

FY2019



THE UNIVERSITY OF  
TENNESSEE  
KNOXVILLE

OFFICE OF RESEARCH & ENGAGEMENT

# ANNUAL REPORT



It's an exciting time to be a Tennessee Volunteer!

The University of Tennessee, Knoxville's research enterprise boasts a robust portfolio with excellence in scholarship and creative activity across its 11 colleges and the UT Space Institute. With research at the core of the educational experience, our students and faculty are equipped to address the global grand challenges ahead.

UT faculty and students are recognized nationally and internationally for their excellence in research, scholarship, and creative activity. In fiscal year 2019, faculty members received seven National Science Foundation CAREER awards, an American Council of Learned Societies fellowship, and a European Union Collaborative fellowship.

Our students set a new record for Fulbright US Student Program awards as 19 were selected to study, conduct research, and teach in cities around the world. Our students also earned two Goldwater Scholarships and three Boren Scholarships.

Grant Rigney, a Haslam Scholar and Neyland Scholar majoring in chemical and biomolecular engineering, became UT's eighth Rhodes Scholar.

Research expenditures stayed stable during a turbulent year for federal funding, which is our largest source of award dollars. The US Department of Energy and the National Science Foundation remain our top sources for research funding, and the Office of Research and Engagement continues to seek opportunities to diversify federal funding.

Researchers from the Tickle College of Engineering were awarded \$1.5 million from the US Department of Defense to study the potential of neural networks to change the way the DOD operates. The National Institutes of Health awarded researchers in the Departments of Nutrition and Psychology \$2.8 million to examine a potential medical treatment for obesity. An associate professor of nursing secured \$1.5 million from the National Institute of Nursing Research to investigate the impact of concurrent hospice care compared to standard hospice care in improving continuity and quality of pediatric end-of-life care.

Everywhere you look, UT is there—expanding knowledge and innovating for tomorrow.

**Matthew Mench**  
Interim Vice Chancellor for Research



UT  
RANKS **#3**

among peers and aspirants  
citations-per-faculty score

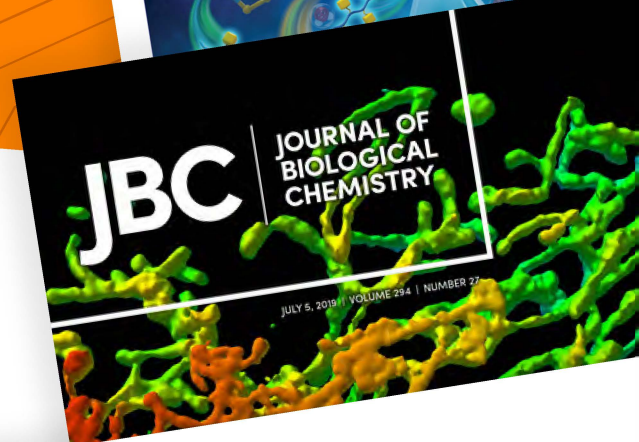
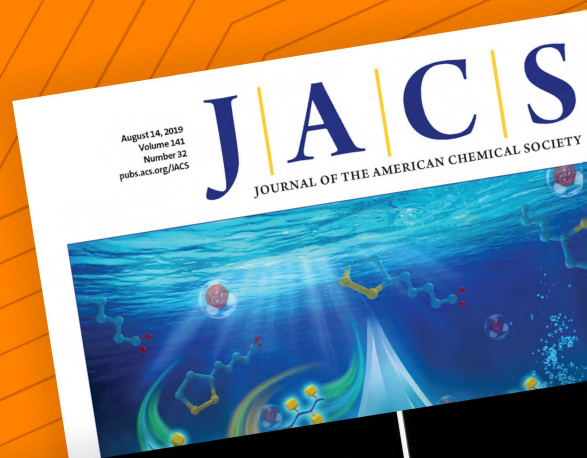
## PUBLICATIONS & CITATIONS

Our internal analysis of publication data\* reveals that the university's number of publications increased considerably from 2015 to 2019. Specifically, the number of journal articles produced by UT authors in 2019 increased by 34% in Scopus and by 24% in Web of Science databases when compared to journal articles produced in 2015. Cumulative bibliometrics like citation counts and h-indices indicate a high quality of publications produced by UT's research community of scholars.

External rankings of publication activity support these findings. According to the 2019 Times Higher Education World University Rankings, UT's citation score ranks third among its official peers and aspirants, ahead of all but the University of Wisconsin and the University of Minnesota. THE also lists UT 39th in citation score among 115 public U.S. academic institutions.

The 2019 Quacquarelli Symonds World University Ranking ranks UT's citations-per-faculty score 28th among 185 North American universities—first among all UT's official peer and aspirant schools—and 81st among 1,019 universities ranked by QS world-wide.

\* ORE draws publication and citation data from three most prominent abstract and citation databases of research literature: Web of Science by Clarivate Analytics (formerly Thomson and Reuters), Scopus by Elsevier, and Dimensions by Digital Science.





# RESEARCH ENGAGEMENT

In the 2018-19 academic year, nearly 4,500 students participated in undergraduate research both inside and outside the classroom, which represents a 14 percent increase over the previous year.

**EURēCA**, the Exhibition of Undergraduate Research and Creative Achievement, is an annual event that showcases research and creative activity by currently enrolled undergraduate students in collaboration with a faculty mentor from UT Knoxville or the UT Institute of Agriculture. In 2019 more than 1,000 students presented their research and 114 projects were recognized at the EURēCA awards event.

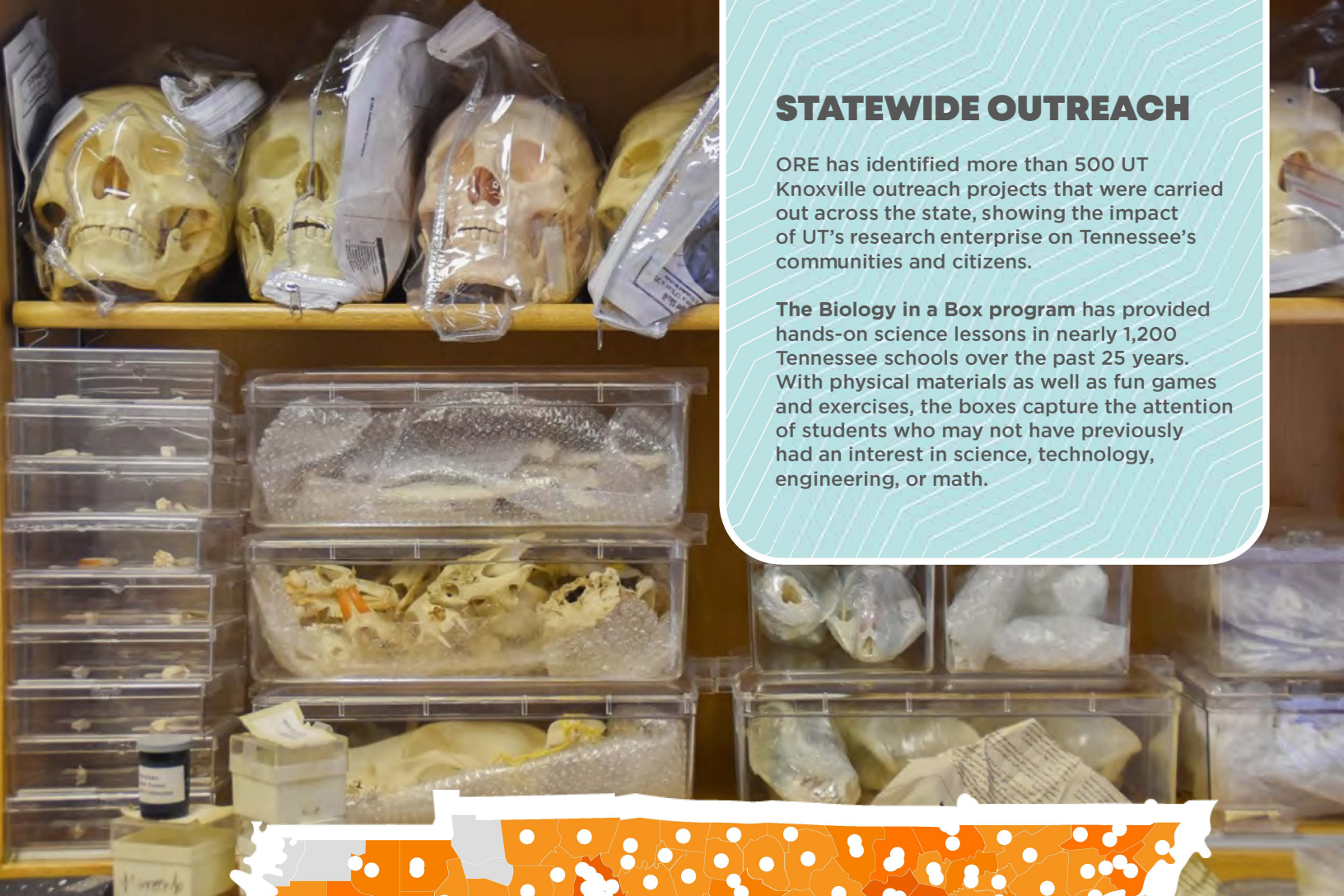
Every year, **Posters on the Hill** invites 60 students from across the country to present their undergraduate research on Capitol Hill in Washington, DC. This year, UT junior Alexander Tripp was a member of that exclusive group and presented his project “Modern Chinese Development of Latin America” to legislators. Tripp is the fifth UT student in the past five years to participate.



The **Undergraduate Awards** is the world's largest international academic awards program, recognizing excellent research and original work across the sciences, humanities, business, and creative arts. Siori Koerner, a May 2018 graduate, was named Highly Commended in the literature category, which recognizes the top 10 percent of students globally in that discipline.



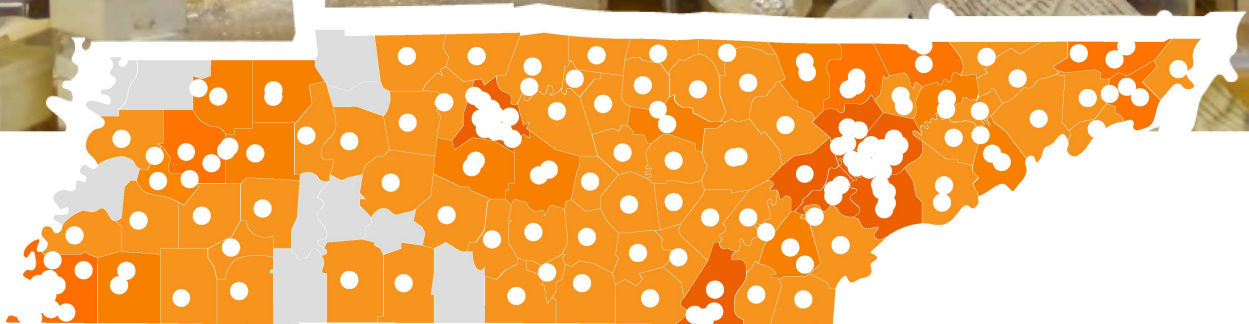




## STATEWIDE OUTREACH

ORE has identified more than 500 UT Knoxville outreach projects that were carried out across the state, showing the impact of UT's research enterprise on Tennessee's communities and citizens.

The **Biology in a Box** program has provided hands-on science lessons in nearly 1,200 Tennessee schools over the past 25 years. With physical materials as well as fun games and exercises, the boxes capture the attention of students who may not have previously had an interest in science, technology, engineering, or math.



## CORE FACILITIES PROGRAM

UT currently has 18 core facilities that provide high-end instrumentation, technical support, and expert consultation to the University of Tennessee research community and, in many cases, to external customers as well.

UT's core facilities supported more than 350 sponsored projects representing \$140.5 million in total anticipated awards.



**13,706**  
Hours of service



**19,918**  
Samples processed



**232**  
Publications including an acknowledgment of support by a core facility



**17**  
Oral and poster presentations using data generated in core facilities



# DATA SUMMARY

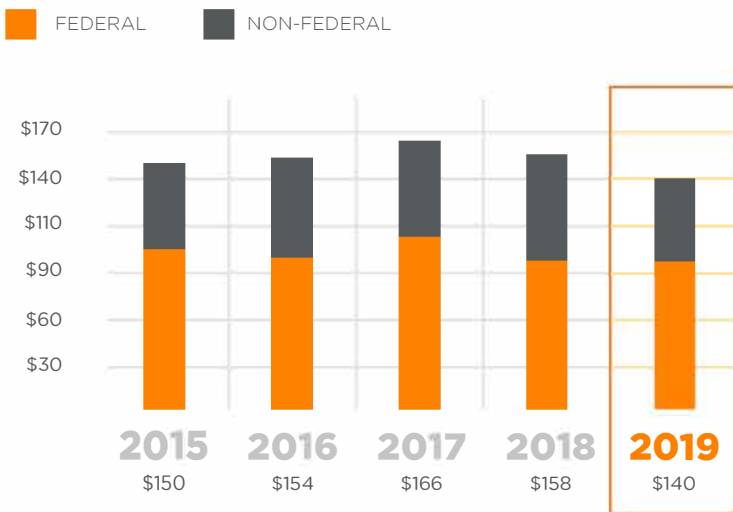
## Fiscal Year 2019

The data for this report includes research expenditures from the University of Tennessee, Knoxville, and the UT Space Institute for the fiscal year ending June 30, 2019, as reported to the National Science Foundation Higher Education Research and Development Survey. More than half of all colleges showed an increase in the proposal amount requested and nearly half reported an increase in the total number of proposals submitted over fiscal year 2018.

Several technology transfer metrics also marked significant increases. UT Knoxville and UTSI faculty contributed to a 9 percent increase in the number of patents filed, resulting in a 15 percent increase in the number of patents issued over fiscal year 2018. Also on the rise was the number of invention disclosures, with a 9 percent increase over fiscal year 2018.

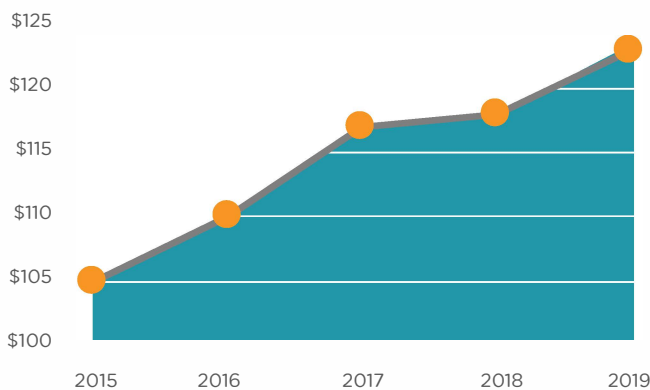
## Sponsored Research Funding by Sponsor Type

(\$ IN MILLIONS)



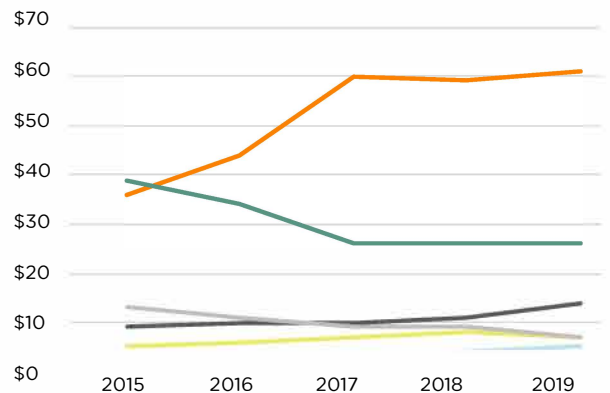
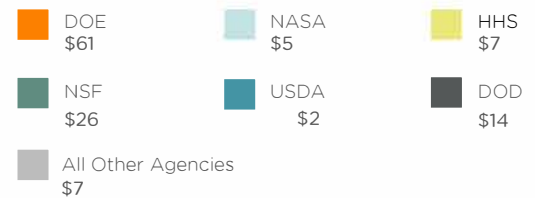
## Federal Research Expenditures

(\$ IN MILLIONS)



## Federal Research Expenditures by Agency

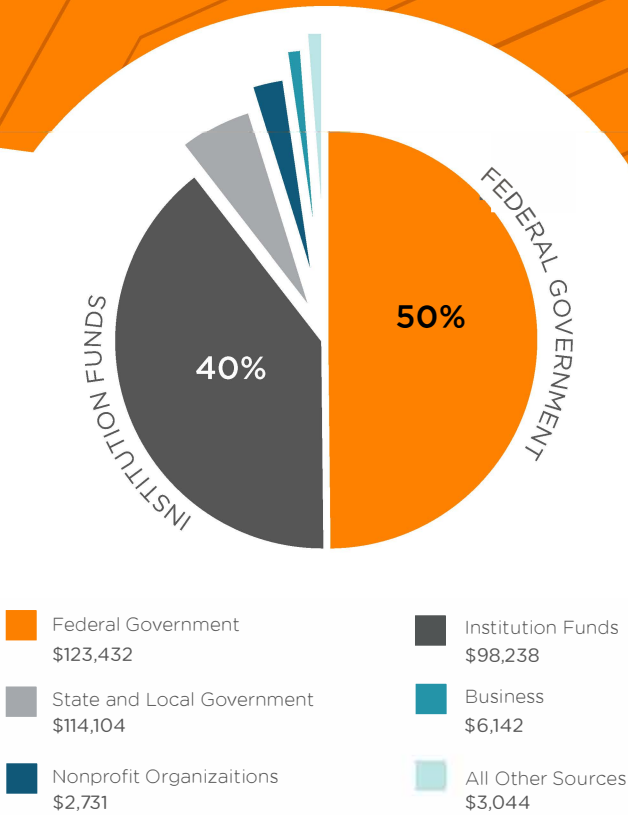
(\$ IN MILLIONS)





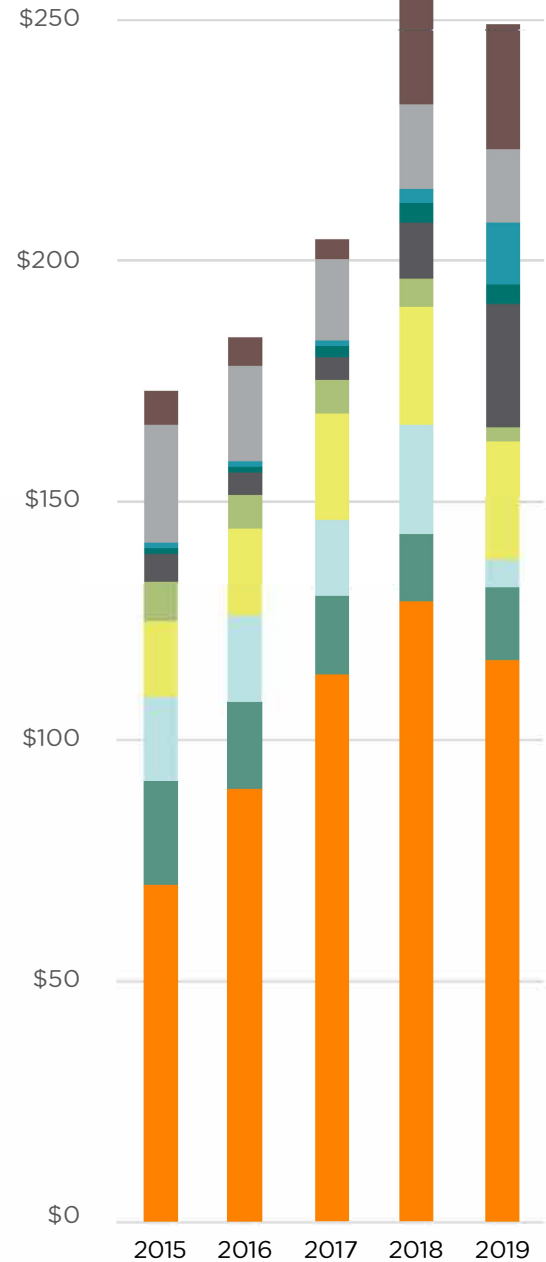
## Total Research Expenditures by Source of Funds

(\$ IN THOUSANDS)



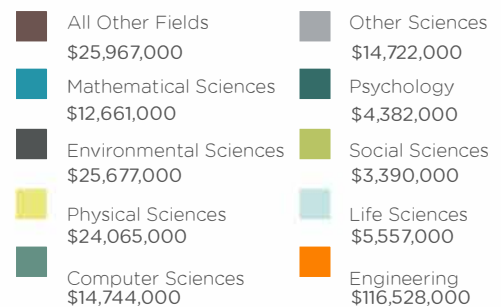
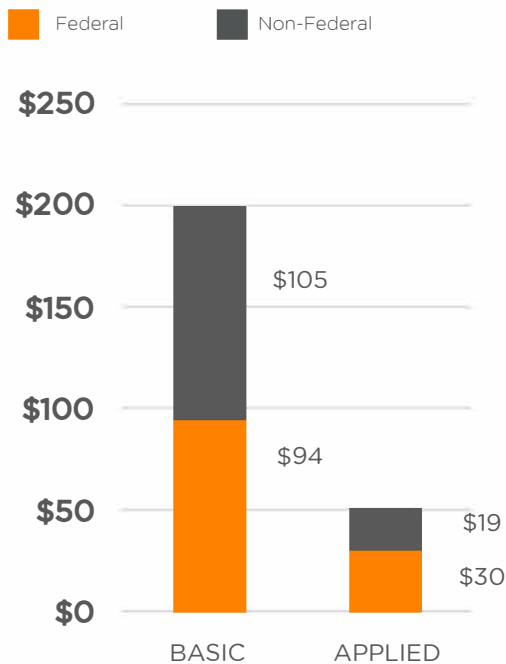
## Total Research Expenditures by R&D Field

(\$ IN MILLIONS)



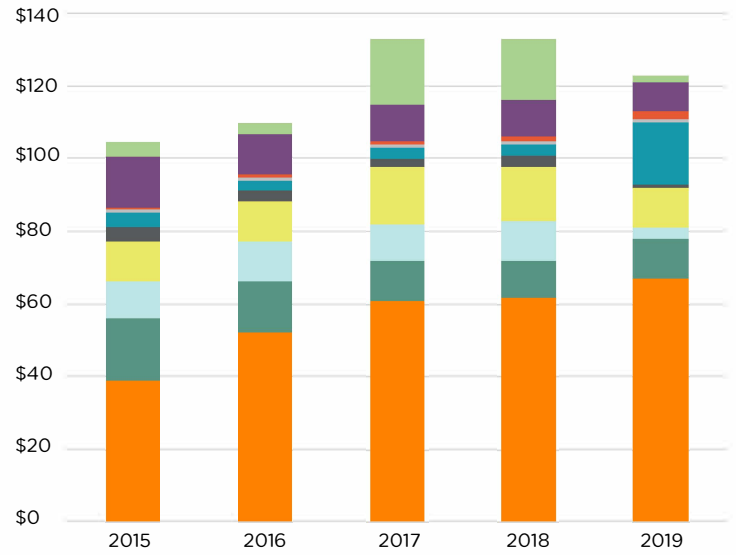
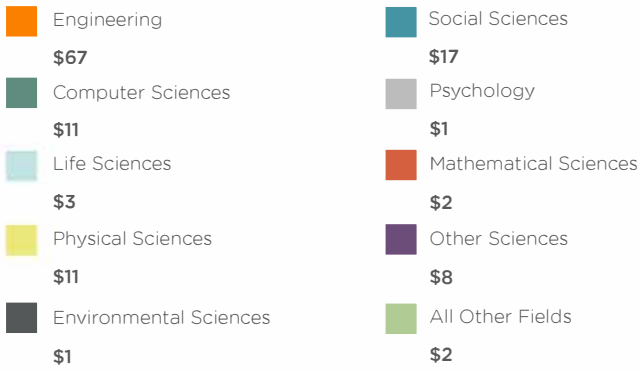
## Total Research Expenditures by Types of Research

(\$ IN MILLIONS)

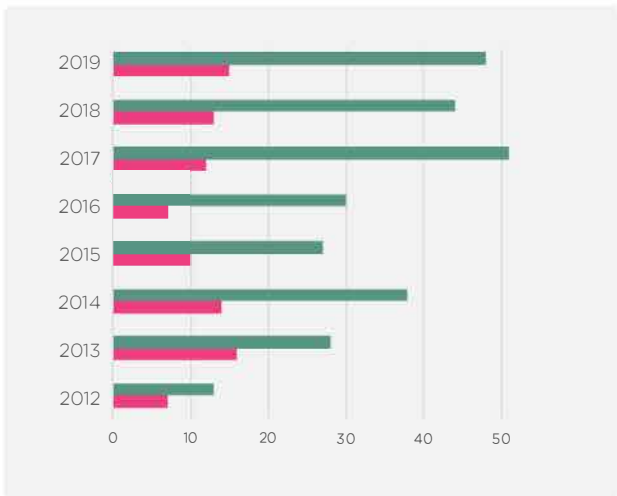




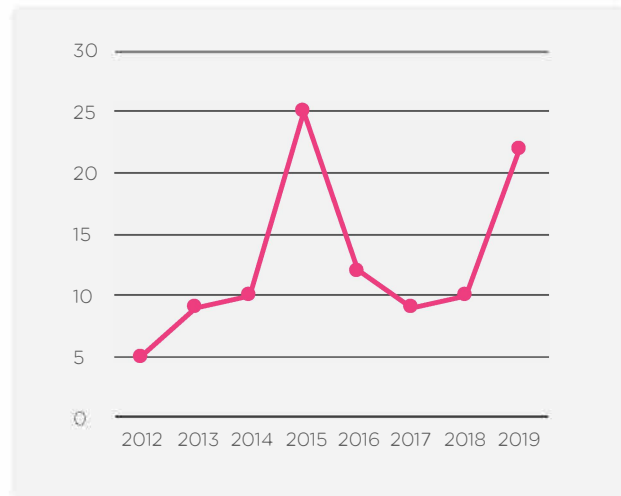
## Federal Research Expenditures by R&D Field (\$ IN MILLIONS)



## Technology Transfer

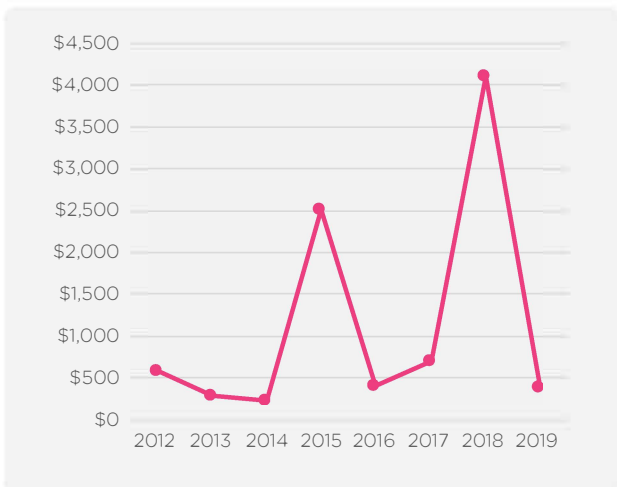


## Licenses and Options

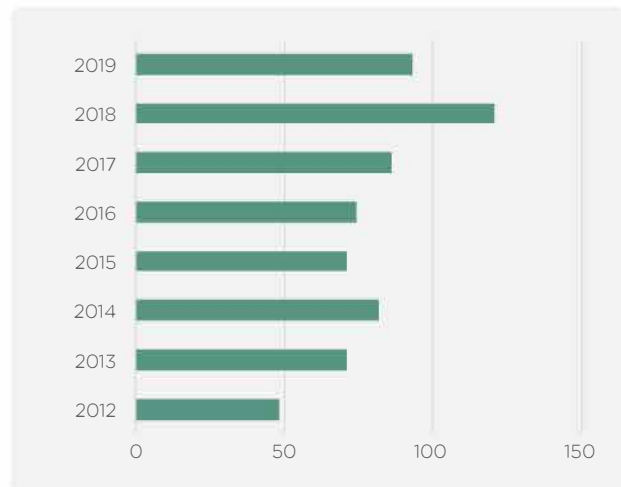


## Revenue

(\$ IN THOUSANDS)



## Invention Disclosures





Since 2012, UT has  
launched 8 student and  
faculty startups





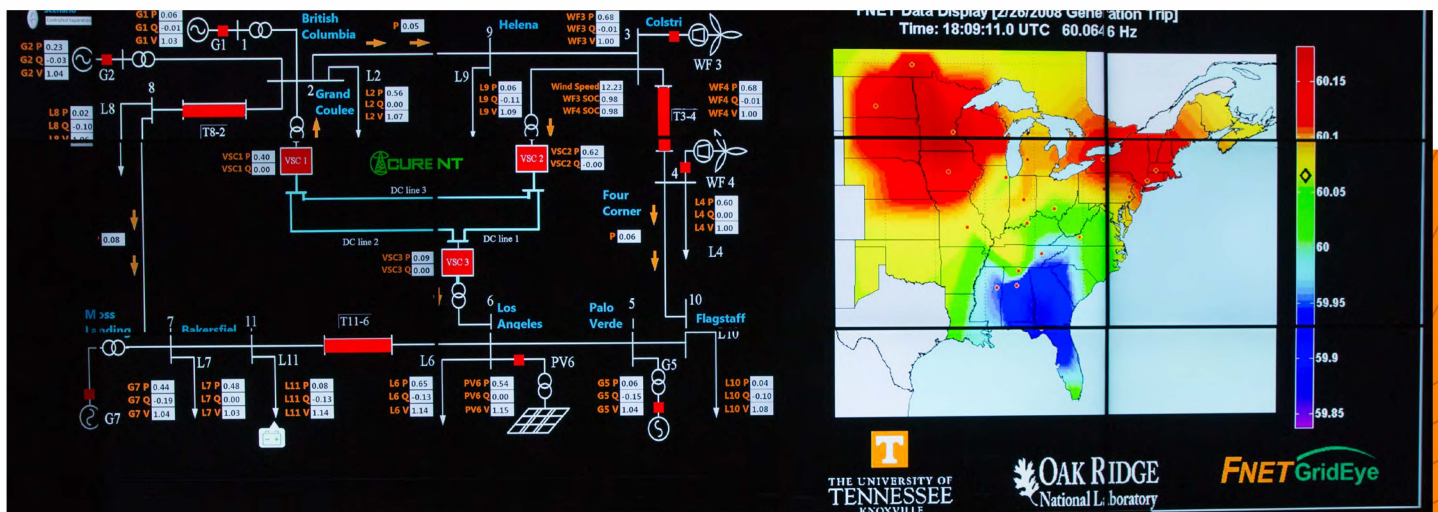
## RESEARCH FOCUS AREAS

The Office of Research and Engagement has identified three areas of strength with strong multidisciplinary components. These research focus areas have long-established external partnerships and the availability of public and private investments aimed at maximizing outcomes.

Advanced Materials & Manufacturing

Computation & Data Sciences

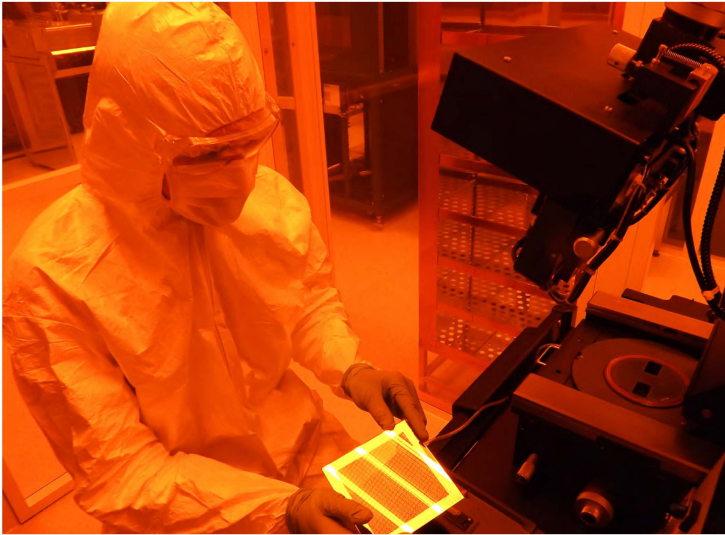
Energy Science & Technology





UT also boasts four areas of research distinction, which are well-established regional and national assets that surpass the capabilities of many of our peers.

- Forensic Anthropology
- Nuclear Sciences
- Conservation & Biodiversity
- Humanities & Artistic Expression



The three emerging research areas highlighted below are our newest areas of investment and growth, and were established based on growing demand from regional and national partners.

- Quantum Sciences
- Hypersonics & Aerospace Engineering
- Healthy Communities & Outcomes







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