



TEXAS TECH UNIVERSITY

Office of the Vice President
for Research

ANNUAL

Report

2015

Welcome



Dear Colleagues and Friends,

This is a very exciting time. Texas Tech University is on the verge of establishing itself as a major public research university.

We saw many successes during 2015. From 2013 through 2015, our research expenditures, numbers of proposals written and awards received have all increased. These increases are the direct result of our superior faculty. Most universities have seen their externally-funded research decline over the last two years. But here at Texas Tech during that time, our awards have increased by 40%.

Texas Tech is focused on transforming education and scholarship through innovation. We were one of only fourteen universities to be recognized as an Innovation and Economic Prosperity University (IEP) by the Association of Public and Land Grant Universities in 2014. Our commitment to innovation and the economic prosperity of our region continues to strengthen. To support this vision, and to better serve our faculty, staff and students, the Office of the Vice President for Research (OVPR) recently went through an internal reorganization.

From assisting our faculty in crafting successful competitive funding proposals to improving our research infrastructure, the OVPR has put into place numerous programs and initiatives that will enhance the university's national prominence, and contribute to the economic prosperity of our region and country. This 2015 OVPR Annual Report outlines these strategies and initiatives and celebrates some of our major accomplishments.

I am delighted to report that Texas Tech University has been duly recognized nationally at the highest levels for our sustained research growth and excellence over the last half-decade. Recently the Carnegie Foundation advanced Texas Tech University into their 'R1: Highest Research University' classification! This designation places Texas Tech among the top 115 out of over 600 universities that are engaged in research at some level nationally, and this recognition of our excellence makes it easier for us to recruit and retain top faculty members, to attract outstanding students, and it directly increases the value of every degree that is earned from Texas Tech University!

I can't say enough about the outstanding talent and dedication of our faculty, students and staff. They are the heart of our success. I'm proud to be part of the Red Raider family. I'm excited about our very bright future that is ahead of us in our research and creative works, and the impact that this will have on the comprehensive educational experience for all of our students.

A handwritten signature in black ink that reads "Robert V. Duncan". The signature is fluid and cursive.

Robert V. Duncan, Ph.D.
Senior Vice President for Research
Professor of Physics

Research by the Numbers

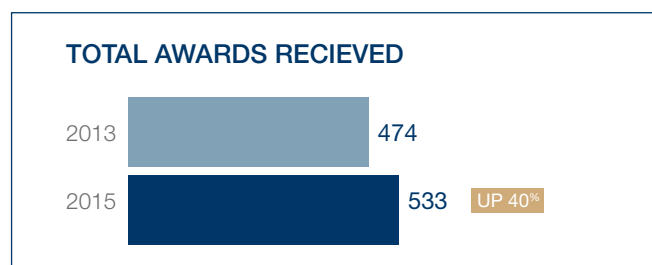
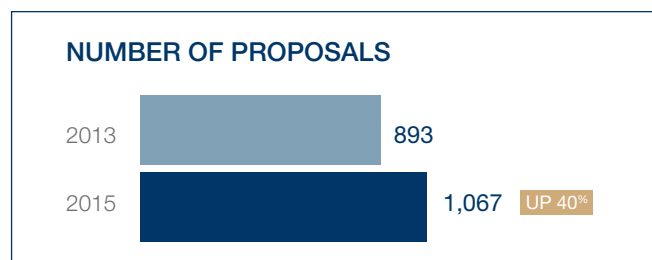
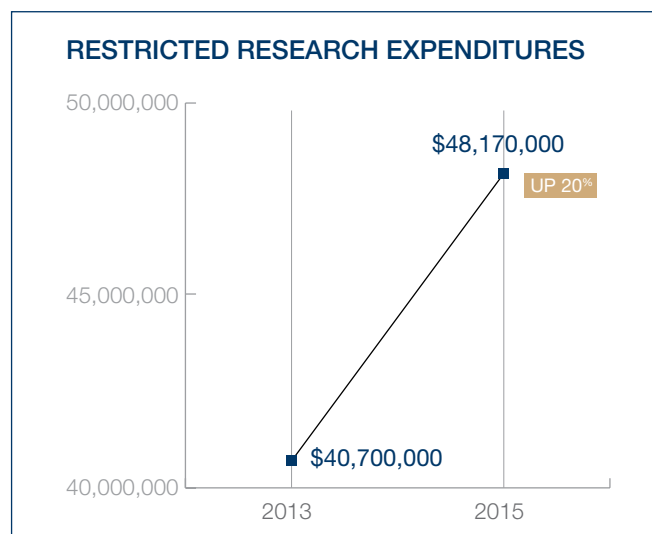
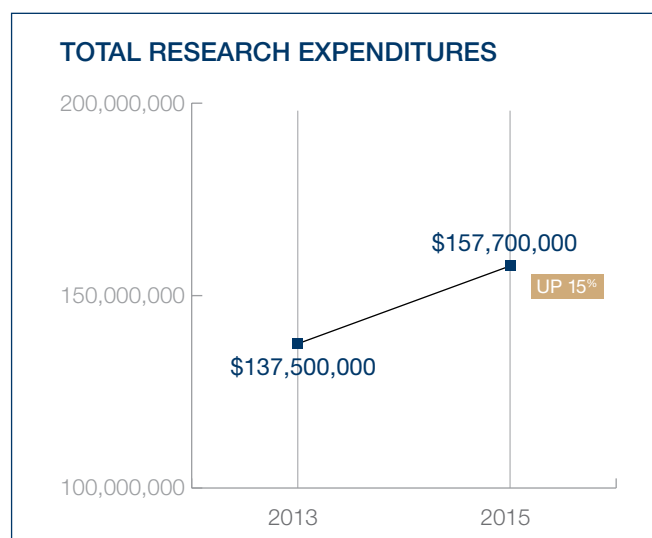
Texas Tech's research success is evident in our numbers for 2015. It also is evident in the prestigious body of scholarly work in the creative and visual arts, the humanities and the social sciences. Genuinely effective national universities are those balanced in their commitments to research, scholarship and creative activity.

All key research metrics have shown steady increases since 2013. This success comes at a time when federal funding is flat or declining.

Total research expenditures have increased from \$137.5 million in 2013 to \$157.7 million in 2015, a 15 percent increase. Restricted research expenditures also grew from \$40.7 million to \$48.7 million, or 20 percent in the same time period. The number of proposals to external funding agencies and sources shows a 19 percent increase from 893 to 1,067. Most remarkably, our total awards are up 40 percent, and the federal component of our research awards is up 11 percent.

The university also is showing progress in the number of inventions disclosed and license agreements signed. Texas Tech licensing revenue has grown from \$358,000 in 2013 to more than \$525,000 in 2015. That is an increase of 38%!

*(Complete research metrics are available in Appendix A.)



OVPR Strategies for Research Growth

During 2015, the Office of the Vice President for Research (OVPR) developed a set of strategies designed to increase Texas Tech University's research funding, particularly federal funding, enhance the university's national prominence, and expand our role in the region's and nation's economic prosperity. These strategies are designed to continue the successes the university has seen since 2013.

Strategy 1: Promote Faculty Success and Increase National Prominence

Strategy 2: Improve Research Infrastructure

Strategy 3: Expand Economic Prosperity and Innovation

Promote Faculty Success and Increase National Prominence

The success of our faculty naturally increases the university's national prominence. It is incumbent on the OVPR to provide the support necessary for faculty to win competitive funding awards. Federal agencies are now more interested in funding proposals from multi-disciplinary research groups

and/or multi-institutional proposals that focus on solving major societal problems, rather than the traditional single-investigator proposal that typically centers on making incremental progress in a single discipline. Texas Tech is in the midst of a focused cluster hiring program designed to bring highly productive researchers to the faculty. Researchers with established funding portfolios also are being sought for key positions outside the cluster areas. Texas Tech has committed to hire 31 new research faculty members within extended and often interdisciplinary groups with a proven track record of extramurally funded research success. We have also created a number of new 'stimulus' programs to assist our existing faculty as they prepare competitive proposals to major funding agencies, often with the assistance of dedicated grant editors.

The OVPR is examining faculty workload issues to identify needs and barriers to increased external funding proposals. An IRB-approved campus-wide faculty survey was completed in late 2015. The OVPR is in the process of analyzing the results and formulating plans to address key issues.

- *Two institutional committees are instituting procedures that should make the submission and review of human subjects and animal use protocols more efficient.*
- *The Institutional Review Board moved its protocol submission system to the Cayuse electronic system. This is the same system the Office of Research Services uses for all proposal submissions. The new electronic process should be easier and faster for faculty and students.*
- *The Institutional Animal Care and Use Committee developed on-demand video generic*

training to allow animal users to complete the training in a more timely and user-friendly manner. The committee also has developed a new user-friendly, fillable form to ease protocol submissions.

There are continuing efforts to facilitate multidisciplinary and multi-institutional collaboration and strategic research advancement.

- *The President's Collaborative Research Initiative is designed to enhance collaboration and expand funded interdisciplinary federal research across Texas Tech, the Texas Tech University Health Sciences Center and the Texas Tech University Health Sciences Center El Paso.*

- *The Faculty Research Club continues monthly meetings to provide a social setting to stimulate interdisciplinary research collaborations.*

- *The OVPR has put programs in place to assist faculty in submitting successful competitive grant proposals.*

- *The Scholarship Catalyst Program promotes faculty research, scholarship and creative output in the arts, humanities and social sciences.*

- *The Early Investigator Faculty Proposal Development Workshop provides tailored instruction on writing grant proposals.*

- *The Proposal Review Program offers feedback on grant proposals to improve quality before submission to an agency.*

- *The Proposal Support Program is a newly established program to provide funds to support collection of pilot data, travel to a funding agency and required agency matching funds.*

The Research Development Team (RDT) works with Texas Tech researchers to form new on-campus research working groups, facilitating proposal development, as well

as assisting collaborations across campus, the state, the nation and internationally. RDT also meets one-on-one with new faculty to assist with finding grant opportunities and identify collaborative opportunities as well as resources and tools through the OVPR. The team also has established Swift Critique and Appraisal Notation (SCAN) sessions to assist faculty with revision and resubmission. A team of grant editors is also available through RDT to help fine-tune proposals.

Faculty recognition plays an important role in increasing the national prominence of the university. The Targeted External Faculty Awards Program continues to identify faculty for selected national and international awards to increase the visibility and reputation of the both the faculty member and the university.



Improve Research Infrastructure

In order for Texas Tech to continue its research success, it is necessary to build new and renovate existing facilities. The current Experimental Sciences Building (ESB) has undergone restructuring and is now fully utilized. Approximately 9,000 square feet of space in the ESB is currently in use by engineering faculty members who are awaiting a return to refurbished laboratory space along the Engineering Key. Planning is underway for a second Experimental Science Building to provide new, state-of-the-art research space.

The opening of the Texas Tech University Innovation Hub at Research Park is a symbol of the university commitment to economic innovation. The facility provides research and office space for start-up companies and of our existing public-private partnerships with industry. Chromatin, a



major agribusiness in sorghum seed development, has moved its research and development efforts from Illinois to Lubbock, and into the Innovation Hub. The Inno-

vation Hub also is designed with students in mind with the new Raider Base Camp, a space for students involved in entrepreneurial groups on campus or interested in starting their own businesses. The area provides work space and meeting areas to facilitate collaboration with fellow students and entrepreneurs through efforts such as the 3-Day Startup Weekends, Texas Tech Innovation, Mentorship, and Entrepreneurialism (TTIME), and the Texas Tech Startup Accelerator.

Financed in part by a major gift from Bayer CropSciences, the new \$14.3 million Bayer Plant Science Building opened in late 2015, providing students and faculty with a state-of-the-art facility to learn and excel in this important area of research. Bayer CropScience also opened its new Seeds Innovation Center on the campus in September. The facility also is now home to the company's global cotton business operations. This \$55 million dollar public-private partnership, equally funded by Bayer CropScience and the State of Texas, provides unprecedented opportunities and an excellent environment for our researchers to excel, and for our students to learn cutting-edge techniques.

Renovations for designated research space along the Engineering Key are underway with construction in progress on the new Engineering and Materials Research Center. A second 98,000 square-foot experimental sciences building is being designed now, and the Reese Center, once a USAF Base, is now home to forefront Texas Tech research, ranging from wind energy and wind hazard mitigation, to new non-woven cotton technologies, to advanced research in infectious disease mitigation and prevention.

Expanding Economic Prosperity and Innovation

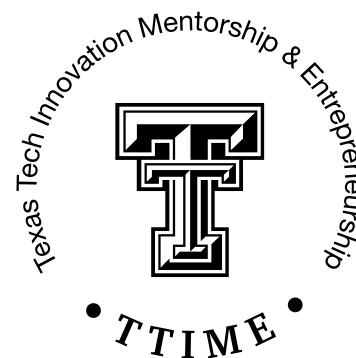
Universities should reach beyond their traditional strengths in basic research and develop a culture of translational research as well. Texas Tech is making progress in this area, as evidenced by its Innovation and Economic Prosperity designation from the Association of Public and Land-grant Universities (APLU) in 2014. The designation recognizes the university's engagement in an array of economic development efforts. As the university strives to increase its technology transfer activities, the Office of Research Commercialization was moved under the Office of the Vice President for Research at the end of 2014 to better serve faculty commercialization needs.

The opening of the Innovation Hub at Research Park marked a major step forward for Texas Tech's economic prosperity and innovation mission. The facility has become a vital resource for the faculty and students of both Texas Tech University and the Texas Tech University Health Sciences Center, as well as community members connected to Texas Tech interested in launching new ventures. This facility will also attract and anchor major new businesses to Lubbock through public-private partnerships with Texas Tech, such as our efforts with Chromatin from Illinois, and with NFR, Inc. from Seattle.

The university continues to strengthen partnerships with the Lubbock Economic Development Alliance (LEDA) and other regional economic development entities. Funding provided by LEDA in late 2014 is being used to facilitate the 3 Day Start-up program; pitch competitions sponsored by the student group Texas Tech Innovation Mentorship and Entrepreneurship; to buy equipment to help outfit a developing makerspace at the Innovation Hub and to support the university accelerator program.

A number of student entrepreneurship groups have been established in areas such as media and communication, engineering, music, and business. These groups are providing educational and networking opportunities for student entrepreneurs. TTIME, a cross-disciplinary entrepreneurial group, serves as an umbrella organization connecting undergraduate and graduate students from all colleges. The first Entrepreneurial and Commercialization Stakeholders Event was held to connect faculty and staff who are supporting these efforts across campus.

The OVPR has established the Entrepreneurial Programs Cluster to coordinate entrepreneurial and commercialization functions in the office. Members of the cluster are the director of Translational Research and Entrepreneurship, the interim director of the Office of Research Commercialization, and the interim director of the Innovation Hub at Research Park.



Year in Review

During 2015, the Office of the Vice President for Research underwent a reorganization to more effectively and efficiently assist faculty, students and staff.



Robert Duncan

Robert Duncan's title changed to Senior Vice President for Research.



Kathleen Harris

Kathleen Harris has moved from senior associate vice president for research over to the Office of Research Services (ORS) to senior vice president for research operations.



Amy Cook

Amy Cook, formerly associate managing director of ORS, was appointed director of the area ORS.



Guy Loneragan

Guy Loneragan was named senior associate vice president for research over enterprise research and centers and institutes reporting to the OVRP.



Carrrie Romo

Carrie Romo is serving as interim director of the Innovation Hub at Research Park. She also continues her duties as part of the Research Development Team.



Russell Thomasson

Russell Thomasson moved from the Office of Research Commercialization (ORC) and was named director of strategic partnerships.



David Snow

David Snow, formerly managing director of intellectual property, was named interim director of ORC.

Accomplishments

Texas Tech hosted representatives of the National Science Foundation for the first ever NSF Day on the campus. NSF Day is designed to give faculty insight and instruction on how to compete for and secure NSF funding for science, engineering and education research. A number of faculty from institutions of higher education also attended the conference.

Texas Tech became part of the Southwest I-Corp node in 2015 with the University of Texas, Texas A&M University and Rice University. The group fosters entrepreneurship that leads to the commercialization of technology previously supported by NSF-funded research.

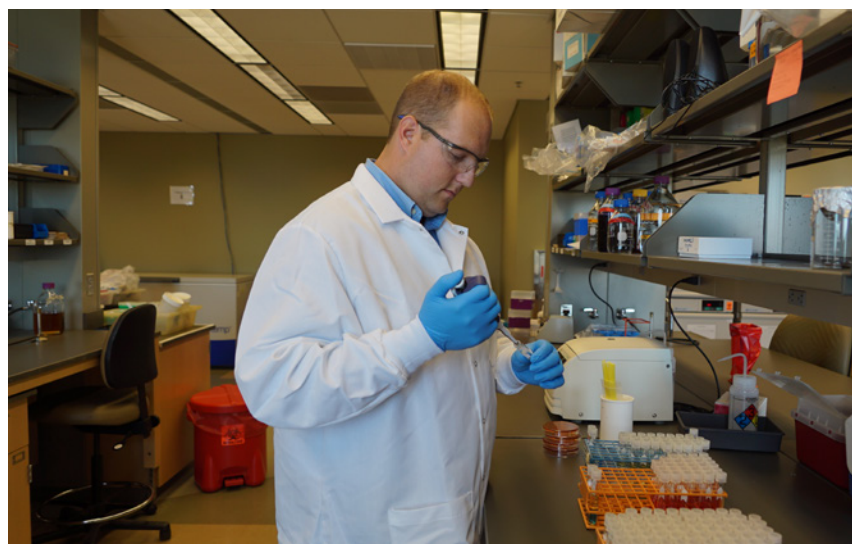
Alice Young, associate vice president for research, served on the new Task Force on Laboratory Safety created by the Association of Public and Land-grant Universities (APLU). The task force will provide research universities with recommendations and guidance on the most appropriate strategies to enhance a culture of laboratory safety.

The U.S. Chemical Safety Board (CSB) closed its investigation into a 2010 explosion that severely injured a graduate student in the Texas Tech University Department of Chemistry and Biochemistry, and recognized Texas Tech's dedication to laboratory safety by accepting the actions TTU has taken to meet the CSB recommendations for continuous improvement of TTU safety policies.

Texas Tech signed an agreement to become a partner in the Lone Star Unmanned Air-

craft Systems Center of Excellence & Innovation (LSUASC). The test site will enable universities and private partners to launch and land Unmanned Aircraft Systems (UAS) to test, develop and evaluate new and emerging technologies.

The university hosted the inaugural meeting of the National Energetic Materials Consortium (NEMC). The consortium, led by Texas Tech, has been formed by key universities across the nation to combine the science and technology resources of the



academic community with the manufacturing resources of private industry. The consortium brings potentially disruptive but critically needed innovation to the energetics sector of the national technological industrial base.

The Texas Tech accelerator graduated its second class of students. The four-month program helps teams learn how to build a new business around Texas Tech University System intellectual property. The teams presented their products to potential investors, companies and regional economic development representatives during the annual Demo Day. The winning teams received an all-expenses paid trip to Colorado to take part in the Denver Startup Week.

Student Success

Five Texas Tech students made up the university's inaugural leadership circle of University Innovation Fellows. The program is designed to increase innovation in higher education. Its administrator, the National Center for Engineering Pathways to Innovation (Epicenter), is funded by the National Science Foundation and directed by Stanford University and the nonprofit VentureWell. The students are trained to become agents of change on the Texas Tech campus, to help other students develop an entrepreneurial mindset and seize opportunities to solve global problems.

A team of Texas Tech University students took first place for their presentation on how to preserve Tibetan heritage and culture at the Tibetan Innovation Challenge held at the Tibet House U.S. in New York City. The five-student team bested five other teams from across the U.S. in presenting a business plan that would help ensure the economic future of Tibetans after their homeland was taken over by China 55 years ago. By winning the TIC, the team will have a chance to travel to India, where many Tibetans fled after the Chinese takeover, to meet the Tibetans and see their plan being put into action.

The 3 Day Startup weekends now have a student leadership team involved in all as-

pects of planning the weekends. The OVPR plans to increase the number of startup weekends it offers in the future and tailor those weekends for specific groups on campus.

TTIME held its first Spring Windup Pitch Competition, with four students receiving prize funding to cover prototyping expenses and travel to entrepreneurial events and competitions.



What We Do

The Office of the Vice President facilitates the ability of Texas Tech's faculty, students and staff to engage in research, discovery, scholarship and innovation.



Research Development

We facilitate collaborations to increase submissions of proposals of significant strategic importance and prestige by coordinating catalytic research events, seminars and workshops. We also assist in developing new on-campus research working groups and help existing groups meet their research development goals. We also assist new faculty in getting started on the road to research by providing a roadmap to OVPR resources, including external funding opportunities.



Faculty Development

We administer numerous programs to provide faculty support in winning competitive research grants. We also administer internal funding opportunities for early-stage proposal development and to provide funding for faculty in the creative arts, humanities and social sciences to increase their national competitiveness. We also promote deserving faculty for targeted fellowships and other awards that garner national prestige for the faculty member and the university.



Research Services

We provide administrative and management services for sponsored projects. Sponsored projects include grants, contracts and cooperative agreements—from both the public and private sectors—which support research, instructional and service projects. We also provide budgeting assistance to researchers submitting proposals and are the final submission mechanism for the university.



Translational Research

We establish programs that create an entrepreneurial mindset, connect innovators across all disciplines and support the expansion of a knowledge-based economy based upon Texas Tech's research capabilities. We operate an accelerator program to assist faculty, staff and students who want to take their ideas and inventions and create viable businesses.



Research Communications

We promote Texas Tech research, scholarship and creative activity to a variety of internal and external audiences including alumni, community leaders and other institutions of higher education using a variety of print, electronic and social media.



Responsible Research

We work collaboratively with the academic community to promote safe, responsible and productive research practices and promote dialogue about ethical concerns that arise naturally from creative endeavors. The area of responsible research incorporates all divisions and committees that support responsible research and compliance at Texas Tech including Environmental Health and Safety, Human Research Protection Program and Animal Care Services.



Technology Transfer

We work with researchers and business partners to translate research discoveries into commercial applications and successfully bring them to the marketplace. We identify, protect, market and license Texas Tech intellectual property, as well as promote entrepreneurship, start-up ventures and economic development for the West Texas community.

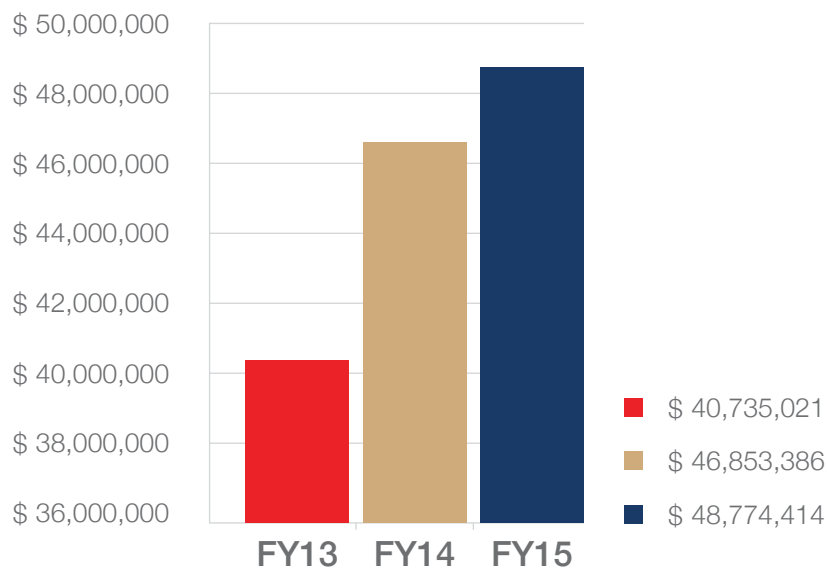
Appendix A

FY 2015 Research Metrics

Institutional Research Metrics

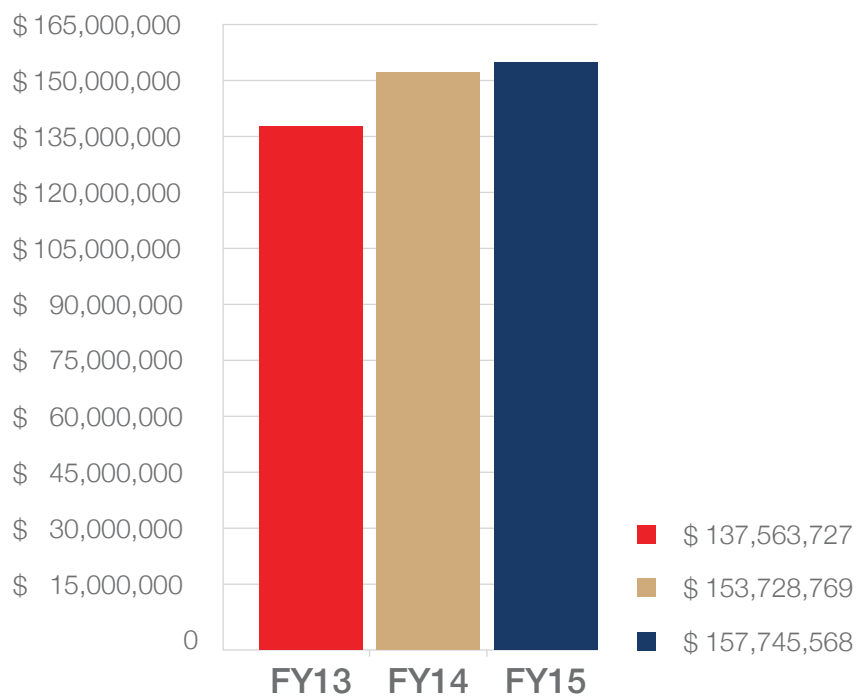
Restricted Research Expenditures

(As Reported to the Texas Higher Education Coordinating Board)

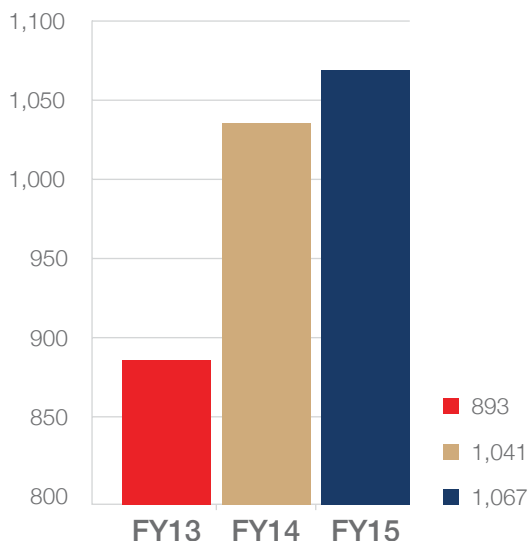


Total Research Expenditures

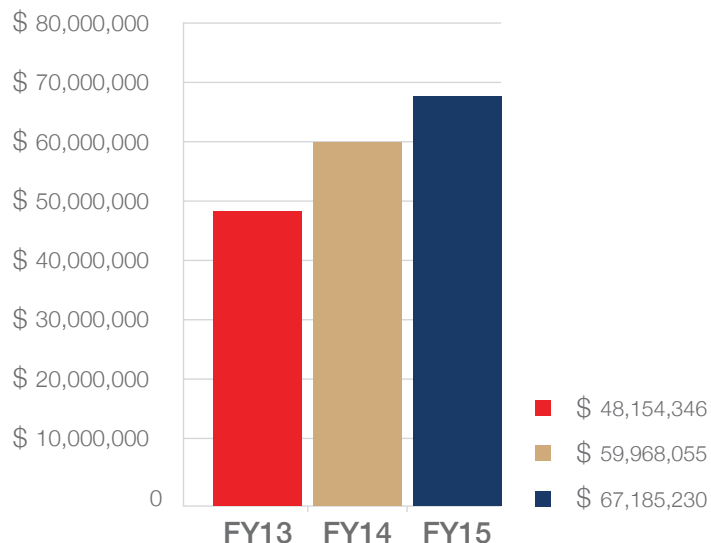
(As Reported to the Texas Higher Education Coordinating Board)



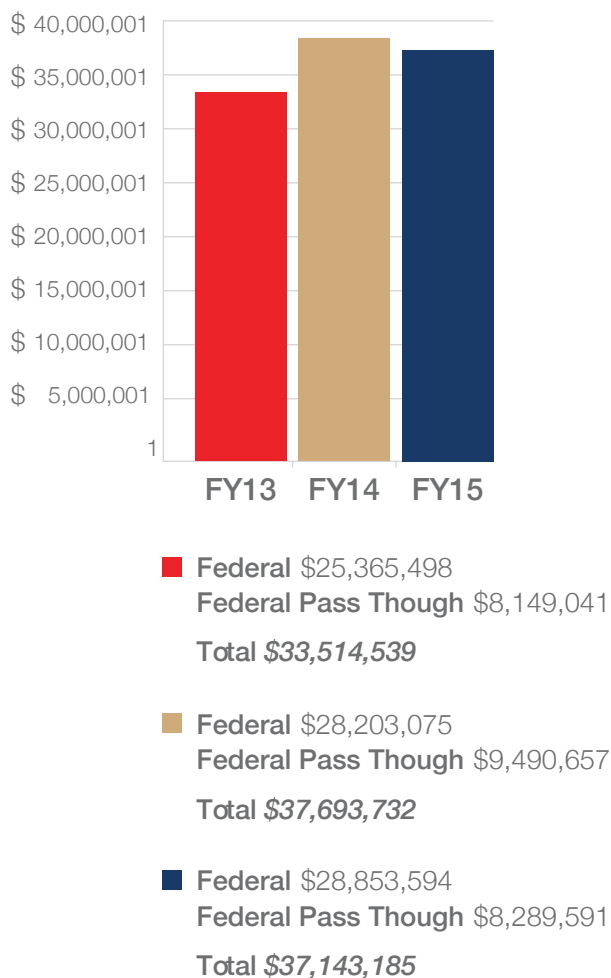
Number of Proposals Submitted



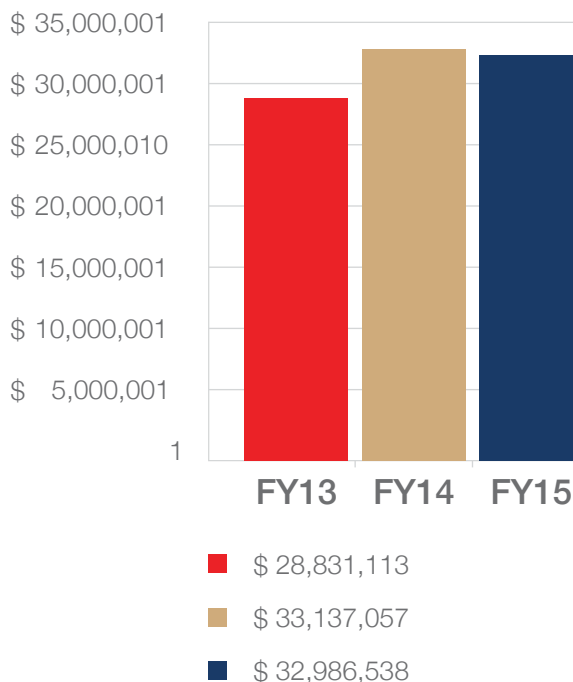
Award Value



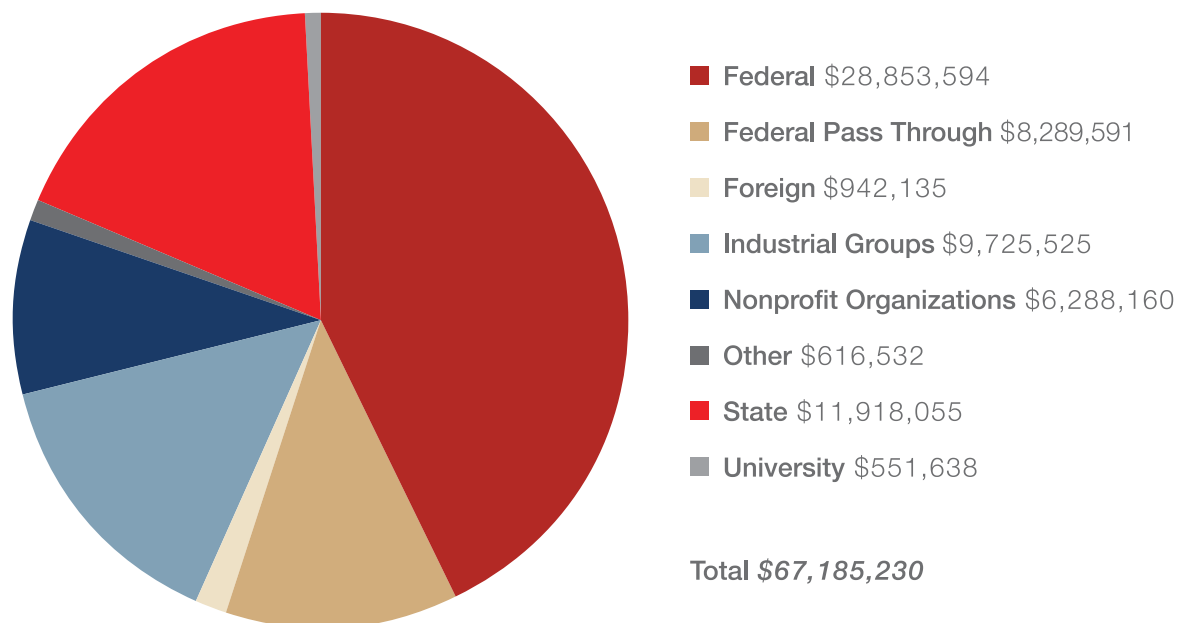
Federal Research Awards



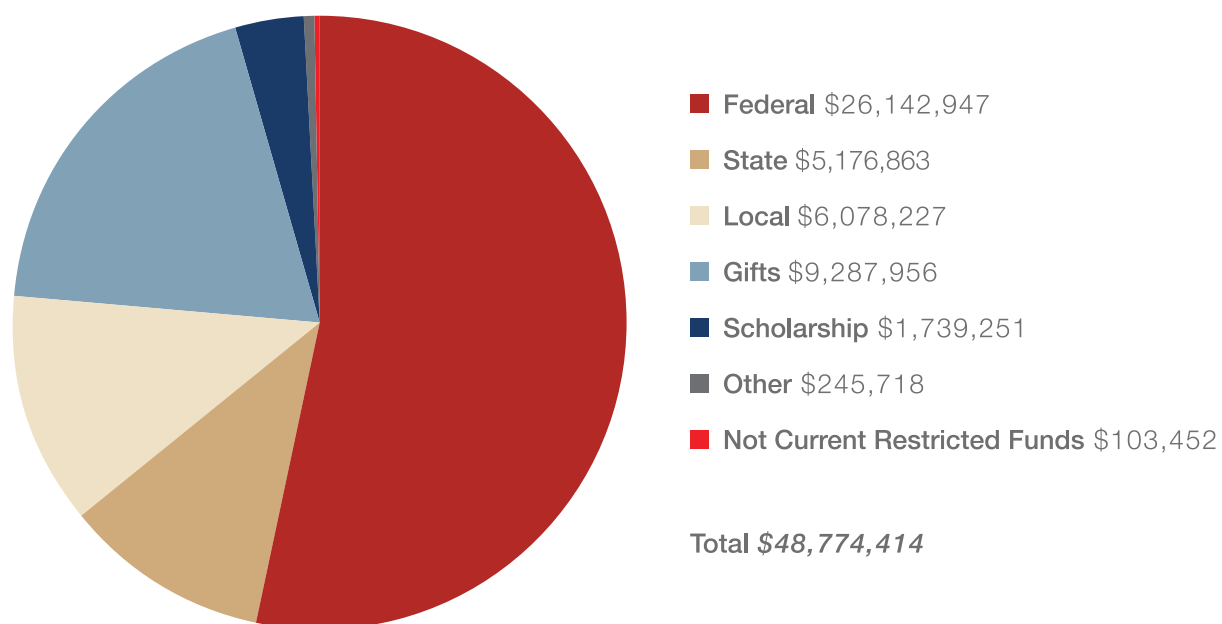
Federal Research Expenditures



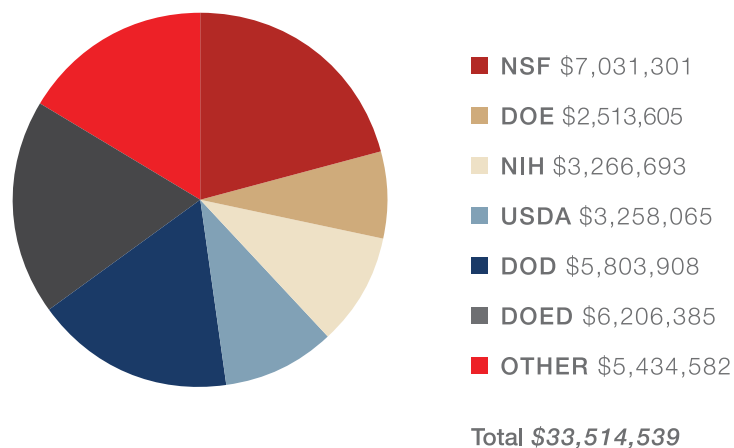
Awards by Sponsor Type



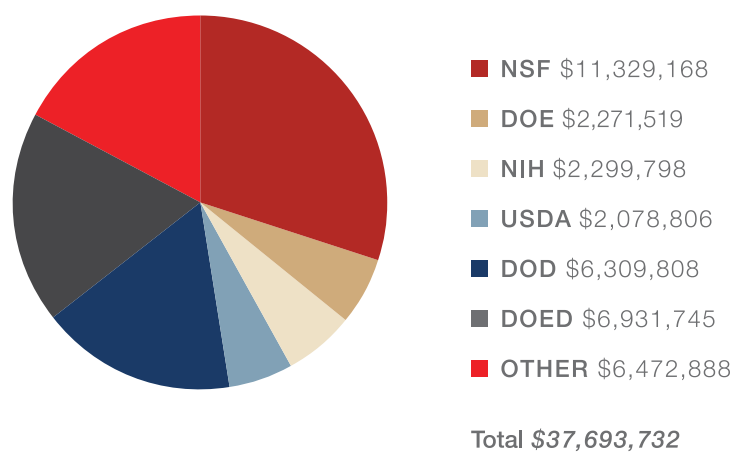
Expenditures (RRE) by Sponsor Type



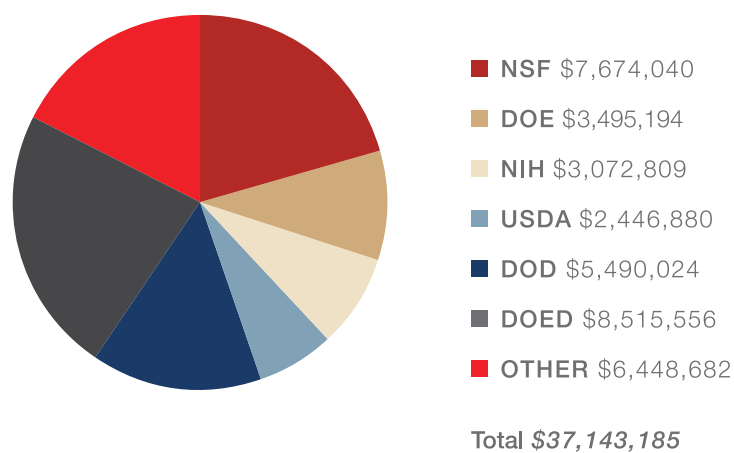
Award Values by Funding Agency FY13



Award Values by Funding Agency FY14



Award Values by Funding Agency FY15



TTU System Commercialization Metrics

Fiscal Year	2011	2012	2013	2014	2015
Invention Disclosures	56	76	83	96	102
U.S. Patent Applications Filed	22	26	35	73	65
License / Option Agreements Signed	2	6	10	15	14
Gross Revenue from Licensing	\$269K	\$207K	\$438K	\$520K	\$679K

Texas Tech Commercialization Metrics

Fiscal Year	2011	2012	2013	2014	2015
Invention Disclosures	32	52	57.5	47	49
U.S. Patent Applications Filed				36	29
License / Option Agreements Signed				8	9
Gross Revenue from Licensing	\$263K	\$181K	\$358K	\$463K	\$526K



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