



NSF Higher Education R&D Survey

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Federal Demonstration Partnership

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National Science Foundation
National Center for Science and Engineering Statistics
www.nsf.gov/statistics/



Presentation Outline

- Overview of the National Center for Science and Engineering Statistics (NCSES)
- Overview of the Survey of Science and Engineering Research Facilities
- Overview of the Higher Education R&D Survey
- Data trends
- Demonstration of new Interactive Data Tool
- Discussion of potential future survey revisions and additions
- Open Forum
- Next steps



Overview of NCSES

- A federal statistical agency that reports to the National Science Foundation's Directorate for Social, Behavioral, and Economic Sciences.
- NCSES provides data users with objective, high-quality statistical information on U.S. and international science, engineering, technology, and R&D, and fosters research that improves the measurement and understanding of science and engineering enterprise.



NCSES Home Page: nsf.gov/statistics

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National Center for Science and Engineering Statistics

The National Center for Science and Engineering Statistics (NCSES) is the nation's leading provider of statistical data on the U.S. science and engineering enterprise.

Explore our website for data on research and development, the science and engineering workforce, the condition and progress of STEM education, and U.S. competitiveness in science, engineering, technology, and R&D.

[Learn More About NCSES](#)

What's New?

- U.S. R&D increased by \$20 Billion in 2015, to \$485 Billion; Estimates for 2016 indicate a Rise to \$510 Billion
INFOBRIEFS | NSF 15-305 | DECEMBER 14, 2017
- State Government R&D Expenditures Increase 3.1% in FY 2016
INFOBRIEFS | NSF 15-305 | DECEMBER 13, 2017
- Survey of State Government Research and Development: FY 2016
DATA TABLES | DECEMBER 13, 2017
- Science and Engineering State Profiles: Fall 2017 update
OTHER WEB PRODUCT | DECEMBER 7, 2017
- Doctorate Recipients from U.S. Universities: 2016
DATA TABLES | NSF 15-304 | DECEMBER 6, 2017

Universities Report Increased Federal R&D Funding after 4-year Decline; R&D Fields Revised for FY 2016

Key Publications

- Science and Engineering Indicators
- Women, Minorities, and Persons with Disabilities in Science and Engineering

Learn More

Statistics - It's not what you think. Learn more about the importance of statistics.

THIS matters



Survey of S&E and Engineering Research Facilities Overview

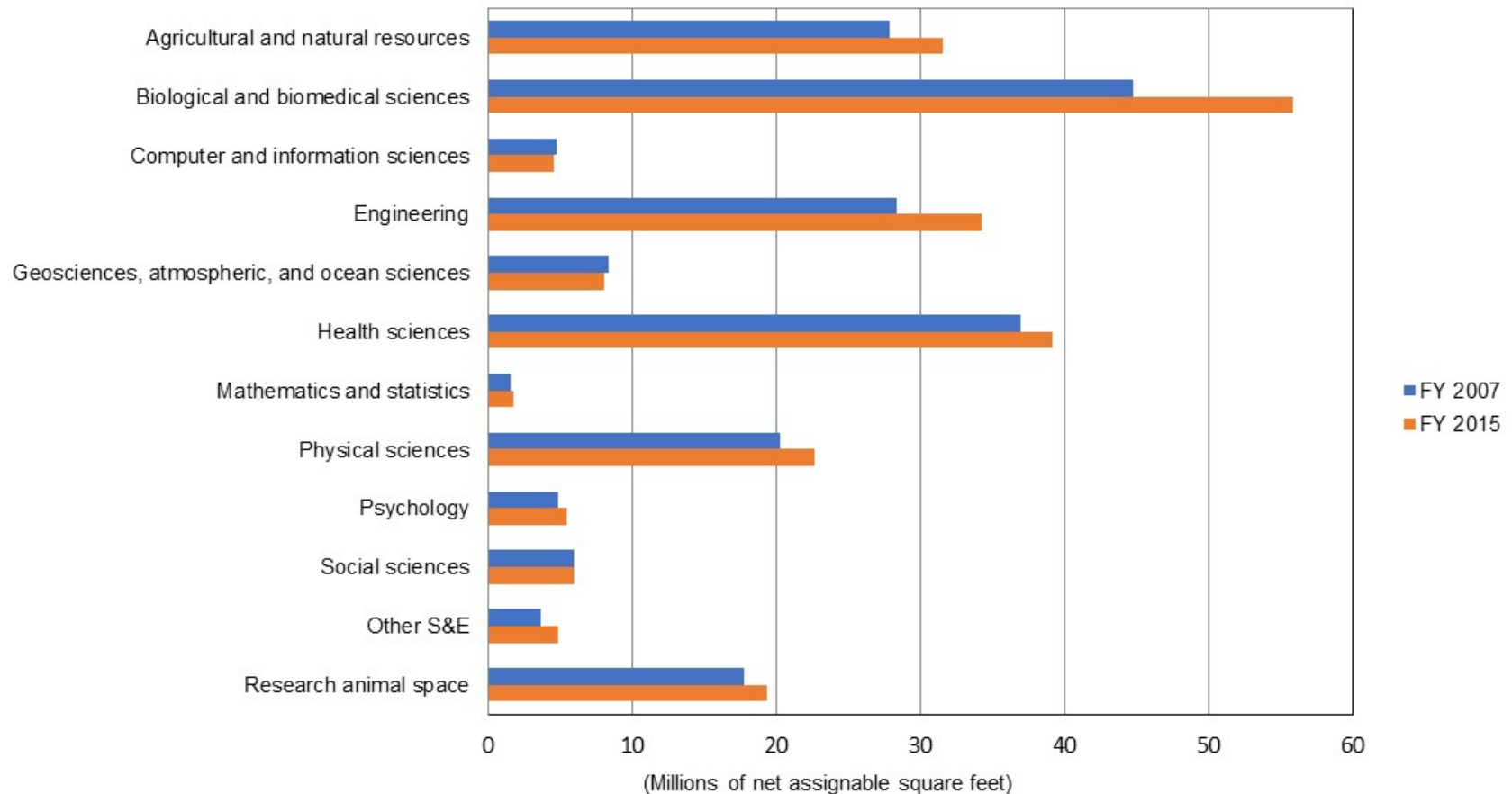
- Congressionally mandated
- Conducted biennially from FY 1986 – FY 2017
- Census of all U.S. universities and colleges with minimum of \$1,000,000 of S&E R&D spending (N = 575 in FY 2017)
- Eligible institutions identified through the Higher Education Research & Development survey
- Voluntary (response rates consistently over 95%)
- Institution level tables available on NSF website



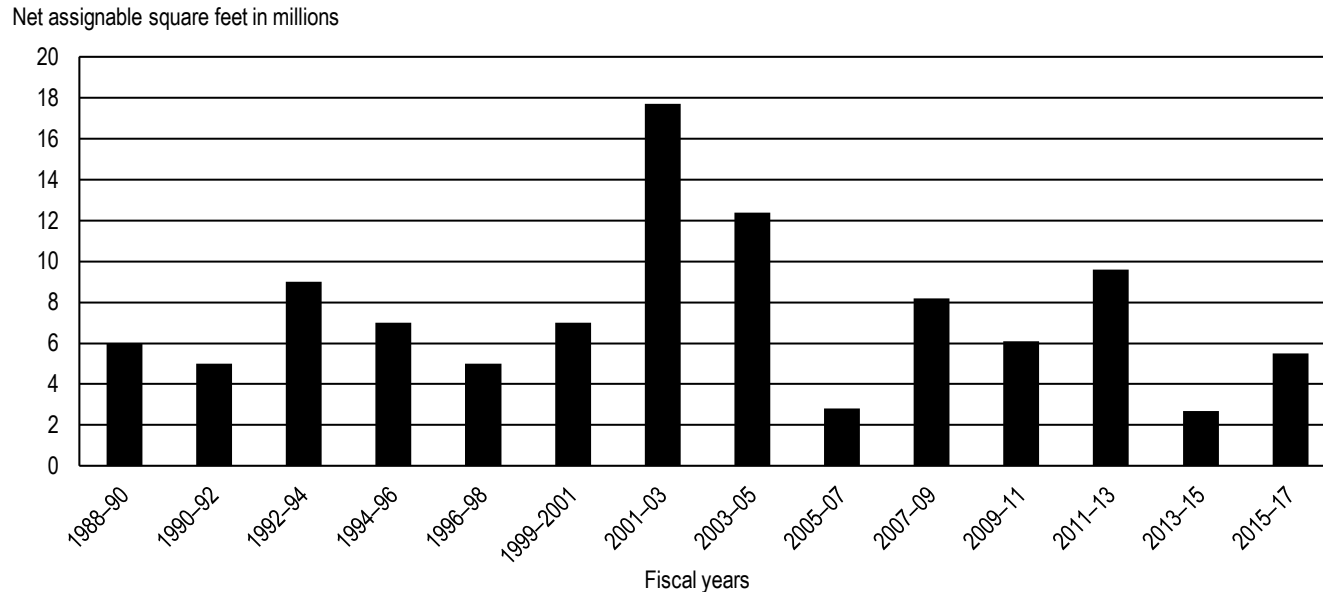
Survey of S&E and Engineering Research Facilities Overview

- Types of data collected:
 - ✓ Current research space
 - ✓ New construction and repairs/renovations
 - ✓ Planned construction and repairs/renovations
 - ✓ Deferred construction and repairs/renovations
 - ✓ Fields of science and engineering
 - ✓ Dollars and net assignable square feet

S&E Research Space at Academic Institutions, by Field: 2007 and 2015



S&E Research Space at Academic Institutions, Change Over 2-Year Period: 1988 to 2017



SOURCE: National Science Foundation, National Center for Science and Engineering Statistics, Survey of Science and Engineering Research

NOTE: Space measured in net assignable square feet. The biennial survey cycle ran on even years from 1988 to 1998 and on odd years from 1999 to 2015.



Higher Education R&D Survey

Overview

- Conducted annually since FY 1972, significantly redesigned in FY 2010
- Census of all U.S. universities and colleges with minimum of \$150,000 of R&D spending (N = 946 in FY 2018)
- Survey response rate has consistently been over 95%
- Requests expenditures for all separately accounted for R&D performed at institutions during previous academic FY
- Institution level tables available on NCSES website



Higher Education R&D Survey

Overview

- Types of data collected:
 - ✓ Federal agency sources of funding by field
 - ✓ Nonfederal sources of funding by field
 - ✓ Type of R&D (basic research, applied research, and experimental development)
 - ✓ Spending on R&D equipment by field
 - ✓ R&D spending passed through to subrecipients or received as a subrecipient

Higher Education R&D Survey

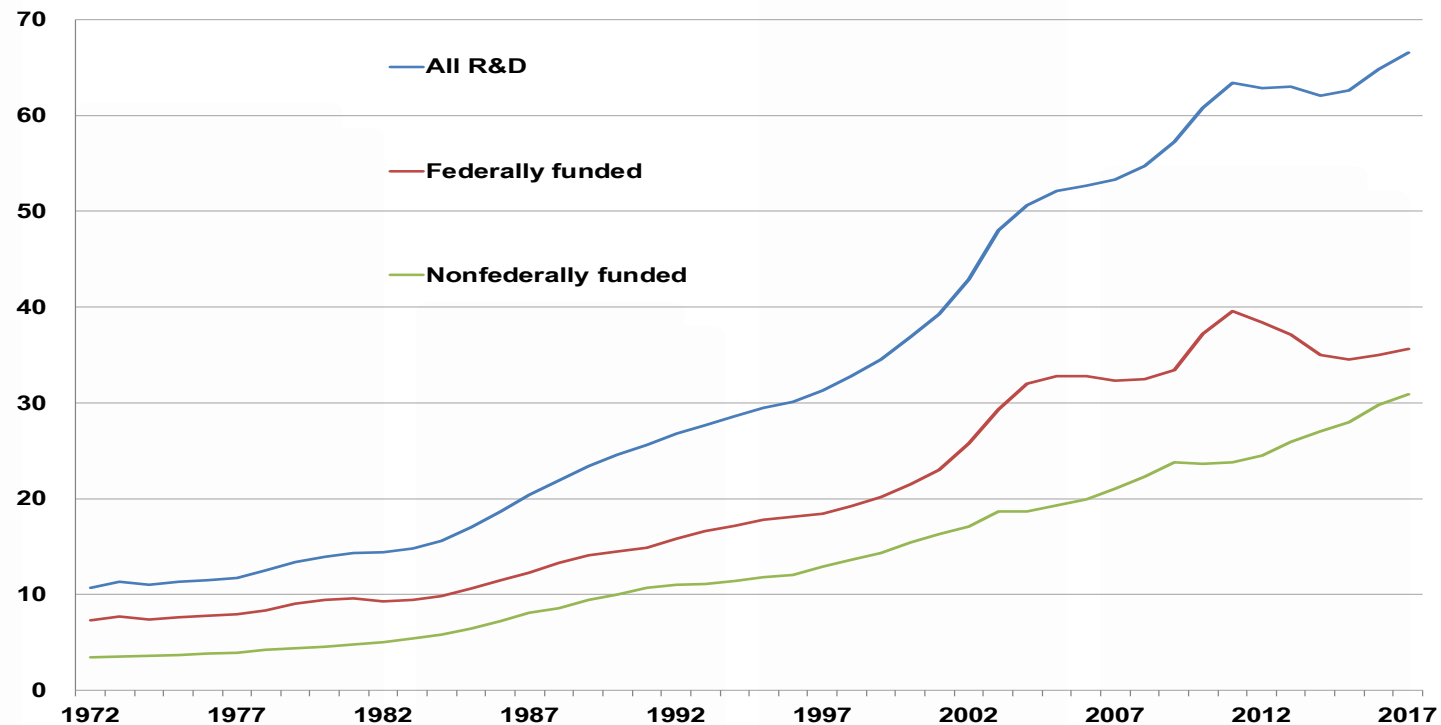
Overview

- Types of data collected (continued):
 - ✓ Foreign sources of funding
 - ✓ Medical school R&D
 - ✓ Clinical trial R&D
 - ✓ Type of funding agreement: contracts vs. grants
 - ✓ Specific cost elements of R&D expenditures (salaries, software, equipment, etc.)
 - ✓ Headcounts of personnel paid from R&D accounts



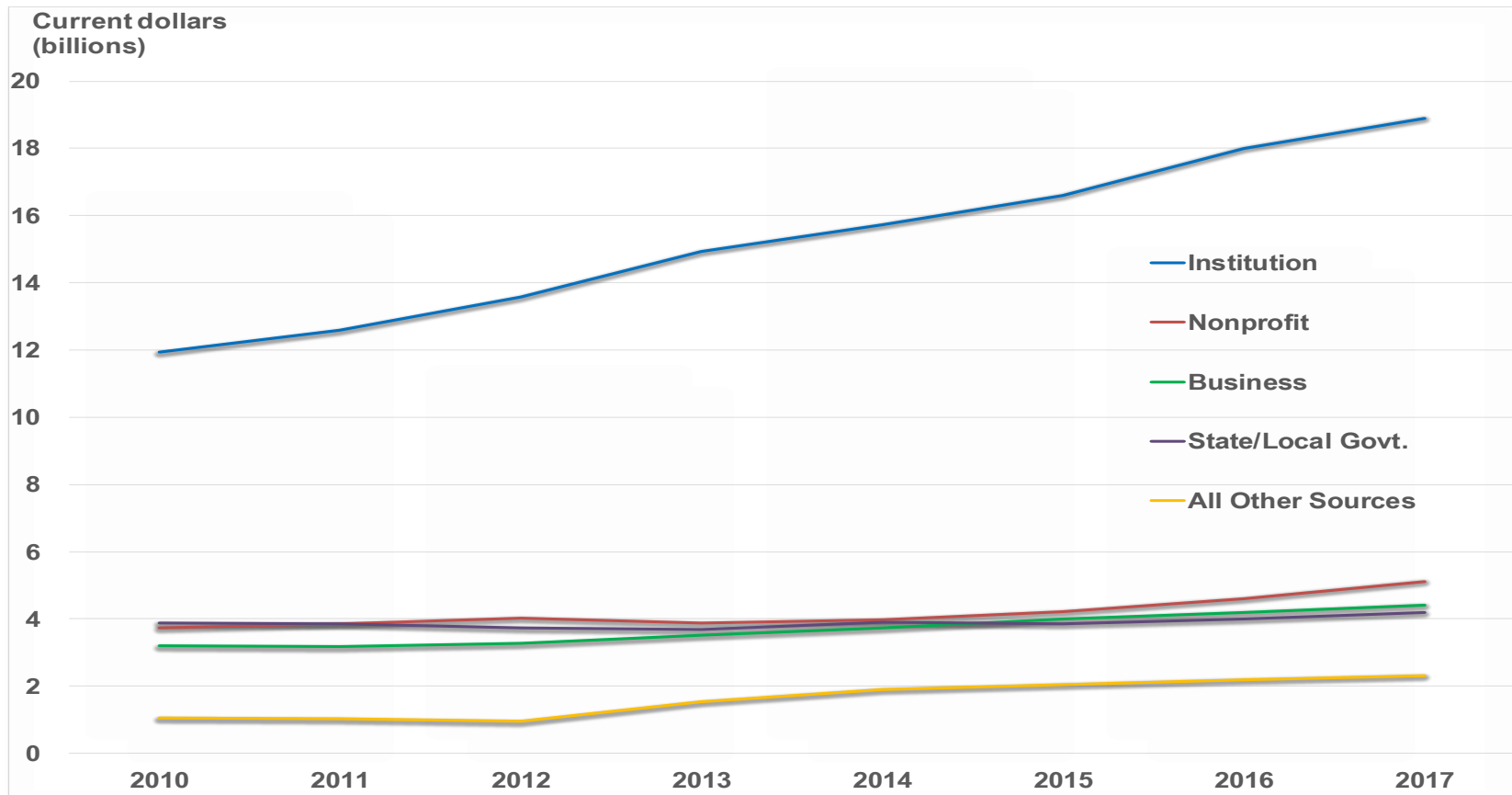
Trends in Higher Education R&D Spending by Source of Funds: FYs 1972-2017

Constant 2009 dollars
(billions)



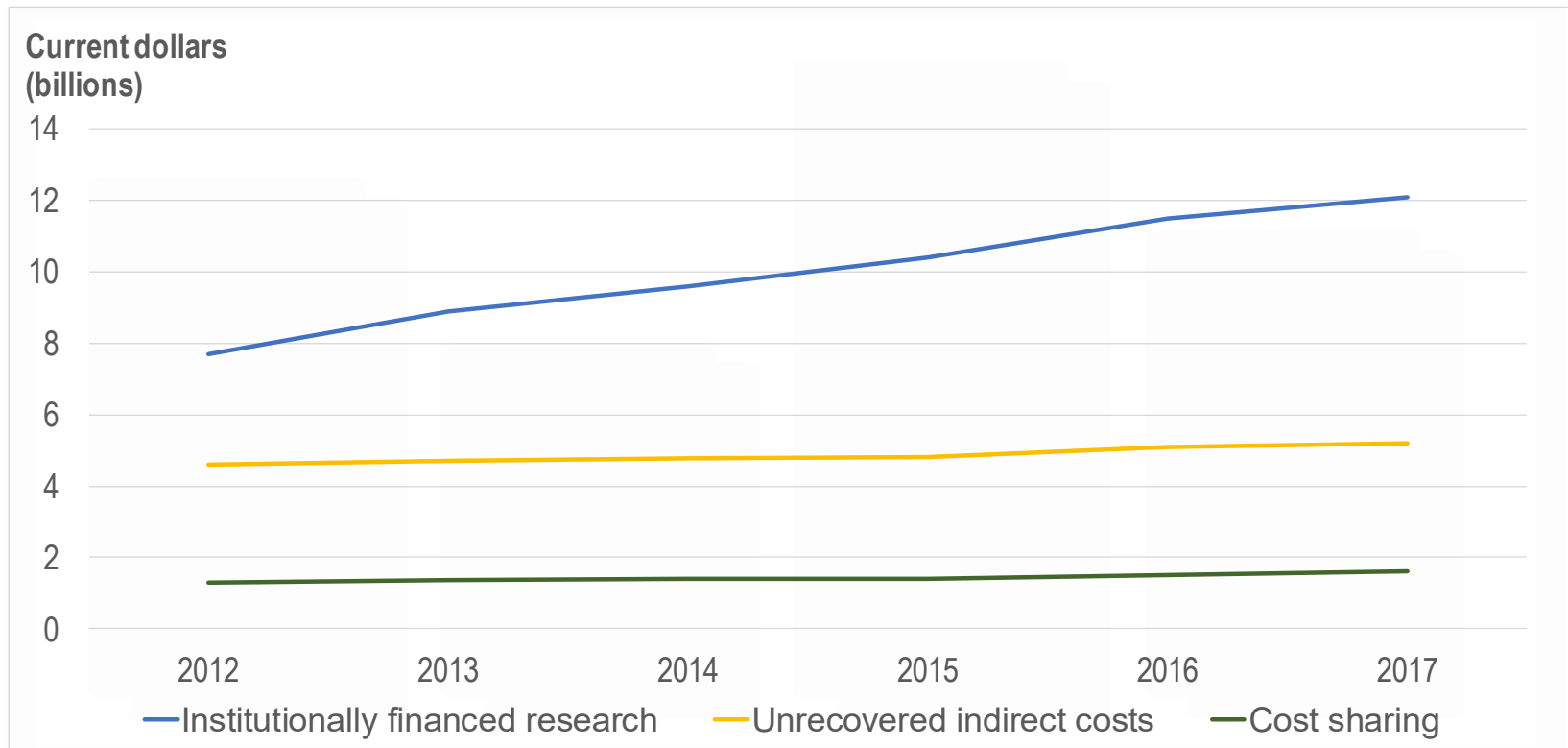
SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Higher Education Research and Development Survey.

Higher Education R&D Spending by Nonfederal Sources of Funds: FYs 2010-17





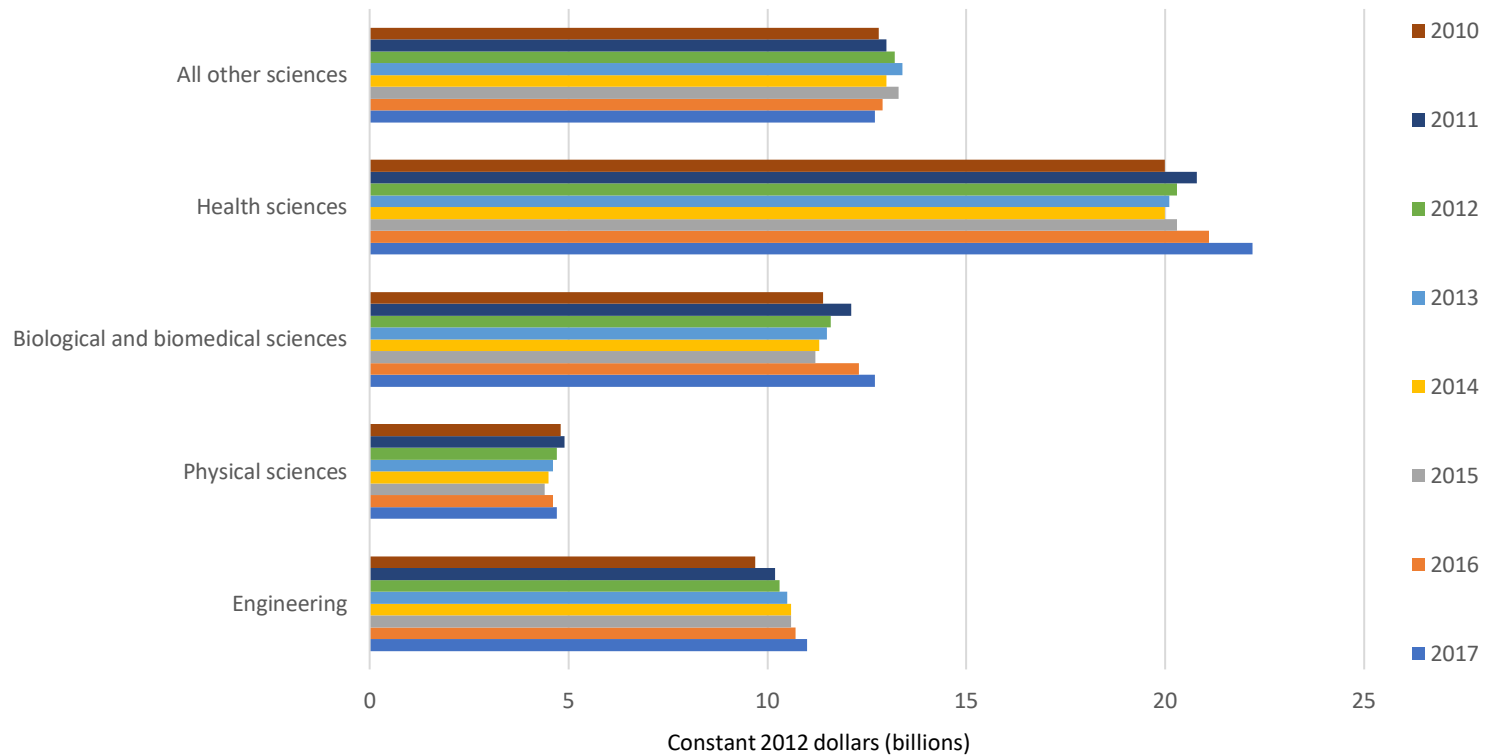
Institutionally-financed Higher Education R&D Spending by Type of Cost: FYs 2010-17



SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Higher Education Research and Development Survey.



Higher Education R&D Spending by R&D Field: FYs 2010-17



SOURCE: National Science Foundation/National Center for Science and Engineering Statistics, Higher Education Research and Development Survey.



NCSES's Interactive Data Tool

- Located at <https://ncesdata.nsf.gov/ids/>
- Data from 5 NCSES surveys are currently available
 - HERD
 - Facilities
 - Federal S&E Support for Universities, Colleges, Nonprofits
 - Graduate Students & Postdocs (GSS)
 - Earned Doctorates (SED)
- More to come including IPEDS
- Continual improvements

NCSES's Interactive Data Tool

The screenshot shows a web browser window displaying the NCSES Interactive Data Tool. The browser's address bar shows the URL <https://ncesdata.nsf.gov/ids/>. The page features a dark blue sidebar on the left with navigation options under "NAVIGATE BY SURVEY" and "NAVIGATE BY TOPIC". The main content area has a blue header with a grid pattern and a section titled "INTRODUCING THE NEW NCSES INTERACTIVE TOOL!". Below this, there is a paragraph explaining the tool's purpose and a list of five steps for getting started. The steps include selecting a survey, checking measures and dimensions, dragging and dropping variables, filtering the table, and downloading the data as a CSV file. At the bottom of the page, there is a version number (1.4.3) and a "Release notes" link, along with contact information for the National Science Foundation.

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NCSES Data

NAVIGATE BY SURVEY

Custom Tables

Earned Doctorates (SED) NEW

Higher Education R&D (HERD) NEW

Graduate Students & Postdocs (GSS)

Federal Funds for R&D

Federal S&E Support to Institutions NEW

Science and Engineering Research Facilities NEW

IPEDS Completions

IPEDS Fall Enrollment

IPEDS Tuition

IPEDS Salaries

NAVIGATE BY TOPIC COMING SOON

Business & Industry

Education

Federal Government


International

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INTRODUCING THE NEW NCSES INTERACTIVE TOOL!

This interactive tool consolidates several of our previous platforms into one easy-to-use system. With it, you can easily create custom tables to suit your specific research needs.

How to get started:

1. Select a survey using the  icon on the left or from the "Navigate by Survey" menu above.
2. Check the box next to at least one measure and as many dimensions you want to appear in your table.
3. Drag and drop variables and expand items to create the layout you prefer.
4. Filter the table by selecting individual items and pressing enter
or
Click a variable name in the corner of the table and select from the dropdown.
5. Download the data using the [Export to CSV](#) at the top right.

Currently, the tool can be used to access data from our [Higher Education Research and Development Survey \(HERD\)](#), [Survey of Earned Doctorates \(SED\)](#), [Survey of Graduate Students and Postdoctorates in Science and Engineering \(GSS\)](#), [Federal S&E Support to Institutions](#) and [Science and Engineering Research Facilities Survey](#). As new NCSES data are released, they will be added to the tool.

The new tool currently provides access to data from surveys from the WebCASPAR platform, which will be inaccessible in 2019. In the coming months, the new NCSES tool will be updated with data from surveys from SESTAT and other NCSES platforms.

version 1.4.3 [Release notes](#)

National Science Foundation, 2415 Eisenhower Avenue, Alexandria, Virginia 22314, USA Tel: (703) 292-5111, FIRS: (800) 877-8339 | TDD: (800) 281-8749 | NSF NCSES



NCSES's Interactive Data Tool

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Higher Education Research and Development Survey (HERD) Feedback

Select items to add to the table Clear Selections

By Broad Field and Federal and Nonfederal Sources

HEADCOUNTS FOR INSTITUTIONS WITH OVER \$1M R&D EXPENDITURES

of R&D Personnel

Survey Dimensions - Collapse

Fiscal Year (8)

R&D FIELD

Detailed Field (40)

Broad Field (10)

FUNDING SOURCE

Detailed Source of Funds (6)

Detailed Source of Funds(Passthrough) (5)

Federal or Nonfederal (2)

Federal Agency (8)

Foreign Organization Type (5)

OTHER DIMENSIONS

Type of R&D Conducted (3)

Type of Costs (Direct or Indirect) (7)

Type of Funding Agreement (Contracts or Grants) (2)

Personnel Role (2)

Institution Dimensions + View All 11

BASIC INFORMATION

Custom Tables

Business & Industry

Education

Federal Government

International

Research & Development

Social Dimensions

State

Workforce

Filters Selecting items in the table will filter results. You can modify your selected filters here.

Inflation Adjustment Current Dollars

Units Thousands of Dollars

Drag variables to customize table. Select items to filter.

Sort Options... Expand All Rows and Columns

Year	instName	fundingDetailed	All other sources	Business	Institutional funds	Nonprofit organizations	State and local government	U.S. federal government
2017			2,277,991	4,429,750	18,921,992	5,132,907	4,246,985	40,305,496
	A. T. Still U.		-	-	132	473	-	177
	Abilene Christian U.		-	-	107	30	12	485
	Adelphi U.		-	-	61	-	-	286
	Agnes Scott C.		-	-	63	68	-	182
	Air Force Institute of Technology		-	-	445	9,700	-	25,588
	Alabama A&M U.		2,450	184	5,055	-	706	23,290
	Alabama State U.		-	-	-	-	-	2,253
	Alaska Pacific U.		-	-	525	-	22	665
	Albany C. of Pharmacy and Health Sciences		90	1,070	792	49	-	566
	Albany Medical C.		176	4,578	3,745	984	-	11,040
	Albany State U.		-	288	-	-	79	1,026
	Albert Einstein C. of Medicine		-	5,830	76,526	15,688	3,382	188,259
	Albion C.		7	-	RAR	9	-	210



Discussion of potential future survey revisions and additions

- Last comprehensive survey redesign began 10 years ago
- Several new areas of content and revisions needed to fill data needs and improve international comparability
- Site visits conducted over the past two summers to assess feasibility

Potential new content areas: Capital expenditures for R&D (1)

- Currently, HERD only asks about capital expenditures for R&D equipment, other countries measuring HERD include all capital expenditures for R&D
- NCSES considering adding a question to the survey to collect capital R&D expenditures for land, buildings, equipment, software and intellectual property

Potential new content areas: Capital expenditures for R&D (2)

Question X. Of your capital expenditures for R&D in FY 20XX, how much was spent for each of the following categories?

	R&D expenditures (Dollars in thousands)
a. Land Land acquired for R&D use, including land purchased for building construction.	\$ <input type="text"/>
b. Buildings Buildings constructed or purchased for R&D use. If the building is constructed or purchased for mixed use, please report the estimated proportion of the cost that is for R&D.	\$ <input type="text"/>
c. Machinery and equipment Major (capitalized) machinery and equipment acquired for use in the performance of R&D.	\$ <input type="text"/>
d. Capitalized software Computer software that is used in the performance of R&D for more than one year. Include long-term licenses and the acquisition of computer software, as well as production costs for internally produced software.	\$ <input type="text"/>
e. Other intellectual property products Purchased patents, long-term licenses, or other intangible assets used in R&D and which are in use for more than one year.	\$ <input type="text"/>
f. Total¹	\$ <u>TOTAL</u>

¹ The column total is automatically generated on the Web survey.



Potential new content areas: Full-time equivalents working on R&D (1)

- HERD has collected head counts of R&D principal investigators and other personnel since FY 2010
- International comparisons of R&D personnel are made using full-time equivalents (FTE)
- NSF considering adding a question to collect FTE for R&D in addition to head counts

Potential new content areas: Full-time equivalents working on R&D (2)

Question X. Approximately how many (paid) full-time equivalents (FTEs) worked on research activities in FY 2016?

FTE research personnel are calculated as the total working (paid) hours spent working on research during a specific reference period (usually a calendar year) divided by the number of hours representing a full-time schedule within the same period.

For example, if you have 3 people working 20, 30, and 40 hours in a week on research activities and a full-time schedule is 40 hours a week at your institution, your research FTE calculation is $(20 + 30 + 40)/40 = 2.25$ FTE.



a. Researchers

Professionals engaged in the conception or creation of new knowledge.

FTEs

b. Technicians and other support personnel

Staff who work under the supervision of researchers to conduct research activities or who provide direct support services for the research project.

FTEs

c. TOTAL

FTEs



Other Issues Under Consideration

- Criteria for campus level reporting
- Improving consistency of institution funding and personnel counts across institutions
- Separate category to report other sponsored activities
- Separate reporting for R&D expenditures at foreign satellite campuses



Open Forum

- Reactions to planned or potential changes?
- What additional areas on HERD would you like to see changed or refined?
- Other questions or concerns?



Next Steps

- A workshop will be held later this year to continue discussion of the new content areas and other issues
- Additional site visits and phone interviews with institutions to test potential new questions
- Your feedback is welcome anytime!



Thank You!

Contact:
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