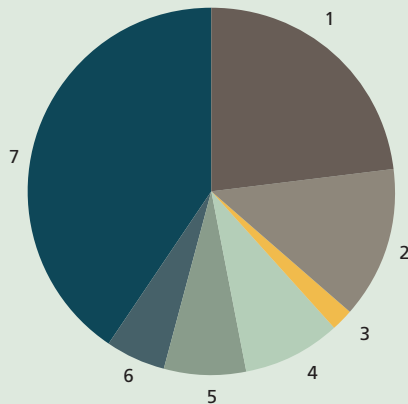
Commerce \$3,552,000
Education \$5,053,000
EPA \$1,687,000
Interior \$1,290,000
Transportation \$7,069,000
Other Federal \$25,408,000

5 **DOE \$36,621,000**

6 **USDA \$27,314,000**

7 **Department of Defense \$205,524,000**

Total \$510,057,000



Expenditures by Performing Unit

1 **Agricultural Sciences \$103,061,000**

2 **Defense-Related Research Units \$195,232,000**

Applied Research Lab \$181,453,000
Electro-Optics Center \$13,779,000

3 **Earth and Mineral Sciences \$63,565,000**

4 **Eberly College of Science \$106,160,000**

5 **Education \$7,709,000**

6 **Engineering \$131,496,000**

7 **Health and Human Development \$40,284,000**

8 **Information Sciences and Technology \$8,087,000**

9 **Liberal Arts \$27,567,000**

10 **Medicine \$94,563,000**

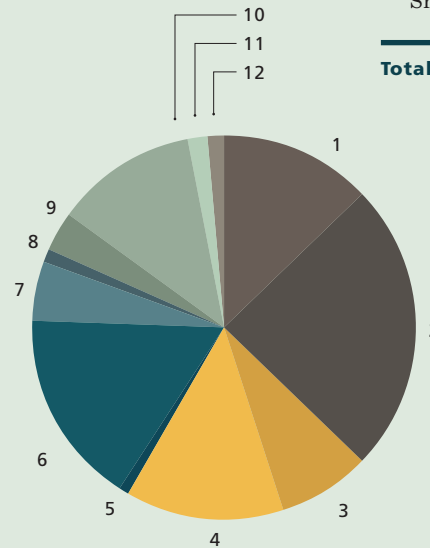
11 **Other Campuses \$14,407,000**

Altoona College \$1,133,000
Behrend College \$6,131,000
Berks College \$222,000
Capital College \$3,881,000
Great Valley \$330,000
Other Commonwealth Campuses \$2,269,000
Penn College \$441,000

12 **Other Schools and Colleges \$9,217,000**

Arts and Architecture \$1,290,000
Communications \$322,000
International Programs \$101,000
Law \$381,000
Nursing \$1,653,000
Smeal College of Business \$5,470,000

Total \$801,348,000



Sources of Research Funding

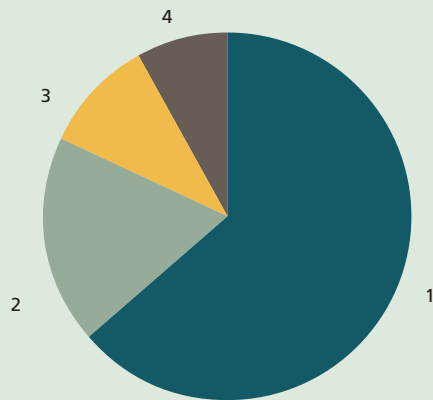
1 Federal \$510,057,000

2 University \$148,323,000

3 Industry and other \$79,128,000

4 Commonwealth of Pennsylvania
\$63,840,000

Total \$801,348,000



Penn State derives its research funding from a broad base of sources, depicted at left, reflecting a diversity of initiatives across academic disciplines. The \$510 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: \$2.5 million

117

**INVENTION
DISCLOSURES
RECEIVED**

55

**U.S. PATENTS
ISSUED**

10

**START-UP
COMPANIES
FORMED**

30

**LICENSES
AND OPTIONS
EXECUTED**

Technology transfer data provided by Penn State's Office of Technology Management are for the period January–December 2014.

THE BREADTH AND DEPTH OF RESEARCH AND DISCOVERY AT PENN STATE

A sampling of major grants and awards received in 2014–15

— The *National Heart, Lung, and Blood Institutes* funded Penn State Hershey College of Medicine to continue as the national data coordinating center for new asthma treatments and asthma management.

— The *National Institute of Digestive and Kidney Disease* and the *USDA* supported activities aimed at the national health problem of obesity, targeting interventions for parents, preschools, and military families.

— The *National Science Foundation* awarded funding to enable Penn State to continue its leadership in materials science and engineering through its Center for Nanoscale Science.

— Two *NSF* awards support fundamental engineering research on new 2D (two-dimensional) materials that are enabling breakthrough technologies for energy harvesting and storage, sensing, electronics and photonics, and bioengineering.

— A *United States Department of Agriculture* grant will enhance food security for underserved populations in the U.S. Northeast through the development of sustainable regional food systems.

— The *US Agency for International Development* awarded funding to accelerate the breeding of more heat-stress and drought resilient beans and their dissemination to rural communities in Africa, Central America and the Caribbean.

— The *US Department of Education* provided support for the establishment of a Rehabilitation Engineering Research Center on Augmentative and Alternative Communication, committed to advancing knowledge and producing innovative engineering solutions for augmentative and alternative

— The *US Department of Energy* supported the design of a robotically-controlled sensor system to safely monitor the integrity of containment systems used for nuclear fuel dry storage.

— The *U.S. Department of Transportation* awarded a grant for operation of the Federal Transit Administration's national bus testing program by Penn State's Larson Transportation Institute.

— The *National Institute of General Medical Sciences* provided support for graduate students interested in studying physiological adaptations to stress in order to develop interventions for the progressions from stress to human disease and disability.

— The *Commonwealth of Pennsylvania* awarded funding for Penn State to host The Pennsylvania Commission on Sentencing, a commission created by the General Assembly for the purpose of creating a consistent and rational statewide sentencing policy for serious crimes and promote fairer and more uniform sentencing practices.

— The *US Department of Commerce* awarded funding for Penn State Innovation Park's TechCelerator Program to support and accelerate new company formation through a regional innovation strategy developed by the grantees.

— *US Department of Energy* funding will leverage the fundamental understanding of underground fracture flow, dynamic permeability enhancement, and induced seismicity to improve geothermal energy production.

— The *US Naval Sea Systems Command* continued its support for the engineering design and development of an anti-torpedo torpedo.

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