

U.S. R&D Investments

RESEARCH AND EXPERIMENTAL DEVELOPMENT (R&D) TRENDS IN GOVERNMENT, INDUSTRY, HIGHER EDUCATION, AND FEDERAL RESEARCH CENTERS REPORTED BY THE NATIONAL CENTER FOR SCIENCE AND ENGINEERING STATISTICS (NCSES)

THE IMPORTANCE OF R&D



As a core driver of scientific discovery and innovation, R&D is needed to foster scientific and technological breakthroughs, build upon existing knowledge, assemble a competitive workforce, and develop the processes, services, and products that move our nation forward.

Recognized as one of the world's leading providers of statistical data on the U.S. science and engineering (S&E) enterprise, NCSES provides insight into the nation's R&D performance and funding, the S&E labor force, STEM education, innovation, the nation's global standing, and other important indicators.



To help our country identify meaningful trends and important benchmarks in R&D performance and funding, NCSES annually collects and assembles data from its collection of surveys to track activity across numerous organizations.

NCSES is also a global authority in the international R&D data community as well as an active participant in the Organisation for Economic Co-operation and Development and in other multicountry measurement efforts.

NOTABLE R&D DATA

U.S. R&D spending is presently expanding at a strong pace annually. This spending totaled **\$606 billion** in 2018 and has been estimated to have increased to



In 2018, R&D performed by businesses with 10 or more employees in the domestic United States totaled **\$441 billion**, and an additional **\$4 billion** was performed by businesses with 1 to 9 employees. Of this, **\$381 billion** was funded by the companies themselves, which included their foreign subsidiaries. The remainder came from other funding sources, including the following:

- The federal government
- Foreign parent companies of U.S. subsidiaries
- Unaffiliated companies
- U.S. state government agencies
- U.S. universities and colleges
- Various other organizations located inside and outside of the United States

The federal government was the largest source of funds for the R&D performed by higher education institutions in 2018, but it directed more of its annual total of R&D funding to support federal performers, including federal intramural agencies and federally funded research and development centers (FFRDCs).

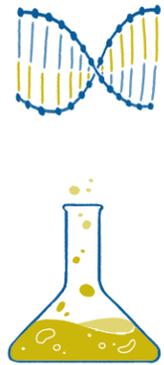


National Center for Science and Engineering Statistics (NCSES)

For more information about NCSES's products and data collection process, visit <https://nces.nsf.gov>, or explore our National Patterns of R&D Resources page at <https://www.nsf.gov/statistics/natlpatterns/> to learn more about national and international R&D performance and funding.

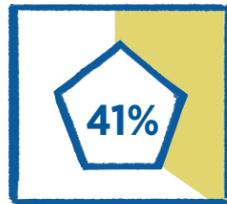
THE INFLUENCE OF R&D IN...

U.S. FEDERAL AGENCIES

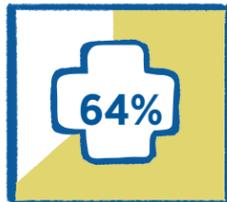


Among the various S&E fields, life sciences received the most federal obligations for research in FY 2019, while physical sciences have seen consistently high percent increases over the past couple of years. The largest obligation for basic research in physical sciences came from the National Aeronautics and Space Administration (NASA) in FY 2019.

The Department of Defense (DOD) outspends all other agencies on R&D, accounting for **41%** of all these obligations in FY 2019.



As the second highest spender on R&D, the Department of Health and Human Services (HHS), which includes the National Institutes of Health, provided **64%** (**\$21.6 billion**) of the R&D support for colleges and universities in FY 2019.



The Survey of Federal Funds for R&D

collects and reports data on federal investments in R&D by

FUNDING AGENCIES | FIELDS WITHIN S&E | GEOGRAPHIC LOCATIONS | TYPES OF PERFORMERS | FUNDING TO FFRDCs | TYPES OF R&D

LARGE AND SMALL BUSINESSES



A total of **\$114.5 billion** was spent on health or medical R&D applications in 2018, which accounted for **26%** of the total of R&D performed by businesses in the United States that year.

Investments made on software R&D have grown at a higher rate than overall business R&D expenditures for more than a decade. This includes dollars spent on semiconductor manufacturing and software publishing.



Small to medium companies (10 to 249 domestic employees) performed **11%** of the nation's total business R&D in 2018 and employed **17%** of the **1.8 million** employees engaged in business R&D in the United States. Micro-businesses (1 to 9 domestic employees) performed **1%** of all business R&D.

The Business Enterprise Research and Development Survey and the Annual Business Survey

collect and report R&D data for both large and small businesses, respectively, by

FUNDING SOURCES | BUSINESS ACTIVITY CODES | TOTAL CAPITAL EXPENDITURES | R&D EMPLOYMENT | INDICATORS OF INNOVATION | R&D PERFORMANCE | GEOGRAPHIC LOCATIONS | TECHNOLOGY FOCUS AND APPLICATIONS | TYPES OF COSTS | TYPES OF R&D

HIGHER EDUCATION

In FY 2019, the total of R&D expenditures at U.S. higher education institutions was **\$83.7 billion**, an increase of **\$4.5 billion**, or **5.7%**, since the prior year. Federally funded R&D to universities saw its largest percent increase since FY 2010 to FY 2011.



53% of the growth in R&D expenditures for FY 2019 went to biological, biomedical, and health sciences.

Academic research performers have remained largely the same from FY 2017 to FY 2019. The five universities with the highest R&D spending included the following:

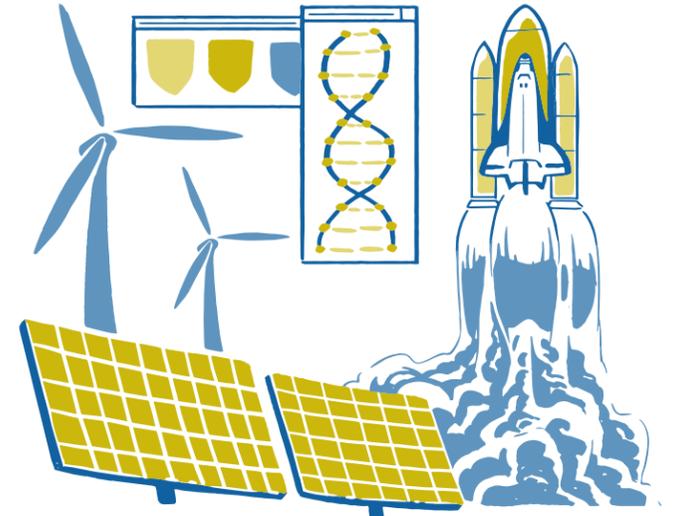
- Johns Hopkins University
- University of Michigan, Ann Arbor
- University of California, San Francisco
- University of Pennsylvania
- University of Washington, Seattle

The Higher Education Research and Development Survey

collects and reports data on R&D expenditures at U.S. colleges and universities by

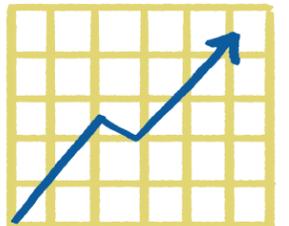
FUNDING SOURCES | FIELDS WITHIN AND NOT WITHIN S&E | GEOGRAPHIC LOCATIONS | INSTITUTIONAL CHARACTERISTICS | TYPES OF COSTS | TYPES OF R&D

FEDERAL RESEARCH CENTERS



In FY 2019, FFRDC R&D expenditures totaled **\$22.7 billion**, **\$22.3 billion** of which was funded by the federal government. On its own, the Department of Energy contributed more than **\$11 billion**, while DOD, NASA, and HHS provided more than **\$1 billion** each.

When adjusted for inflation, total FFRDC R&D expenditures rose an average of **3.4%** from 2014 to 2019. This includes a **5.5%** increase from FY 2018 to FY 2019.



The FFRDC Research and Development Survey

collects and reports R&D expenditures at FFRDCs by

FUNDING SOURCES | FUNDING AGENCIES | TYPES OF COSTS | TOTAL OPERATING BUDGET | TYPES OF R&D



National Center for Science and Engineering Statistics (NCSES)

For more information about NCSES's products and data collection process, visit <https://nces.nsf.gov>, or explore our National Patterns of R&D Resources page at <https://www.nsf.gov/statistics/natlpatterns/> to learn more about national and international R&D performance and funding.