



OFFICE OF THE VICE PRESIDENT FOR RESEARCH

# ANNUAL REPORT

2014



TEXAS TECH UNIVERSITY

Office of the Vice President for Research™



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# WELCOME



Friends and colleagues,

2014 was an exciting and productive year for research at Texas Tech University. Total research expenditures are up 12 percent over 2013 and restricted research expenditures are up 15 percent. Those are impressive numbers in an era of declining federal research dollars.

We continue to invest in key areas of research. We have completed cluster hiring efforts in four primary areas: food safety and security, materials and soft condensed matter, big data/cybersecurity, and bioinformatics and genomics.

Our expanding emphasis on innovation and commercialization is evident in the construction of the first building in our new Innovation Hub and Research Park and our designation as an Innovation and Economic Prosperity University by the Association of Public and Land-Grant Universities.

All of our successes in 2014 are due to our outstanding faculty, staff and students. It is your dedication to outstanding research, scholarship and creative activities that will allow Texas Tech to meet its goal of becoming a major national research university in the near future.

There are many ways to measure a university's research success. While Texas Tech places great importance on the scholarship and creative activity of our faculty and students, most of the accepted research metrics are weighted heavily toward federal, state and private funding, something that is not readily available in the humanities, some social sciences, and the performing arts. While the 2014 Annual Report focuses primarily on our success securing competitive funding, the Office of the Vice President for Research fully supports and encourages the expression of all scholarship and creative activity occurring on campus.

December 31, 2014, marked the end of my first year at Texas Tech. I knew it would be a very busy and exciting time, and I was right. I thank you for welcoming me to the Red Raider family and making last year a very successful whirlwind of activity and achievement. I look forward to an even better year to come in 2015.

Thank you,

A handwritten signature in black ink that reads "Robert V. Duncan". The signature is fluid and cursive, with a long horizontal stroke at the end.

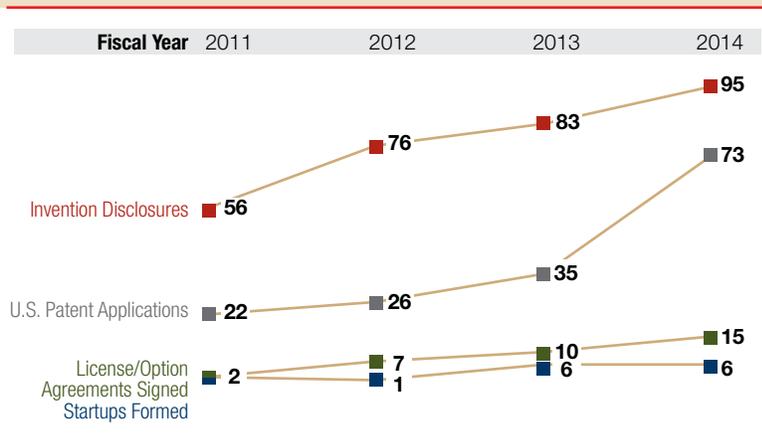
Robert V. Duncan  
Senior Vice President for Research

# COMMERCIALIZATION

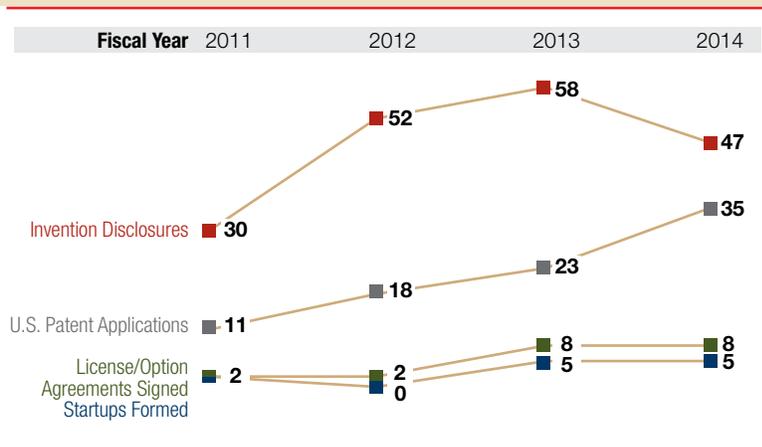
The Office of Research Commercialization (ORC) moved out of the Texas Tech University System (TTUS) office and under the umbrella of the OVPR in 2014. The move allows the university to more effectively and efficiently integrate the commercialization process into the academic fabric of the university, making the process more accommodating to the needs and concerns of the faculty. The office will continue to assist the three other universities in the TTUS with their commercialization needs.

Among ORC's success this year is the establishment of the Small Business Innovation Research and Small Business Technology Transfer Resource Center. The center is designed to assist Texas Tech-related startups gain federal funding to support some of the best early-stage ideas.

The office was also instrumental in the creation of the Lubbock Angel Network.



Texas Tech University System commercialization metrics.



Texas Tech University commercialization metrics.



## RESEARCHERS CREATE COMPANY TO OPTIMIZE WIND PLANT OUTPUT

Of the 35 Texas Tech patents filed in 2014, two have the potential to change how wind farms around the world operate.

“Many wind farms are not producing as much power as we would expect,” said John Schroeder, professor of atmospheric sciences. “With a better understanding of how turbines interact with each other, we may be able to make small adjustments that could be worth millions.”

The two patents include the use of radar technologies and subsequent analysis concepts for wind energy

applications. Using the enhanced information about flow conditions enables proactive controls to be developed that can minimize turbine-to-turbine interaction and maximize power generation.

The patent rights are licensed to SmartWind Technologies LLC, a technology development and service company founded by Schroeder and research professors Brian Hirth and Jerry Guynes. The company specializes in providing products, software and knowledge to measure and analyze wind energy relevant complex flows.

“The idea is to take what we’ve been doing in the research realm and, through the company, provide a commercial vehicle to offer it to industry that can benefit from it,” Schroeder said. “It is technology developed at Texas Tech, licensed and ready to be used by industry. It benefits wind energy, it benefits society and it benefits Texas Tech. The endpoint of this research and commercialization process will have an impact well beyond the university.”



## ACCELERATOR

The Texas Tech Accelerator finished its first year with Demo Day in May. The four-month program combines university innovations, faculty inventors, entrepreneurs, students and mentors with a curriculum based on a scientific approach to launching new companies and moving inventions from the lab to the market.



Eleven Texas Tech students and one local entrepreneur were accepted into the first accelerator program. Demo Day is the culmination of the program. Accelerator participants presented their business plans to a group of more than 100 venture capitalists, angel investors, local business leaders, alumni and other community stakeholders.



Two of the accelerator ventures have raised outside capital from private investors totaling approximately \$347,000. One of the accelerator ventures, NovoFluidix, raised outside capital from private investors totaling approximately \$185,000. NovoFluidix was also chosen as being the most likely to invest in by the Demo Day audience and received a trip to Silicon Valley to meet with other startup companies, Life Science Angels, a premiere angel investment network in Silicon Valley, and to visit with potential customers and partners.



# OFFICE OF RESPONSIBLE RESEARCH

The Office of Responsible Research works 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 Office of Responsible Research incorporates all divisions and committees that support responsible research and compliance at Texas Tech including: Responsible Conduct of Research (RCR), Financial Disclosure, Environmental Health and Safety (EH&S), Human Research Protection Program (HRPP) and Animal Care Services.

## HIGHLIGHTS



Alice Young

The university embraced the finding of the 2014 National Academies of Science/ National Research Council (NAS/

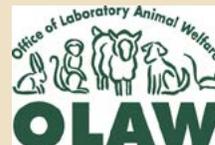
NRC) report on Safe Science: Promoting a Culture of Safety in Academic Chemical Research. Key among those findings was that to safeguard the welfare of students, staff and faculty, academic leaders must establish expectations and support systems that reinforce a strong safety culture and enable strong scholarship, teaching and service. Alice Young, associate vice president for research/responsible research, served on the NAS/NRC task force and was a co-author on the report.



Matt Roe

Matt Roe was named assistant vice president for environmental health and safety in October. He has been part of the environmental

health and safety program since 2004. The Department of Environmental Health and Safety also initiated a new chemical inventory and delivery system, the TTU Chemical Gateway. The system is designed to save faculty time and effort and to allow the university to better inventory all chemicals on campus.

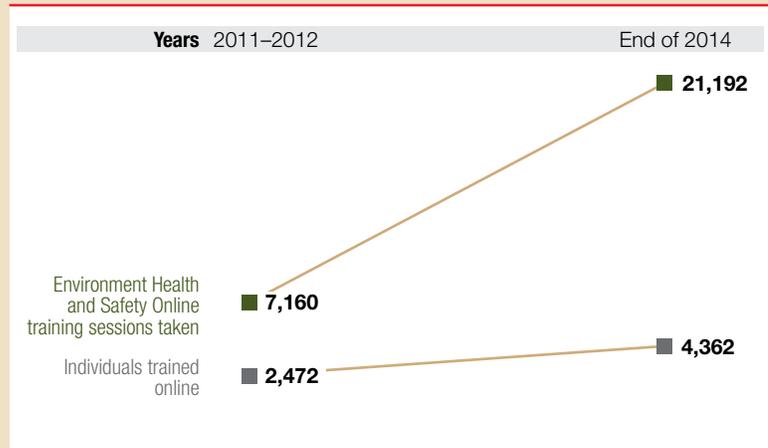
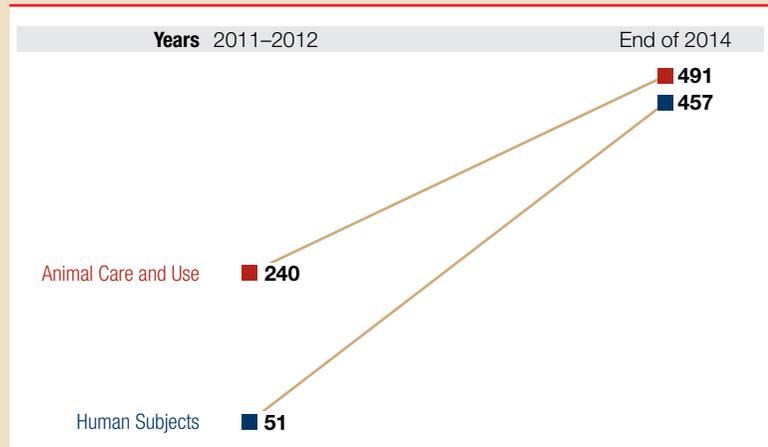


The university's animal care and use program received a positive report

for 2014. The U.S. Department of Agriculture reported that there were no non-compliance issues with Texas Tech's animal care and use program during an unannounced inspection in January 2015. Texas Tech also received a renewal of Assurance from the Office of Laboratory Animal Welfare, which ensures compliance with Public Health Service. This assurance is required in order to allow the university to secure National Institutes of Health funding. Additionally, the university's animal care and use program remains fully accredited by the Association for Assessment and Accreditation of Laboratory Animal Care International (AAALAC), which is a voluntary accreditation.

## TRAINING

Safety and compliance training have also increased dramatically in the areas of environmental health and safety, responsible conduct of research (RCR) and animal and human subjects. The number of research groups and student in the RCR program has increased from 23 groups and 126 students in 2011-2012 to 48 groups and 196 students at the end of 2014.



# INNOVATION AND ENTREPRENEURSHIP

Texas Tech is making a strong commitment to the innovation and entrepreneurship of its faculty, staff and students. With most of the nation's research and development taking place in universities today, Texas Tech's drive to become a true national research university is positioning it to be a major player in the region, state and nation's economic prosperity.

Twenty-first century universities must be entrepreneurial, providing their faculty, staff and students with opportunities to accelerate new businesses and support startup companies.

Texas Tech made major strides in 2014 as it builds a stronger infrastructure to bring the innovations of faculty, staff and students to the marketplace.



*Partnership to Support Innovation and Entrepreneurship*

**The Lubbock Economic Development Alliance (LEDA) approved \$255,000 to support four Texas Tech entrepreneurial programs.**

## **The four programs supported by LEDA:**

- **Three-Day Startup** – a 72-hour hands-on experience geared to teaching students entrepreneurial skills.
- **Texas Tech Innovation Mentorship & Entrepreneurship (TTIME)** – Funding for student-led pitch competitions as guided by mentors.
- **Texas Tech Accelerator** – Seed grants for selected accelerator business startup teams, which will be selected by the accelerator selection committee.
- **Presidential Innovation Commercialization Awards** – Funding in the initial year to purchase equipment for the Research Park Building, and each year thereafter to offset a company's costs of rental and equipment, given at the discretion of the president.

## *National Academy of Inventors Fellows*

Robert Duncan, senior vice president for research, and Mohamed Soliman, the Livermore Chair Professor in the Herd Department of Petroleum Engineering, have been named fellows of the National Academy of Inventors.

Duncan holds 10 domestic patents and many international filings, nine of which involve a new form of cryogenic surgery. Soliman has 28 patents on fracturing operations and analysis that have already been issued and nine more pending.

Selection for a fellowship is based on a demonstrated prolific spirit of innovation in creating or facilitating outstanding inventions that have made a tangible impact on quality of life, economic development, and the welfare of society.



## *Research Park*

Perhaps the most visible symbol of the university's commitment to innovation is the new Innovation Hub and Research Park building on the northwestern side of the campus.

When it opens in summer 2015, the building will provide common space for academic programs that promote entrepreneurship and innovation; space for public-private partnerships; and facilities for new startup businesses that will be built primarily around faculty intellectual property.

### *Research Park by the numbers:*

- \$29 million facility
- 40,000 square feet
- Laboratory, research and office spaces designed to meet tenant needs

## *Economic Prosperity Efforts*

Texas Tech's dedication to the economic prosperity of the region, state and nation was recognized in July when the university received the Innovation and Economic Prosperity (IEP) University designation from the Association of Public and Land-grant Universities (APLU).

The designation, instituted in 2013, acknowledges universities working with public and private sector partners in their states and regions to support economic development through a variety of activities, including innovation and entrepreneurship, technology transfer, talent and workforce development, and community engagement.

## *Student Engagement*

Texas Tech recognizes that students play an important role in the university's innovation successes. A 2014 student survey found that of the 6,017 respondents, 1,073 are currently engaged in inventing or entrepreneurship, and 4,014 expressed interest in becoming involved.

Armed with that information, the Office of the Vice President for Research began work to form a new student-led organization, Texas Tech Innovation Mentorship and Entrepreneurship (TTIME). The organization is designed to create a culture of entrepreneurship across campus and is open to all undergraduate and graduate students from all majors across the university. The group is a foundational effort to provide students with resources and support to turn their innovative ideas into reality.



Texas Tech sponsored its first 3 Day Startup Weekend during the fall 2014 semester and has plans to continue the program each fall and spring semester. The workshop is an intense 72-hour experience geared to teaching students entrepreneurial skills. The workshop will be repeated each fall and spring semester.

# THE YEAR IN REVIEW

**2014 brought transitions and new services to the Office of the Vice President for Research (OVPR).**



Robert V. Duncan joined Texas Tech as Vice President for Research on Jan. 1. He was elevated to Senior Vice President for Research in December.

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## *PERSONNEL HIGHLIGHTS*



Patricia R. DeLucia

Patricia R. DeLucia, professor of psychology, was appointed associate vice president for research for faculty affairs in November. She is responsible for faculty award nominations and recognition and faculty research development. She initially joined the office in April as a faculty fellow.

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Guy Loneragan

Guy Loneragan, professor of food safety and public health, also joined the OVPR in April as a faculty fellow focusing on international research efforts. He will continue those duties into 2015.

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Jennifer Horn

Jennifer Horn was named director of translational research and entrepreneurialism in May. She is responsible for establishing programs that support the expansion of a knowledge-based economy based upon Texas Tech's research capabilities and is working closely with the startup of the university's new research park.

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Kay Tindle

Kay Tindle was elevated to director of the OVPR Research Development Team.

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Matt Roe

Matt Roe was named assistant vice president for environmental health and safety in October. He has been part of the environmental health and safety program since 2004.

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## ACCOMPLISHMENTS

Robert V. Duncan, along with Mohamed Soliman, the Livermore Chair Professor in the Herd Department of Petroleum Engineering, was named fellows of the National Academy of Inventors in December.



Alice Young, associate vice president for research/responsible research, was a co-author on

the National Academies of Science/National Research Council report on Safe Science: Promoting a Culture of Safety in Academic Chemical Research.

As part of Texas Tech's drive to increase recognition of distinguished faculty and increase the national and international visibility of the university, a new list of Targeted External Awards for Faculty was developed. These awards are recognized by the Center for Measuring University Performance, the American Association of Universities, and the Texas Higher Education Coordinating Board.

The post-award administration for sponsored projects was consolidated to improve customer service to departments and principal investigators. The responsibility for most post-award administration functions was moved from the Office of Research Services to the Office of Research Accounting, formerly known as Sponsored Programs Accounting and Report (SPAR).

Working with the Office of International Affairs, the OVPR has supported research connections and collaborations with a number of foreign countries and institutions.



The OVPR was instrumental in assisting students to form Texas Tech Innovation Mentorship and Entrepreneurship (TTIME), a new student organization designed to create a culture of entrepreneurship across the campus.

The OVPR, in conjunction with the Office of the President sponsored the first 3 Day Startup event in November. The workshop is an intense 72-hour experience geared to teaching students entrepreneurial skills. The workshop will be held every fall and spring semester.

The OVPR also established two new programs to aid in communications across campus and encourage new collaborations.

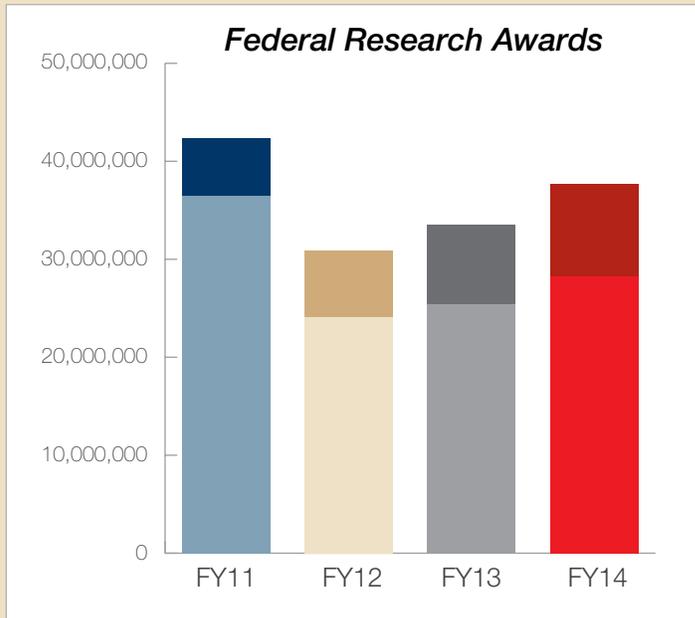
The Faculty Research Club was established during the fall semester to provide a social setting to stimulate interdisciplinary research collaborations, promote informal discussion about research and disseminate information about campus resources to faculty. The Faculty Research Club meets monthly.

The OVPR Discussion Series was created as an interactive discussion platform to spur conversation on topics involving research, ethics and innovation in higher education. The discussion series is held monthly.

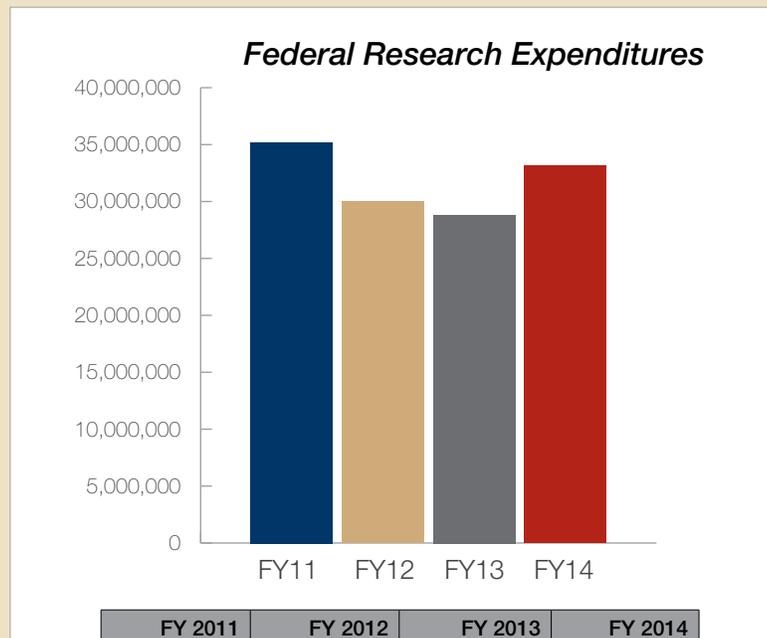
As a result of the application process for the APLU Innovation and Economic Prosperity designation, which Texas Tech was awarded in 2014, the OVPR in conjunction with the Office of the President is holding a series of luncheons to encourage dialogue between Texas Tech faculty researchers and business leaders in related fields. The surveys and town hall meetings held as part of the application process found that our external partners wanted more information about Texas Tech research and to learn how to participate with faculty.

The OVPR partnered with the Office of the Provost to create the Scholarship Catalyst Program which provides internal funds to support research and scholarship in the arts, humanities and social sciences. In 2014, more than 30 winning proposals were awarded more than \$100,000. The program is geared to providing funding to areas in the humanities, some social sciences and the creative arts where competitive federal funding is not readily available.

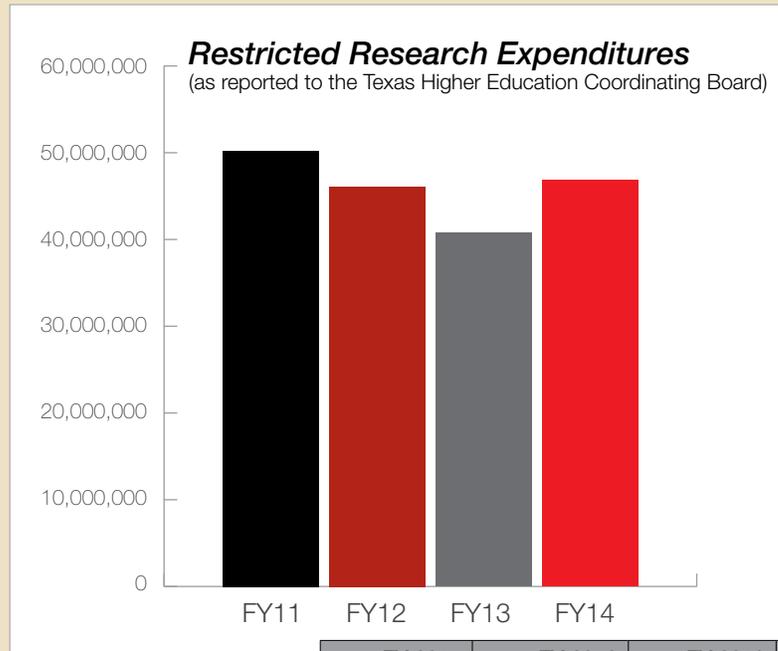
# Institutional Research Metrics for Federal Research Awards and Expenditures Over Time



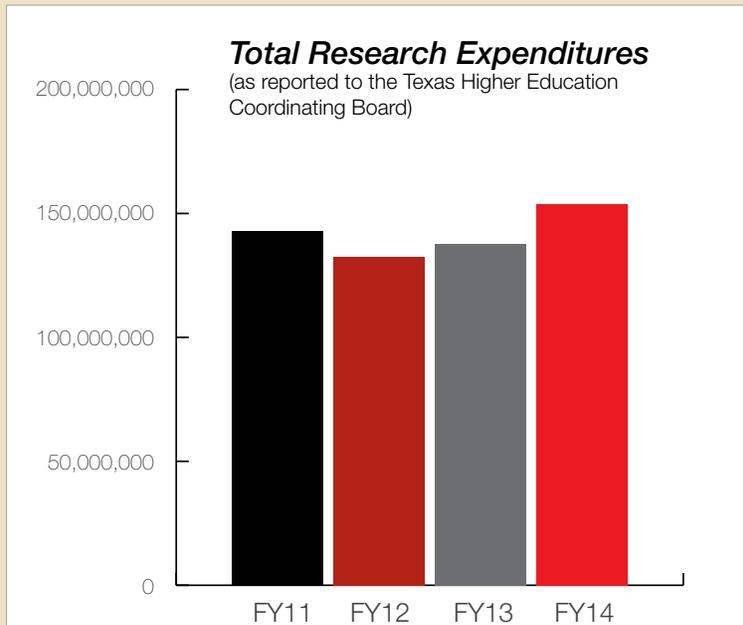
	FY 2011	FY 2012	FY 2013	FY2014
Federal	36,497,220	24,101,495	25,365,498	28,203,075
Federal Pass Through	5,840,826	6,698,911	8,149,041	9,490,657
<b>Total</b>	<b>42,338,046</b>	<b>30,800,406</b>	<b>33,514,539</b>	<b>37,693,732</b>



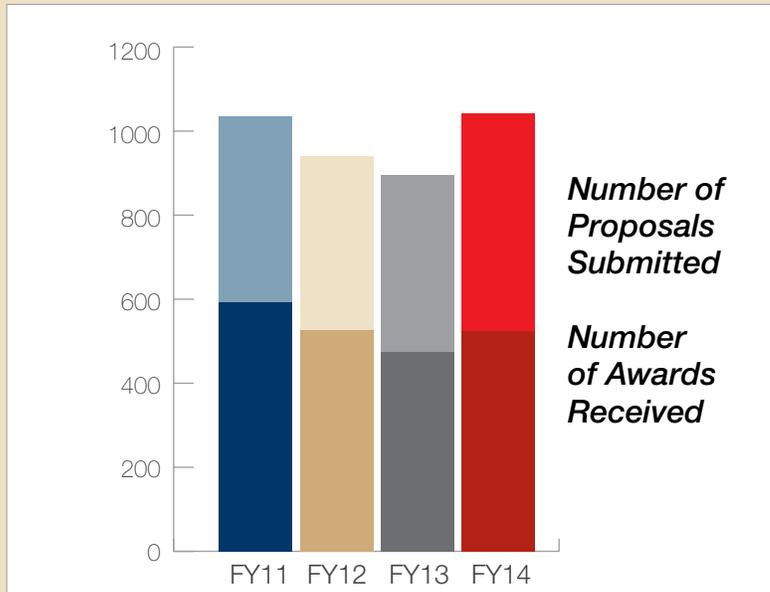
FY 2011	FY 2012	FY 2013	FY 2014
35,190,905	29,968,704	28,826,864	33,137,056



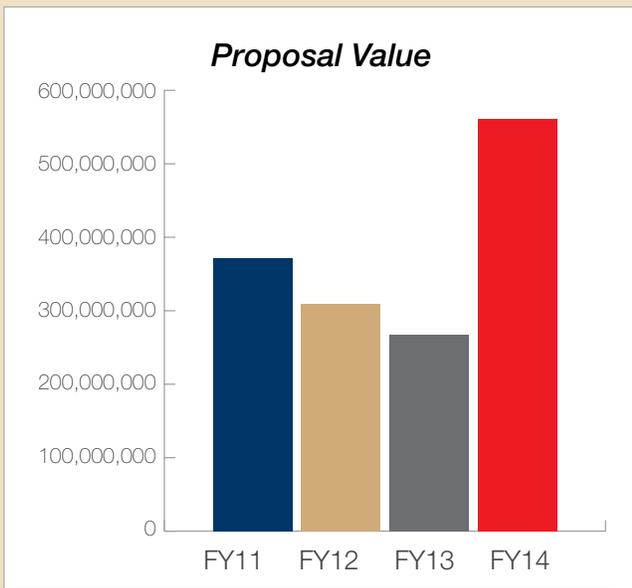
FY 2011	FY 2012	FY 2013	FY2014
50,205,458	46,106,813	40,735,021	46,853,386



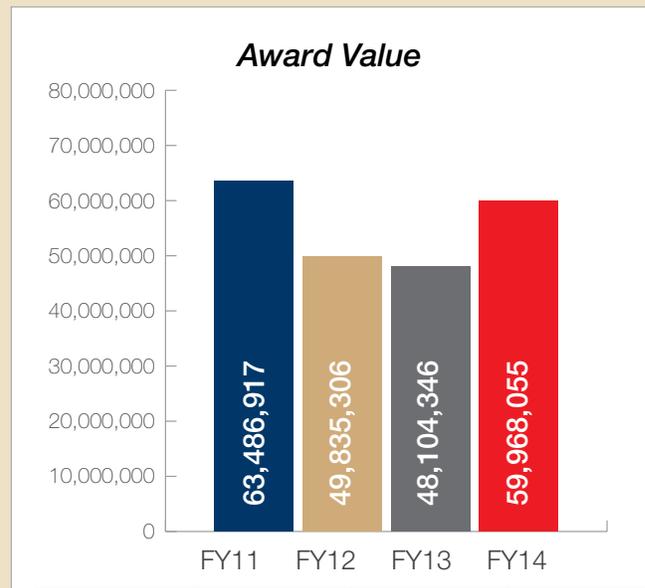
FY 2011	FY 2012	FY 2013	FY2014
142,762,792	132,542,194	137,563,727	153,728,769



	FY 2011	FY 2012	FY 2013	FY2014
Proposals Submitted	1,035	940	895	1,042
Awards Received	593	526	474	525

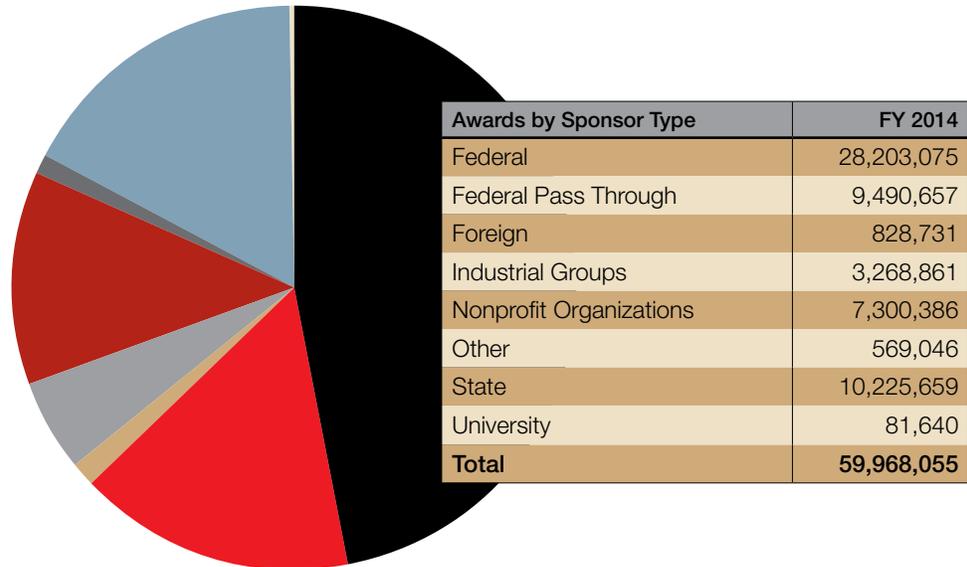


FY 2011	FY 2012	FY 2013	FY2014
370,949,937	308,652,941	267,387,931	561,376,002

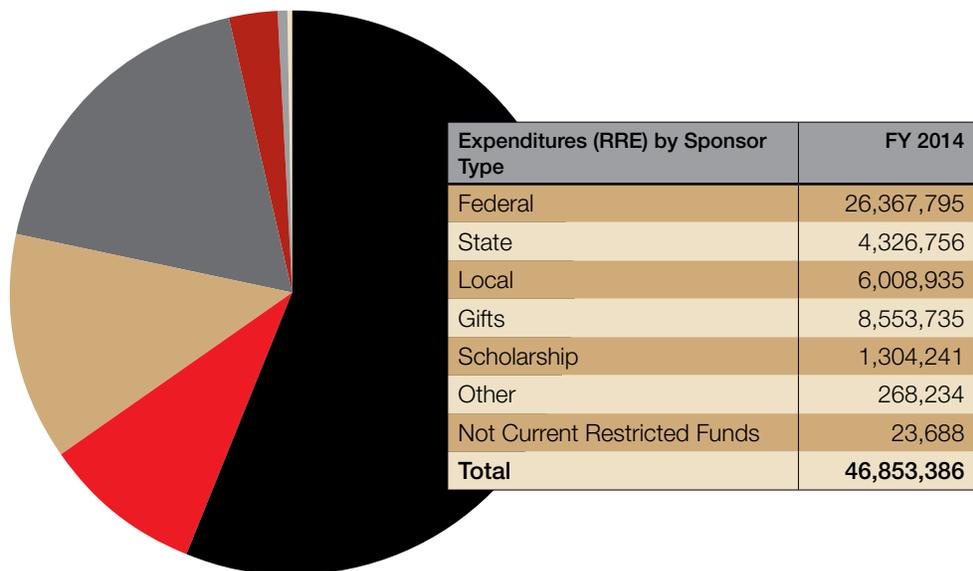


FY 2011	FY 2012	FY 2013	FY2014
63,486,917	49,835,306	48,104,346	59,968,055

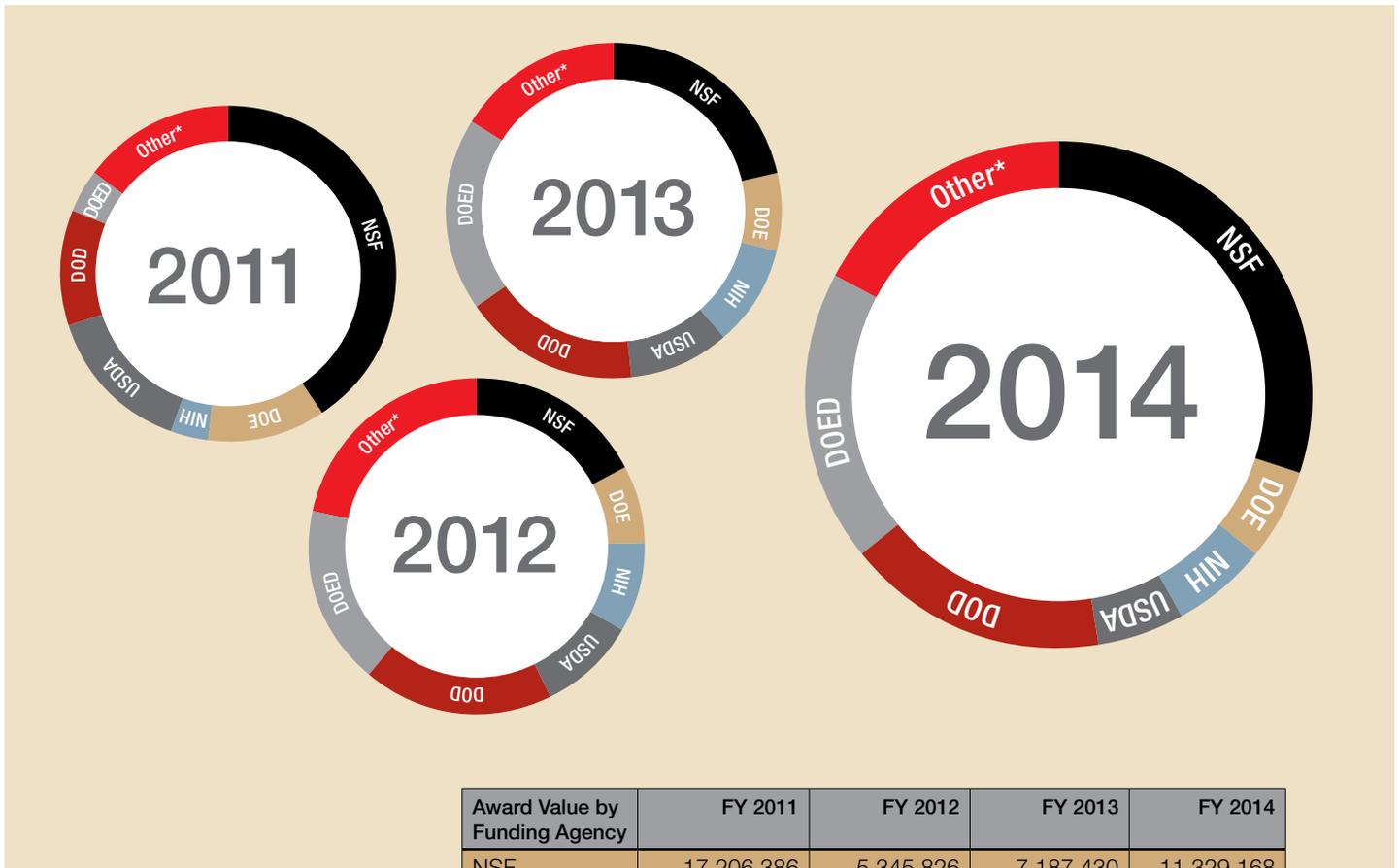
*Awards by Sponsor Type*



*Expenditures (RRE) by Sponsor Type*



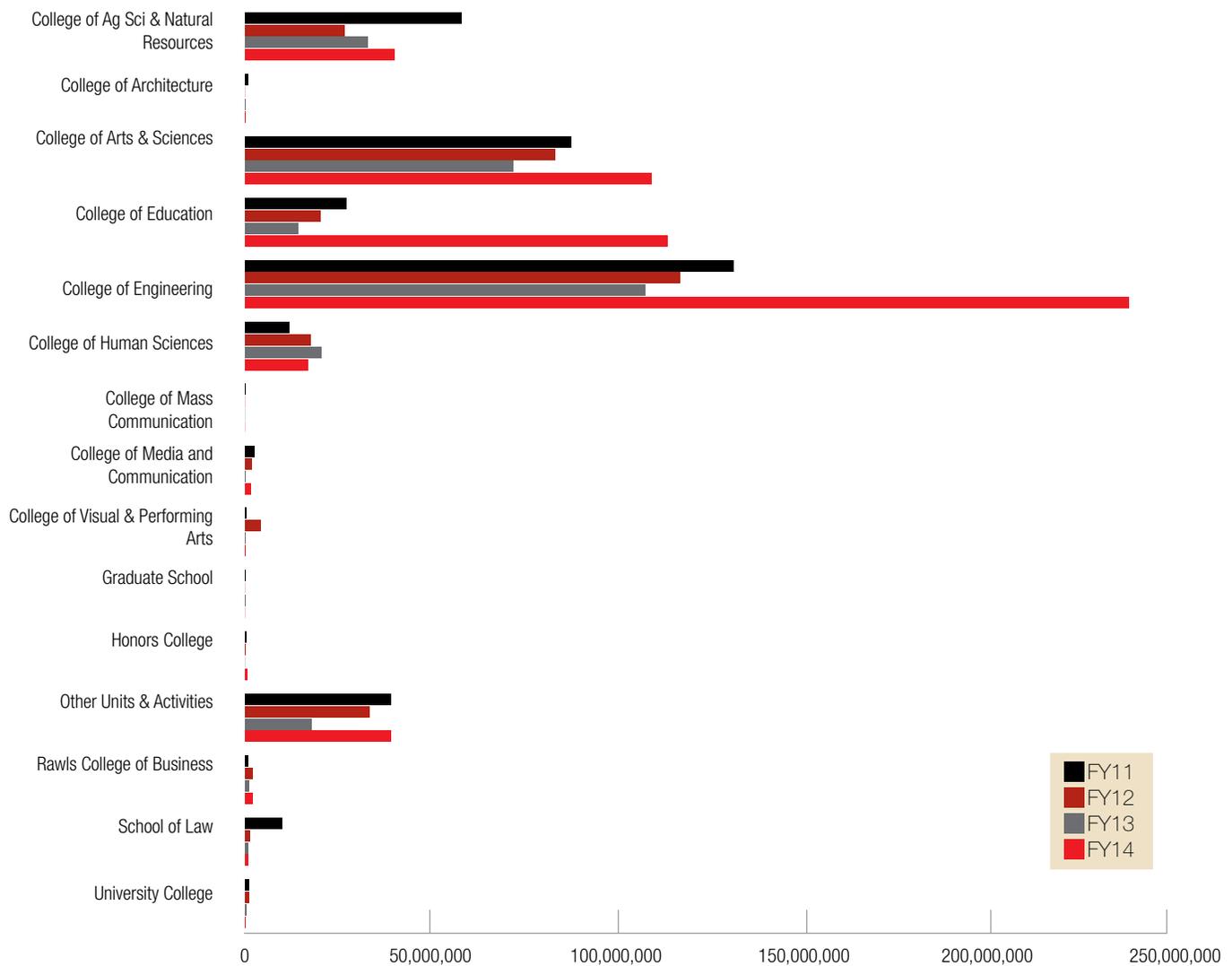
## Award Values by Funding Agency



Award Value by Funding Agency	FY 2011	FY 2012	FY 2013	FY 2014
NSF	17,206,386	5,345,826	7,187,430	11,329,168
DOE	4,829,409	2,318,350	2,513,605	2,271,519
NIH	1,553,435	2,676,001	3,266,693	2,299,798
USDA	6,158,567	2,840,447	3,258,065	2,078,806
DOD	4,651,113	5,642,845	5,743,621	6,309,808
DOED	1,800,660	5,372,890	6,206,385	6,931,745
Other*	6,138,476	6,604,-47	5,338,740	6,472,888
<b>Total</b>	<b>42,338,046</b>	<b>30,800,406</b>	<b>33,514,539</b>	<b>37,693,732</b>

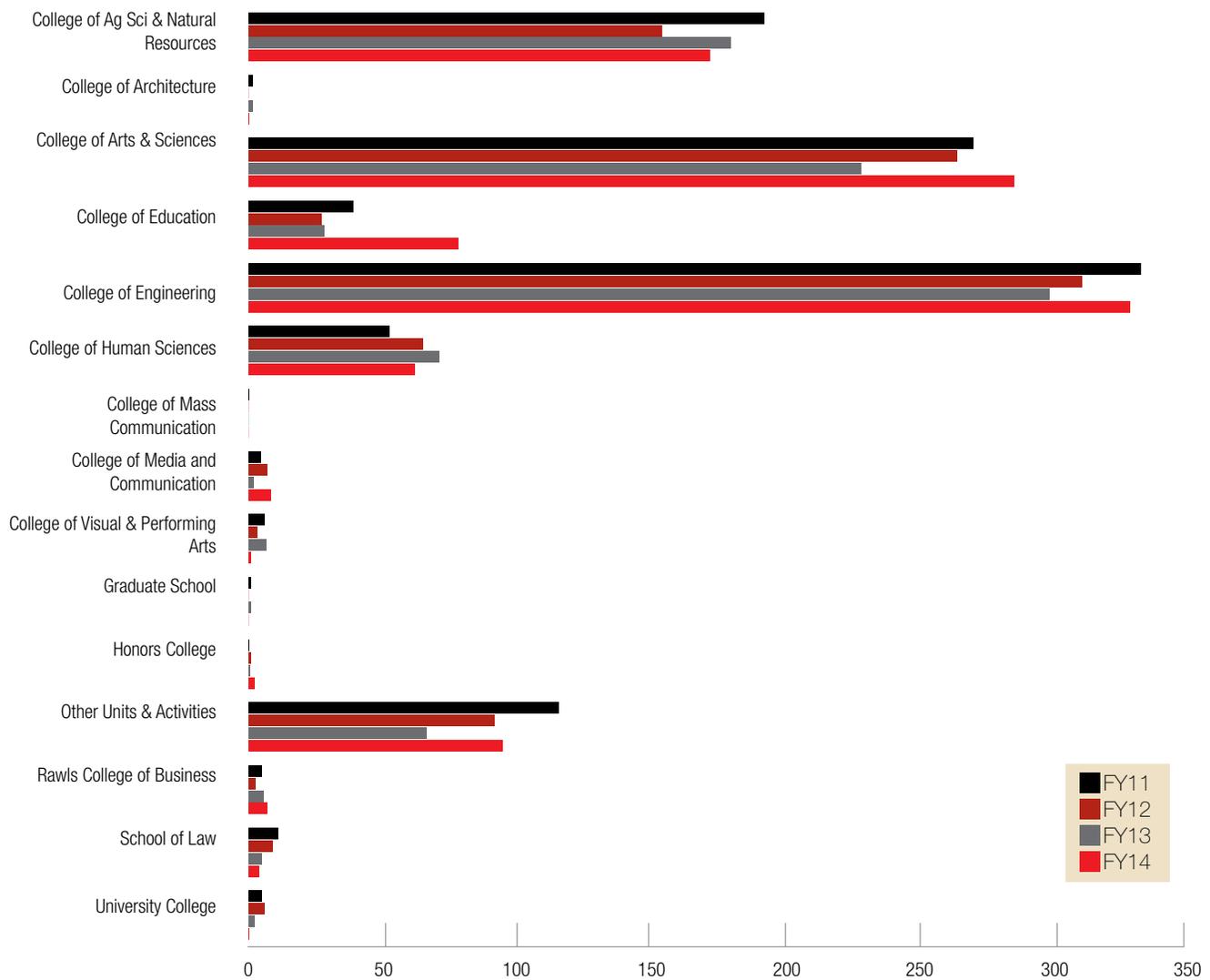
\*OTHER category composed of the rest of the federal and federal pass through agencies in our database.

## Proposal Value by Submitting Unit



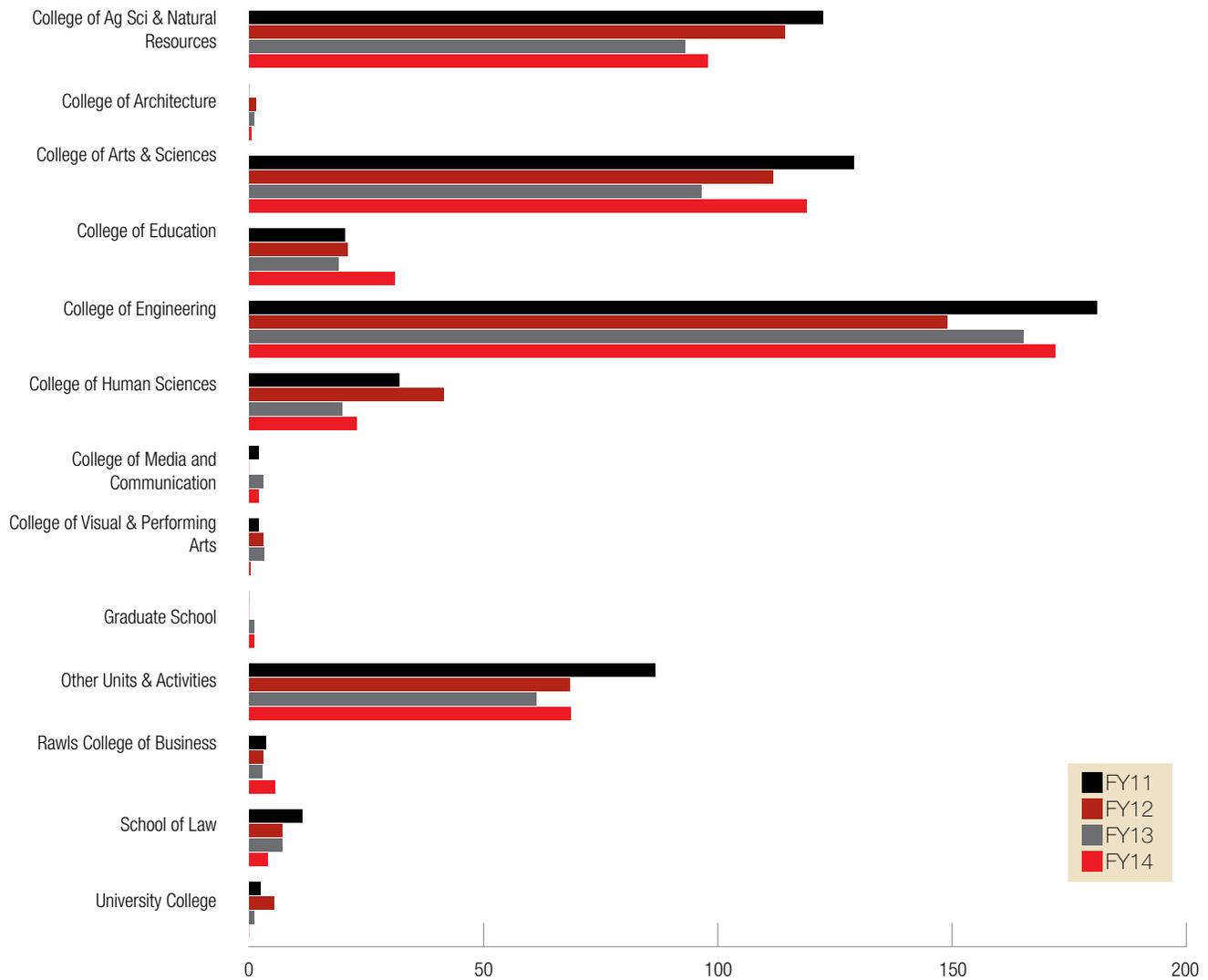
Submitting Unit	FY 2011	FY 2012	FY 2013	FY 2014
College of Ag Sci & Natural Resources	58,027,018	26,705,246	32,937,718	40,134,307
College of Architecture	730,981	0	13,694	72,000
College of Arts & Science	87,619,060	83,307,865	71,926,023	109,202,501
College of Education	27,117,137	20,314,738	14,160,770	113,415,875
College of Engineering	131,289,310	116,699,178	107,565,276	237,309,215
College of Human Sciences	11,784,664	17,651,682	20,537,615	16,964,053
College of Mass Communication	37,499	0	0	0
College of Media and Communication	2,504,806	1,847,383	45,000	1,585,505
College of Visual & Performing Arts	452,389	4,215,720	130,719	6,000
Graduate School	100,000	0	126,000	0
Honors College	433,081	37,456	0	495,503
Other Units & Activities	39,108,944	33,506,046	17,754,452	39,072,837
Rawls College of Business	857,570	2,024,745	1,018,637	2,010,560
School of Law	9,834,280	1,357,201	770,369	957,678
University College	1,053,198	985,680	401,660	149,968
<b>Total</b>	<b>370,949,937</b>	<b>308,652,941</b>	<b>267,387,931</b>	<b>561,376,002</b>

## Number of Proposals Submitted by Unit



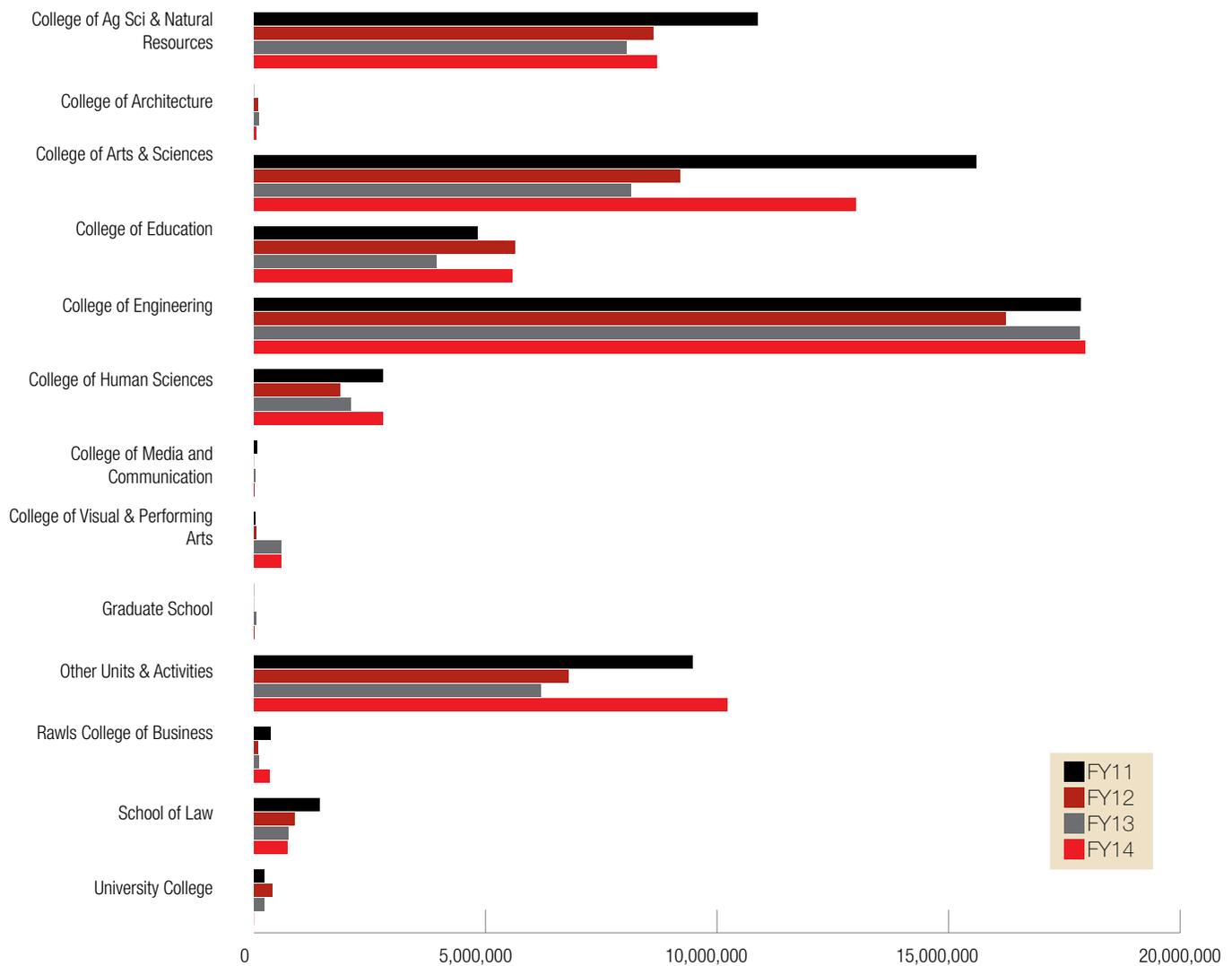
Number of Proposals	FY 2011	FY 2012	FY 2013	FY 2014
College of Ag Sci & Natural Resources	191.87	153.96	179.42	171.64
College of Architecture	1.5	0	1.5	.10
College of Arts & Science	269.73	263.70	227.98	284.98
College of Education	39.01	27.05	28.20	78.19
College of Engineering	332.26	310.36	298.19	328.23
College of Human Sciences	52.50	64.79	70.92	61.91
College of Mass Communication	.15	0	0	0
College of Media and Communication	4.68	6.80	2.00	8.18
College of Visual and Performing Arts	6.00	3.17	6.50	1.00
Graduate School	1.00	0	1.00	0
Honors College	0.20	1.00	0.50	2.05
Other Units and Activities	115.38	91.55	66.22	94.73
Rawls College of Business	4.83	2.50	5.42	6.84
School of Law	10.98	9.10	5.00	4.00
University College	4.91	6.02	2.15	0.15
<b>Total</b>	<b>1,035</b>	<b>940</b>	<b>895</b>	<b>1,042</b>

## Number of Awards Received by Submitting Unit

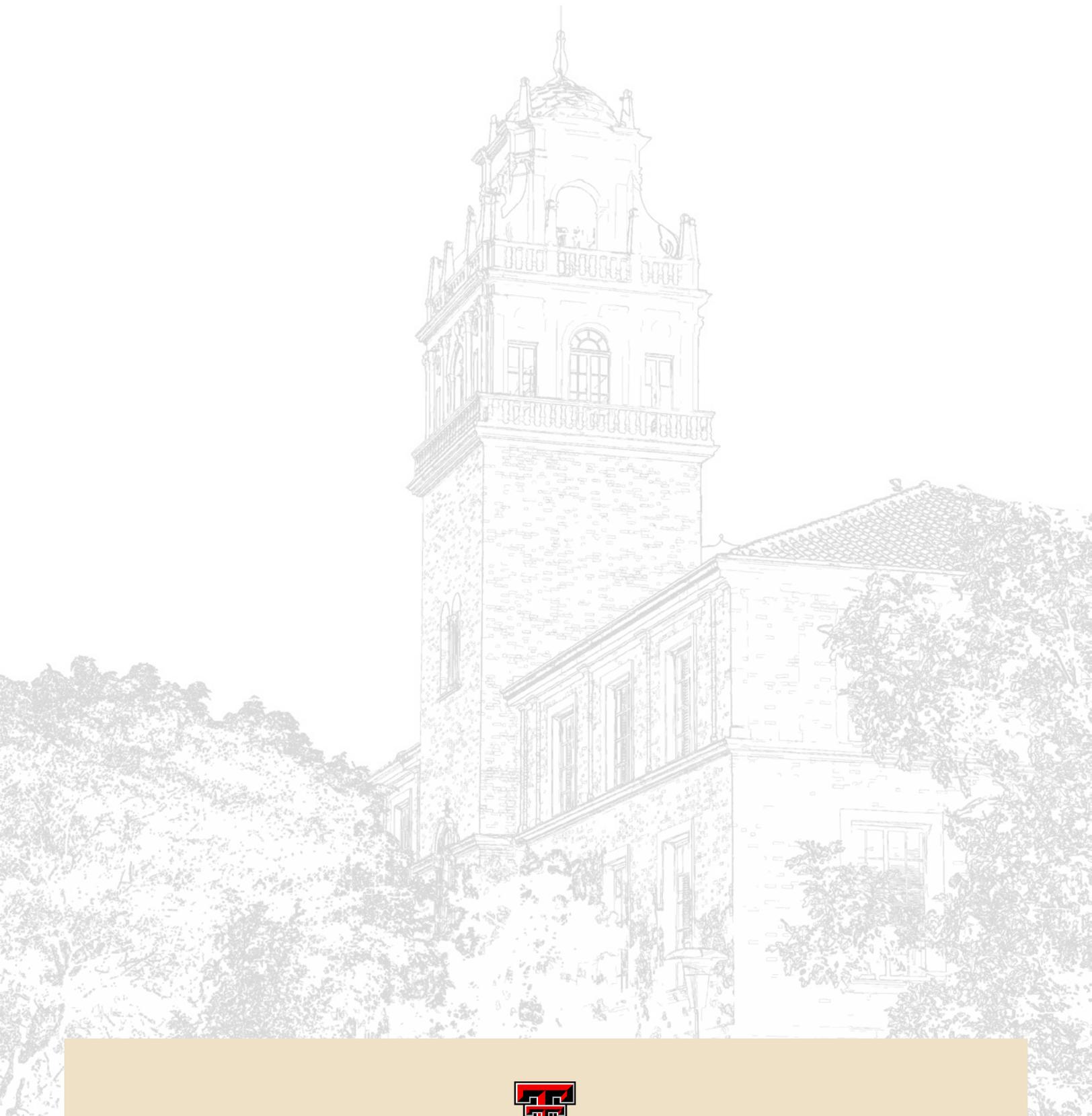


Number of Awards	FY 2011	FY 2012	FY 2013	FY 2014
College of Ag Sci & Natural Resources	122.45	114.38	93.11	97.93
College of Architecture	0	1.50	1.00	0.50
College of Arts & Science	129.12	111.76	96.47	119.06
College of Education	20.38	20.95	19.05	31.08
College of Engineering	180.90	148.98	165.28	172.06
College of Human Sciences	32.05	41.50	19.77	22.94
College of Media and Communication	2.00	0	3.0	2.0
College of Visual and Performing Arts	2.00	3.0	3.17	0.34
Graduate School	0	0	1.00	1.00
Other Units and Activities	86.74	68.53	61.25	68.58
Rawls College of Business	3.66	3.00	2.90	5.51
School of Law	11.25	7.10	7.00	4.00
University College	2.45	5.30	1.00	0
<b>Total</b>	<b>593</b>	<b>526</b>	<b>474</b>	<b>525</b>

## Award Value by Submitting Unit



Award Value	FY 2011	FY 2012	FY 2013	FY 2014
College of Ag Sci & Natural Resources	10,876,333	8,627,005	8,046,671	8,694,304
College of Architecture	0	92,318	105,179	57,354
College of Arts & Science	15,602,992	9,198,372	8,145,193	13,003,740
College of Education	4,821,859	5,633,490	3,941,243	5,585,058
College of Engineering	17,850,067	16,237,831	17,821,907	17,946,142
College of Human Sciences	2,782,410	1,863,494	2,091,925	2,779,617
College of Media and Communication	67,644	0	36,700	16,330
College of Visual and Performing Arts	30,500	40,500	595,344	595,015
Graduate School	0	0	44,000	11,000
Other Units and Activities	9,469,092	6,786,184	6,190,986	10,220,122
Rawls College of Business	360,272	91,828	108,909	342,940
School of Law	1,406,531	876,092	746,289	716,433
University College	219,217	388,192	230,000	0
<b>Total</b>	<b>63,486,917</b>	<b>49,835,306</b>	<b>48,104,346</b>	<b>59,968,055</b>



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