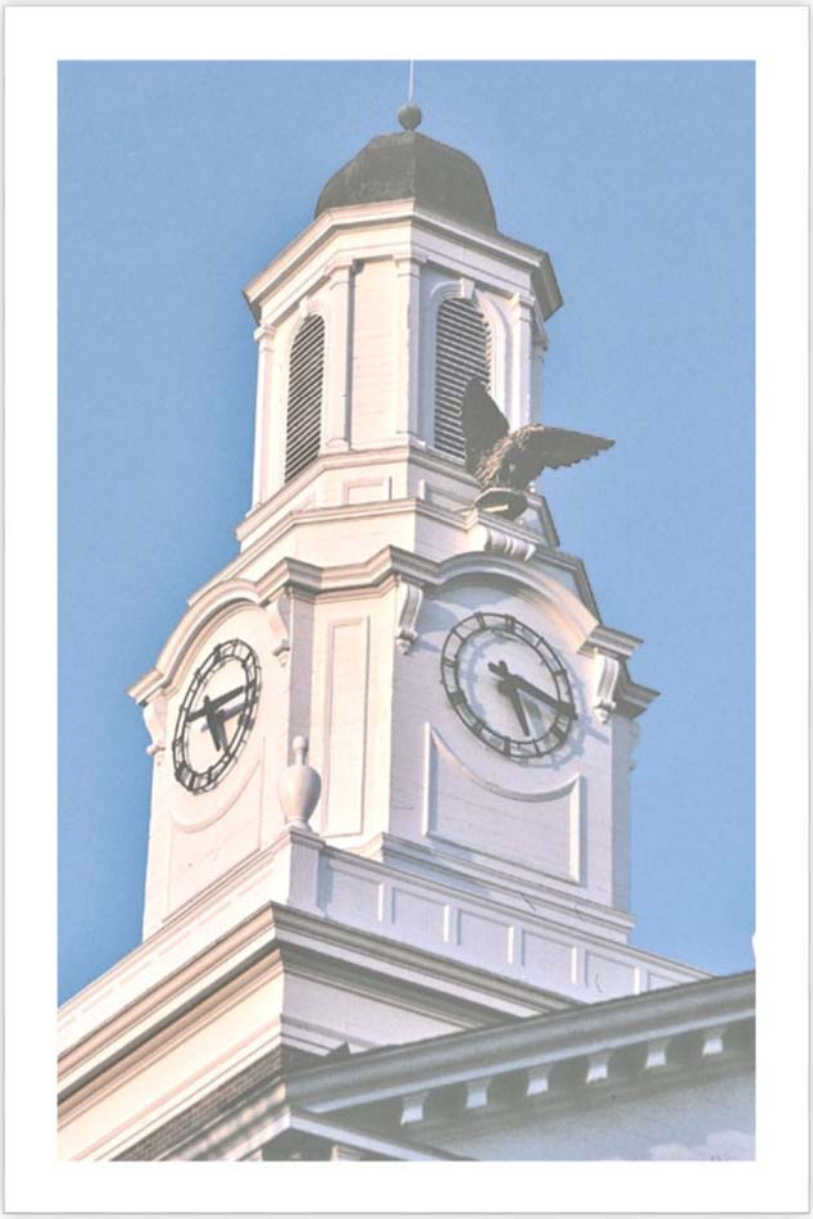

TENNESSEE TECHNOLOGICAL UNIVERSITY ANNUAL REPORT 2015-16

Office of Research

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MISSION OF THE OFFICE OF RESEARCH

The mission of the Office of Research is to support faculty in developing strong research programs and producing quality competitive research proposals. Whether locating funding opportunities, providing easy access to policies, or assisting in proposal preparation, the goal is to offer effective strategies, responsive information, and tangible assistance to the Tennessee Technological University community.

The Office of Research supports the Principal Investigator and provides services for proposals, award management, contract and license negotiation, data access and support services, research administration, and regulatory compliance.

The personnel of the Office of Research support the University's mission by:

- Facilitating the identification of funding opportunities;
- Training and assisting with proposal development;
- Submitting proposals to funding agencies;
- Monitoring project and research to ensure regulatory compliance;
- Negotiating agreements, contracts, and grants;
- Coordinating training for compliance of agreements, contracts, and grants;
- Facilitating the protection of intellectual property and technology transfer;
- Reviewing sponsor guidelines and identifying key issues;
- Facilitating meetings with Principal Investigator, business office, and other appropriate departments and units;
- Collaborating with university and community stakeholders, as appropriate during the proposal process;
- Assisting with electronic submission of proposals; and
- Completing forms for certification, as necessary.

SUMMARY OF ACTIVITIES

During fiscal year 2015-16, the University's Mission was supported through the Office of Research in the following ways:

- Grants and contracts externally funded numbered 137 with a value of $13,088,361, which represents an increase of 17% over the 2014-15 total of $11,197,912.
- Grants and contracts received through the three Centers of Excellence and the STEM Center numbered 93 with a value of $9,566,593, which represents 73% of total dollars and 68% of the total number of grants and contracts received.
- Grants and contracts received through federal agencies numbered 91 with a value of $7,399,496, which represents 66% of grants and contracts and 56% of total dollars received.
- Grants and contracts received through state agencies numbered 25 with a value of $5,212,596 which represents 18% of the total number of grants and contracts and 40% of total grant and contract dollars received.
- Private contracts were at 17 with a value of $404,835, which represents 13% of the total number of grants and contracts and 3% of total grant and contract dollars.
- Local funding came in at 4 with a value of $71,434, which represents 3% of grants and contracts and 1% of total grant and contract dollars.
- Grants and contracts received for research numbered 85 with a value of $8,282,215, which represents 62% of the total number of grants and contracts and 63% of total dollars received.
- Grants and contracts received for public service numbered 28 with a value of $2,337,727 which represents 20% of all grants and contracts and 18% of total grant and contract dollars received.
- Instruction funding received numbered 10 with a value of $1,608,639, which represents 7% of total number of grants and contracts and 12% of total grant and contract dollars.
- Grants and contracts received for student services/scholarships/fellowships numbered 7 with a value of $624,314, which represents 5% of the total number of grants and contracts and 5% of total dollars received.

- Academic Support funding accounted for 5 contracts with a value of $180,467, which represents 4% of the total number of grants and contracts and 1% of total grant and contract dollars.

- Operation/Capital Projects funding numbered 2 with a value of $54,999, which represents 2% of total number of grants and contracts and .42% of total grant and contract dollars.

- Internal funds were provided in the amount of $91,958 for small grants to support faculty research. Four Track I proposals from 4 faculty were funded for a total of $11,971 and 8 Track II proposals from 9 faculty were funded for a total of $79,987.

- The top funding agencies were the National Science Foundation at $3,458,955, the Governor's Highway Safety Office at $635,170, the Tennessee Department of Education at $567,450, and the U. S. Department of Energy at $471,316.

- Proposals submitted for external funding numbered 219 with a value of $62,221,204.

- Proposals submitted through the Centers of Excellence and STEM Center numbered 149 with a value of $45,059,867, which represents 68% of proposals submitted and 72% of funds requested.

- Proposals submitted to federal agencies numbered 132 requesting $52,687,862, which represents 60% of proposals submitted and 85% of dollars requested.

- Proposals submitted to state agencies numbered 36 requesting $5,614,327 which represents 16% of proposals submitted and 9% of dollars requested.

- Proposals submitted to private agencies numbered 47 requesting $3,847,581 which represents 21% of proposals submitted and 6% of dollars requested.

- Proposals submitted to local agencies numbered 4 requesting $71,434 which represents 2% of proposals submitted and .1% of dollars requested.

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FIGURE 1

External Funds Historical, Actual and Projected FY 2007-16

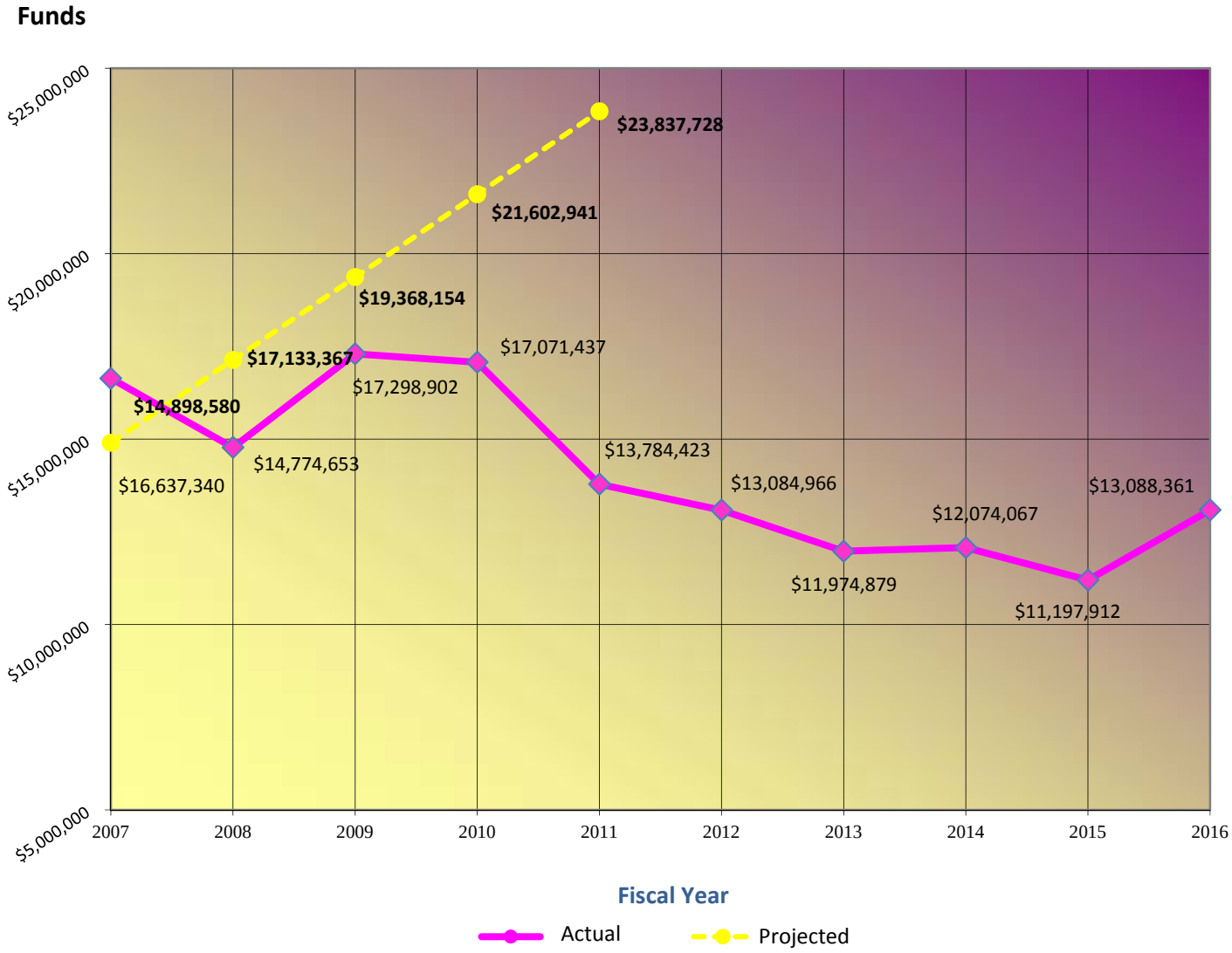

TABLE I

Externally Funded Projects by Department of Project PI* FY 2015-16

		Centers of Excellence					
PI's College	**PI's Department, Center, or Unit**	**Energy Center**	**Manufacturing Center**	**Water Center**	**STEM Center**	**Departments/ Other Units**	**Total**
Agriculture and Human Ecology	Administration					$85,000	$85,000
	Agriculture					$194,466	$194,466
	Human Ecology					$159,467	$159,467
Subtotal						**$438,933**	**$438,933**
Arts and Sciences	Biology			$248,459			$248,459
	Chemistry			$702,834		$411,980	$1,114,814
	Cooperative Fisheries Research Unit			$105,850		$30,000	$135,850
	English			$25,000		$2,500	$27,500
	Physics				$309,347	$224,009	$533,356
Subtotal						**$668,489**	**$2,059,979**
Business	Business Media Center					$1,723,553	$1,723,553
	Economics, Finance and Marketing					$1,000	$1,000
	Small Business Development Center					$83,873	$83,873
Subtotal						**$1,808,426**	**$1,808,426**
Education	Administration					$33,264	$33,264
	Art				$73,659		$73,659
	Counseling and Psychology					$21,941	$21,941
	Craft Center					$5,660	$5,660
	Curriculum and Instruction				$134,286	$99,707	$233,993
Subtotal						**$160,572**	**$368,517**
Engineering	Chemical Engineering	$55,438	$238,709	$35,000			$329,147
	Civil and Environmental Engineering	$260,649		$173,700		$70,056	$504,405
	Computer Science	$293,921	$714,208				$1,008,129
	Electrical and Computer Engineering	$40,000	$373,088			$21,000	$434,088
	Mechanical Engineering		$1,157,826		$22,100	$133,973	$1,313,899
	Engineering Administration	$29,000				$37,322	$66,322
Subtotal						**$262,351**	**$3,655,990**
Centers of Excellence	Energy Center Appropriation	$887,000					$887,000
	Energy Center Other	$25,275					$25,275
	Manufacturing Center Appropriation		$1,476,800				$1,476,800
	Manufacturing Center Other		$232,255				$232,255
	Water Center Appropriation			$1,213,130			$1,213,130
	Water Center Other			$50,899			$50,899
Subtotal							**$3,885,359**
Other	Center for Teaching and Learning Experience					$62,000	$62,000
	Counseling Center					$99,998	$99,998
	Nursing					$1,000	$1,000
	Research and Economic Development					$15,000	$15,000
	STEM Center				$688,160		$688,160

	University Police					$4,999	$4,999
Subtotal						**$182,997**	**$871,157**
Total	All Units	**$1,591,283**	**$4,192,886**	**$2,554,872**	**$1,227,552**	**$3,521,768**	**$13,088,361**

***Colleges and Departments not listed did not have funding activity during the fiscal year.**

TABLE II

Proposals Submitted and Awards Received
By University Unit
FY 2015-16

University Unit	Proposals Submitted		Awards Received***	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Administration*	6	$301,979	5	$182,997
Agriculture and Human Ecology*	4	$534,623	5	$438,933
Arts and Sciences*	23	$5,607,795	8	$668,489
Business Administration*	16	$2,659,304	14	$1,808,426
Education*	11	$7,498,106	6	$160,572
Engineering*	4	$246,351	6	$262,351
CE/Energy Systems**	39	$10,645,282	17	$1,591,283
CE/Manufacturing**	60	$22,681,019	38	$4,192,886
CE/Water Center**	39	$6,884,708	29	$2,554,872
Interdisciplinary Studies*	1	$25,000	0	$0
Nursing*	5	$288,178	0	$0
STEM Center**	11	$4,848,858	9	$1,227,552
Total	**219**	**$62,221,204**	**137**	**$13,088,361**

* Without Centers of Excellence or STEM Center

**See Table III

***Amount awarded by agency during 2015-16. Does not represent actual expenditures on project.

NOTE: The number of awards received may be greater than the number of proposals submitted because proposals submitted in previous years could be awarded in the current year. Similarly, the amount of funded may be greater than the current requested for the same reason.

TABLE III

Proposals Submitted and Awards Received Through Centers of Excellence and STEM Center by Academic Unit FY 2015-16

Energy Center

Center/Academic Unit	Proposals Submitted		Awards Received*	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Center	1	$889,000	1	$887,000
Center/Chemical Engineering/ Engineering Administration/ Mechanical Engineering	1	$25,275	0	$0
Basic Engineering/Civil and Environmental Engineering/ Engineering Administration/ English	1	$851,300	0	$0
Basic Engineering/Civil and Environmental Engineering/ Retention Services/English	1	$999,765	0	$0
Chemical Engineering	1	$176,872	1	$55,438
Civil and Environmental Engineering	7	$813,091	6	$125,161
Civil and Environmental Engineering/Manufacturing and Engineering Technology	0	$0	2	$135,488
Computer Science	5	$923,833	4	$293,921
Computer Science/Electrical and Computer Engineering	1	$40,000	0	$0
Computer Science/Mechanical Engineering	1	$200,000	0	$0
Electrical and Computer Engineering	8	$2,644,205	0	$0
Electrical and Computer Engineering/Chemical Engineering	1	$366,592	0	$0
Electrical and Computer Engineering/Engineering Administration	1	$60,000	1	$40,000

Engineering Administration/Chemical Engineering/Mechanical Engineering	0	$0	1	$25,275
English/Engineering Administration/Engineering Minority Program	1	$25,000	1	$29,000
Mechanical Engineering	4	$33,773	0	$0
Mechanical Engineering/ Civil and Environmental Engineering	1	$112,568	0	$0
Mechanical Engineering/ Computer Science/ Engineering Administration	1	$200,000	0	$0
Mechanical Engineering/ Engineering Administration	3	$2,284,008	0	$0
Total	**39**	**$10,645,282**	**17**	**$1,591,283**

*Amount awarded by agency during 2015-16. Does not represent actual expenditures on project.

TABLE III cont'd

Proposals Submitted and Awards Received Through Centers of Excellence and STEM Center by Academic Unit FY 2015-16

Manufacturing Center

Center/Academic Unit	Proposals Submitted		Awards Received*	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Center	3	$1,785,187	1	$1,476,800
Center/Mechanical Engineering	1	$299,531	0	$0
Center/Chemical Engineering/Earth Sciences/Mechanical Engineering	1	$375,758	0	$0
Chemical Engineering	7	$1,519,218	1	$99,336
Chemical Engineering/Chemistry	2	$412,479	0	$0
Chemical Engineering/ Chemistry/Sociology and Political Science	0	$0	2	$127,874
Chemical Engineering/Nursing	1	$20,000	1	$11,499
Computer Science	5	$5,057,507	6	$714,208
Computer Science/Economics, Finance and Marketing/Sociology and Political Science	1	$2,000,000	0	$0
Electrical and Computer Engineering	15	$2,220,773	9	$273,088
Electrical and Computer Engineering/ Engineering Administration/ Mechanical Engineering	1	$40,000	0	$0
Electrical and Computer Engineering/ Chemical Engineering/Engineering Administration/Mechanical Engineering	0	$0	1	$100,000
Engineering Administration	3	$107,934	4	$232,255
Manufacturing and Engineering Technology	1	$899,989	0	$0
Mechanical Engineering	16	$4,626,754	12	$1,057,870
Mechanical Engineering/ Computer Science	1	$3,000,000	0	$0
Mechanical Engineering/ Decision Sciences and Management/Manufacturing	0	$0	1	$99,956

and Engineering Technology/ STEM Center				
Mechanical Engineering/ Electrical and Computer Engineering/Manufacturing and Engineering Technology	1	$40,000	0	$0
Mechanical Engineering/ Manufacturing and Engineering Technology	1	$275,889	0	$0
Total	**60**	**$22,681,019**	**38**	**$4,192,886**

*Amount awarded by agency during 2015-16. Does not represent actual expenditures on project.

TABLE III cont'd

Proposals Submitted and Awards Received Through Centers of Excellence and STEM Center by Academic Unit FY 2015-16 Water Center

Center/Academic Unit	Proposals Submitted		Awards Received*	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Center	2	$1,213,130	3	$1,264,029
Agriculture	1	$299,746	0	$0
Biology	18	$780,291	17	$283,459
Biology/Chemistry/Civil and Environmental Engineering	1	$216,445	0	$0
Biology/Civil and Environmental Engineering	2	$2,889,556	0	$0
Biology/Environmental Sciences	1	$10,000	0	$0
Chemical Engineering	3	$340,791	0	$0
Chemistry/Curriculum and Instruction	0	$0	1	$702,834
Civil and Environmental Engineering	5	$495,701	3	$113,681
Civil and Environmental Engineering/Biology	1	$203,222	0	$0
Civil and Environmental Engineering/Computer Science	1	$60,019	1	$60,019
Civil and Environmental Engineering/Earth Sciences	1	$150,000	0	$0
Cooperative Fisheries Research Unit	1	$153,083	2	$105,850
Cooperative Fisheries Research Unit/Biology	1	$24,610	0	$0
Earth Sciences	1	$48,114	0	$0
English/Curriculum and Instruction	0	$0	2	$25,000
Total	**39**	**$6,884,708**	**29**	**$2,554,872**

*Amount awarded by agency during 2015-16. Does not represent actual expenditures on project.

TABLE III cont'd

Proposals Submitted and Awards Received Through Centers of Excellence and STEM Center by Academic Unit FY 2015-16

STEM Center

Center/Academic Unit	Proposals Submitted		Awards Received*	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Center	2	$2,320,057	4	$688,160
Art/Communication/Curriculum and Instruction	1	$73,658	1	$73,659
Chemical Engineering	1	$74,432	0	$0
Chemistry	1	$74,959	0	$0
Curriculum and Instruction	2	$149,974	0	$0
Curriculum and Instruction/ Electrical and Computer Engineering	1	$75,000	1	$74,996
Curriculum and Instruction/ Physics	1	$59,286	1	$59,290
Mechanical Engineering	1	$22,100	1	$22,100
Mechanical Engineering/English/ Mechanical Engineering	1	$1,999,392	0	$0
Physics/Curriculum and Instruction	0	$0	1	$309,347
Total	**11**	**$4,848,858**	**9**	**$1,227,552**

*Amount awarded by agency during 2015-16. Does not represent actual expenditures on project.

TABLE IV

Proposals Submitted and Awards Received By Agency Classification FY 2015-16

University Unit	Proposals Submitted		Awards Received*	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Federal	132	$52,687,862	91	$7,399,496
State	36	$5,614,327	25	$5,212,596
Private	47	$3,847,581	17	$404,835
Local	4	$71,434	4	$71,434
Total	**219**	**$62,221,204**	**137**	**$13,088,361**

*Amount awarded by agency during 2015-16. Does not represent actual expenditures on project.

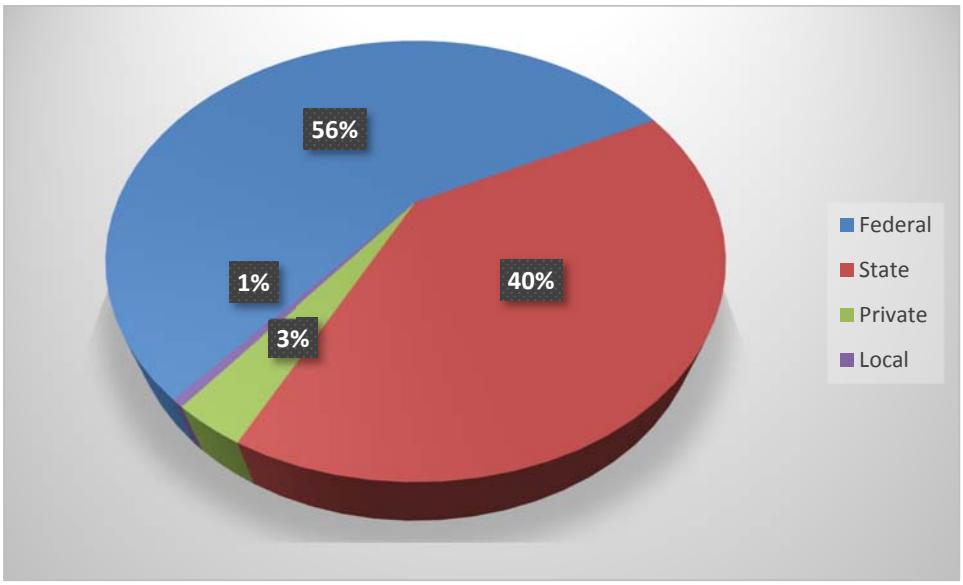

Figure 2
Percentage Funding by Agency Classification

TABLE V

Federal Awards Received By Agency FY 2015-16

Federal Awards	Amount Funded*
American Lightweight Materials Manufacturing	$180,000
Army Research Office	$15,000
Arnold Engineering Development Center	$48,000
Governor's Highway Safety Office	$635,170
Great Smoky Mountains National Park	$9,777
Luna Innovations	$20,207
MIT Lincoln Laboratory	$100,000
NASA	$22,100
National Science Foundation	$3,458,955
National Writing Project	$25,000
NAVFAC Atlantic	$57,420
Oak Ridge National Laboratories	$300,127
Office of Naval Research	$390,000
Substance Abuse and Mental Health Services	$99,998
Tennessee Department of Education	$567,450
Tennessee Department of Environment and Conservation	$1,000
Tennessee Department of Health and Human Services	$33,264
Tennessee Department of Transportation	$140,488
Tennessee Higher Education Commission	$148,655
Tennessee Small Business Development Center	$83,873
Tennessee Valley Authority	$5,000
Tennessee Wildlife Resources Agency	$146,850
The Nature Conservancy	$9,961
U. S. Army Corps of Engineers	$65,534
U. S. Department of Agriculture	$62,685
U. S. Department of Energy	$471,316
U. S. Department of Interior	$22,620
U. S. Fish and Wildlife Service	$25,647
U. S. Geological Survey	$50,899
U. S. AID	$17,500
UT-Battelle, LLC	$185,000
Total	**$7,399,496**

*Amount awarded by agency during 2015-16. Does not represent actual expenditures on project.

TABLE VI

Proposals Submitted and Awards Received By Activity FY 2015-16

Activity	Proposals Submitted		Awards Received*	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Research	162	$54,805,833	85	$8,282,215
Public Service	26	$3,531,615	28	$2,337,727
Instruction	19	$2,945,129	10	$1,608,639
Student Support/Scholarships	4	$380,969	7	$624,314
Academic Support	3	$186,467	5	$180,467
Operation/Capital Project	5	$371,191	2	$54,999
Total	**219**	**$62,221,204**	**137**	**$13,088,361**

*Amount awarded by agency during 2015-16. Does not represent actual expenditures on project.

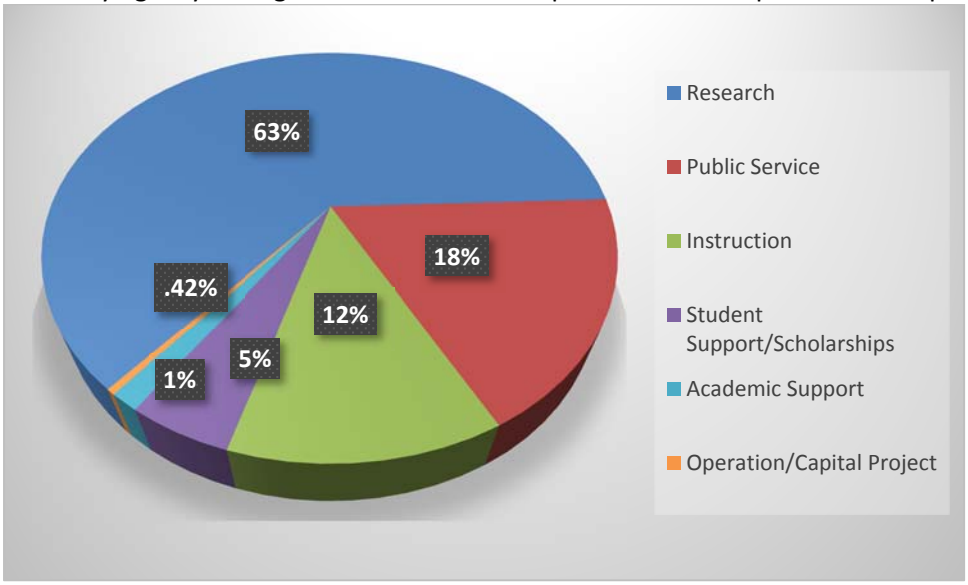

Figure 3
Percentage Funding by Activity

TABLE VII

Proposals Submitted and Awards Received FY 2015-16

Fiscal Year	Proposals Submitted	Amount Requested	Awards Received	Amount Funded*
2012	136	$30,525,667	131	$13,084,966
2013	125	$37,315,847	115	$11,974,879
2014	153	$46,245,166	129	$12,074,067
2015	163	$46,001,271	106	$11,197,912
2016	219	$62,221,204	137	$13,088,361

*Amount awarded by agency during 2015-16. Does not represent actual expenditures on project.

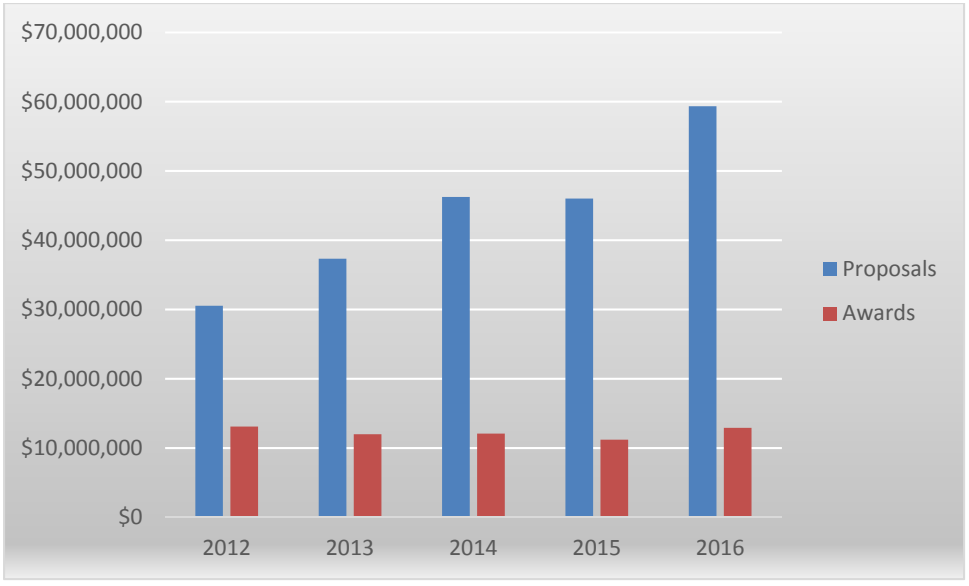

Figure 4
Proposals Submitted and Awards Received

TABLE VIII

Awards Received and Award Amounts By Classification FY 2012-16

Fiscal Year	Federal		State		Private		Local	
	No.	Award Amount*	No.	Award Amount*	No.	Award Amount*	No.	Award Amount*
2012	78	$6,439,549	40	$6,335,278	11	$184,100	2	$126,039
2013	70	$6,003,853	34	$5,768,149	9	$142,084	2	$60,793
2014	73	$5,640,601	42	$6,036,257	12	$366,656	2	$30,553
2015	71	$5,427,437	24	$5,451,722	11	$318,753	0	$0
2016	91	$7,399,496	25	$5,212,596	17	$404,835	4	$71,434

*Amount awarded by agency during 2015-16. Does not represent actual expenditures on project.

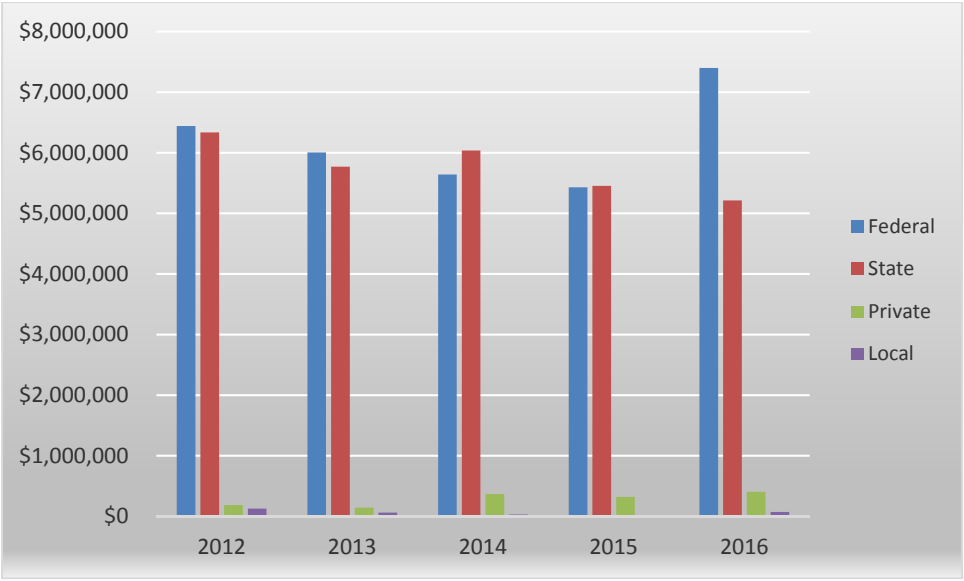

Figure 5
Funding Received by Classification

TABLE IX

Awards Received and Award Amounts By Type of Activity FY 2012-16

Fiscal Year	Research		Public Service		Instruction		Academic Support		Capital Project		Fellowship/ Scholarships/ Student Services	
	No.	Award Amount*	No.	Award Amount*	No.	Award Amount*	No.	Award Amount*	No.	Award Amount*	No.	Award Amount*
2012	75	$7,779,893	35	$2,932,169	17	$2,245,626	-	-	-	-	4	$127,278
2013	67	$7,436,337	34	$3,013,522	8	$1,037,411	1	$40,000	1	$250,000	4	$197,609
2014	84	$8,345,113	25	$2,439,103	12	$681,632	3	$240,100	-	-	5	$368,119
2015	60	$6,943,175	28	$2,587,904	8	$906,837	4	$200,728	-	-	6	$559,268
2016	85	$8,282,215	28	$2,337,727	10	$1,608,639	7	$624,314	5	$180,467	2	$54,999

*Amount awarded by agency during 2015-16. Does not represent actual expenditures on project.

RESEARCH COMPLIANCE AND GENERAL COMPLIANCE SUPPORT

Research Compliance

The Office of Research is responsible for monitoring compliance with the federal policies that regulate research activities in the following areas: responsible conduct of research, research ethics, human subjects research, the humane care of laboratory animals used in research and experimentation, the management of conflicts of interest in research, research integrity, export laws, and other areas of oversight.

Ultimately, it is the responsibility of the of the individual investigators, with the assistance from the Office of Research, to comply with all applicable federal, state, and funding agency guidelines in implementing their grants and contracts.

General Compliance Support

Several University Standing Committees are regulated federally and must meet certain compliance criteria, as well as other special committees. These committees are, in general, research related and are associated with the Office of Research. The Associate Vice President serves as the Executive Officer for these committees which include: the Institutional Animal Care and Use Committee, the Institutional Review Board for the Protection of Human Subjects, the Intellectual Property Advisory Committee, the Faculty Research Committee, the Caplenor Faculty Research Award Committee, and the University Research Advisory Committee. The Annual Report of each of these Committees is on file in the Office of Research and Graduate Studies.

INSTITUTIONAL ANIMAL CARE AND USE COMMITTEE

The Institutional Committee for the Care and Use of Laboratory Animals in Experimentation provides for and protects the welfare of laboratory animals used for research and pedagogy as set forth by the University and in accordance with the Public Health Service Act (PHS Act) mandated by the Health Research Extension Act of 1985, Public Law 99-158, and its amendments from the U.S. Department of Agriculture, 9 CFR 9, Parts 1-3. The committee membership includes faculty, administrators, a veterinarian, and a community representative. The Committee reports to the Administrative Council.

- **Committee Members**

  - Dr. Chris Brown, Biology
  - Dr. Bruce Greene, Agriculture
  - Dr. Steve Hayslette, Biology (Chair)
  - Ms. Tammy Howard, Nursing
  - Dr. Christy Killman, Health and Physical Education
  - Dr. Jessica Matson, Civil and Environmental Engineering
  - Dr. Charles McCaskey (ethicist)
  - Dr. Tyler Verble (veterinarian)
  - Dr. Francis Otuonye, Executive Officer

- **Committee Actions**

  - In accordance with national and institutional guidelines laboratories were inspected on September 25, 2015, and March 28, 2016.
  - Policy and procedures regarding the use of animals in research, training, and testing were updated and approved consistent with U.S. Department of Agriculture and Office of Laboratory Animal Welfare requirements.
  - 2 Applications Approved for the Use of Animals
    1) *"Identifying the skin and gut microbiota of amphibians and reptiles from the southeast U.S.,"* (D Walker), Fall 2015
    2) *"Feasibility of GPS collars to study eastern spotted skunks,"* (B. Carver), Spring 2016

- **Committee Dates**

  - September 17, 2015; March 17, 2016

INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS

The Institutional Review Committee for Human Subjects serves as the review board in accordance with the requirements for the protection of human subjects as set forth by the regulations created by Congress (Code of Federal Regulations, Title 45, Part 46). The committee is composed of faculty, administrators, and persons not affiliated with the University. It reports to the Administrative Council. The use of human subjects in any experimental environment, whether it be research (funded or non-funded), or other scholarly activities such as surveys, questionnaires, and classroom experiences, must be reviewed and approved by the committee.

- **Committee Members**

  - Dr. Meral Anitsal, Economics and Marketing
  - Dr. Chris Burgin, Counseling and Psychology
  - Dr. George Chitiyo, Curriculum and Instruction
  - Dr. Michael Clark, Music and Art (Chair)
  - Dr. Jann Cupp, Counseling and Psychology
  - Dr. Paula Engelhardt, Physics
  - Dr. Patricia McGee, Community Representative
  - Dr. Susan Piras, Nursing
  - Mr. James Rogers, Community Representative
  - Dr. Steven Seiler, Sociology and Political Science
  - Dr. Lisa Zagumny, Curriculum and Instruction
  - Dr. Francis Otuonye, Executive Officer

- **Committee Actions**

  - The Committee processed 233 exempt proposals and completed review of nine proposals submitted for expedited processing.
  - The Committee conducted two full-board reviews, both approved.
  - The Committee published new requirements for training and certification for all university faculty, staff, and students who are involved in research with human subjects.

- **Committee Dates**

  - September 14, 2015; November 9, 2015; April 4, 2016

INTELLECTUAL PROPERTY ADVISORY COMMITTEE

Tennessee Technological University acknowledges that the faculty and staff may from time to time conceive of an idea or discover a process that could lead to the development of a patent or the production of copyrightable materials. The University encourages such activities by the faculty and staff and recognizes its responsibility to see that ideas and discoveries are administered for the best interest of all parties concerned, including the public. The University has established an Intellectual Property Advisory Committee for the purpose of advising the President on all matters involving patents and copyrights. Membership is composed of faculty and staff experienced in research, innovation, and the production of copyrightable materials. A majority of the membership is from the faculty.

- **Committee Members**

  - Dr. Michael Allen, Mathematics
  - Dr. Sean Alley, Economics, Finance and Marketing
  - Dr. Ali Alouani, Electrical and Computer Engineering
  - Dr. Michael Best, Agriculture (Chair)
  - Dr. Sherrie Foster, Counseling and Psychology
  - Dr. Steve Frye, Interdisciplinary Studies
  - Dr. Kim Hanna, Nursing
  - Ms. Sharon Holderman, Library
  - Ms. Ann Manginelli, Library
  - Mr. Eugene Poole, Student
  - Dr. Manuel Villalba, Foreign Languages
  - Mr. Chase Womble, Student
  - Dr. Francis Otuonye, Executive Officer

- **Committee Actions**

  - A complete listing of intellectual property activity for 2015-16 is provided in Appendix B.

- **Committee Dates**

  - September 8, 2015; October 6, 2015; November 17, 2015; January 19, 2016; February 19, 2016; March 15, 2016

FACULTY RESEARCH COMMITTEE

The Faculty Research Program was established in the fall quarter of 1963 to: 1) stimulate interest in research on the part of the faculty; 2) provide institutional assistance to faculty members who wish to undertake research projects; and 3) assist in the dissemination of information developed in faculty research projects. The research program provides support for investigations of new research areas for the faculty members involved. The results of such support are expected to be publications or other dissemination of results and, where appropriate, proposals for external funding. It is anticipated that the results of faculty research will filter downward into the classroom, particularly to graduate courses. The Faculty Research Program is coordinated by the Faculty Research Committee. This committee consists of nine faculty members with the Associate Vice President of Research serving as Executive Officer.

- **Committee Members**

  - Dr. Curtis Armstrong, Decision Sciences and Management
  - Dr. William Eberle, Computer Science
  - Dr. John Harwood, Chemistry
  - Dr. Rachel Hall, Nursing
  - Dr. Ada Haynes, Sociology and Political Science
  - Dr. David Huddleston, Civil and Environmental Engineering
  - Dr. Judith Sullivan, Music
  - Dr. Melinda Swafford, Human Ecology
  - Dr. Stephanie Wendt, Teacher Education
  - Dr. Bharat Soni, Executive Officer

- **Committee Actions**

  - The Committee voted to remove the original Track II funding opportunity (travel) from the program and replace Track II with the original Track III funding. The Committee also approved for the Office of Research to review requests for travel funding on a case-by-case basis with the funding being supplied by the Office of Research.
  - A complete listing of the Faculty Research Awards for 2015-16 is provided in Appendix C.
  - The Committee held two proposal development workshops on November 19, 2015.

- **Committee Dates**

  - October 8, 2015**;** February 11, 2016**;** March 3, 2016

CAPLENOR FACULTY RESEARCH AWARD COMMITTEE

The Caplenor Faculty Research Award, established in 1984 in honor of the late Dr. Charles Donald Caplenor, former Associate Vice President for Research and Dean of Instructional Development, is awarded annually to one member of the faculty of Tennessee Technological University for outstanding research accomplished while employed at the University.

- **Committee Members**

  - Dr. Pedro Arce, Chemical Engineering
  - Dr. Deborah Barnard, Foreign Languages
  - Dr. Greg Danner, Music
  - Dr. Billye Foster, School of Agriculture
  - Dr. Tor Guimaraes, Business Administration
  - Dr. Melissa Geist, Nursing
  - Dr. Joseph Ojo, Electrical Engineering
  - Dr. Sandi J. W. Smith, Curriculum and Instruction
  - Dr. Ying Zhang, Mechanical Engineering
  - Dr. Francis Otuonye, Executive Officer

- **Committee Actions**

  - Dr. Michael Birdwell, History, was the recipient of the 2015-16 Caplenor Faculty Research Award.

- **Committee Dates**

  - September 10, 2015; March 4, 2016

UNIVERSITY RESEARCH ADVISORY COMMITTEE

The University Research Advisory Committee (URAC) advised the President and Provost on strategies to stimulate growth in research and externally funded scholarly activities within the University community. The Committee advised on the development of a comprehensive structure and network of activities to foster externally funded scholarly activities. The Committee report directly to either the Academic Council or Administrative Council or both, depending on the matter at hand. In carrying out its function, the Committee will:

A. Identify strengths, weaknesses, opportunities and challenges to research growth and externally funded scholarly activities at TTU.
B. Identify emerging research opportunities anticipated across the academic discipline.
C. Make recommendations regarding intellectual and infrastructure needs required to capitalize on major research opportunities.
D. Develop plans and make recommendations for accessing, supporting and sustaining existing and emerging research thrust areas.
E. Review current practices in research administration and recommend strategies to foster research growth.
F. Make recommendations regarding the commercialization of research and intellectual property issues.

- **Committee Members**

  - Dr. Pedro Arce, Chemical Engineering
  - Dr. Debbie Barnard, Foreign Languages
  - Dr. Greg Danner, Music
  - Dr. Billye Foster, School of Agriculture
  - Dr. Melissa Geist, Nursing
  - Dr. Tor Guimaraes, Business Administration
  - Dr. Joseph Ojo, Electrical and Computer Engineering
  - Dr. Sandi J. W. Smith, Curriculum and Instruction
  - Dr. Ying Zhang, Mechanical Engineering
  - Dr. Bharat Soni, Executive Officer

- **Committee Actions**

  - The Committee began work on evaluating and revising the strategic plan for research that was adopted April 10, 2012, with a subcommittee assigned to research what had been accomplished in relation to the specific recommendations found in the strategic plan.

  - The Committee worked with Dr. Soni to establish a set of criteria for the development of awards to acknowledge faculty research. A subcommittee was appointed to develop the criteria and the full committee approved guidelines to be used in the establishment of these awards.

APPENDICES

Appendix A gives the total amount of research funds brought into the University from external sources by college/area, departments/units within a given college, the faculty/ administrators/staff responsible for each proposal, the funding agency, and the amount of funding received.

Appendix B summarizes the intellectual property activity in the areas of patents and copyrights.

Appendix C summarizes the Faculty Research Committee Awards.

Appendix A

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Administration	5 Faculty	$166,997

Center for Teaching and Learning Exception

PI – Laura Cruz

- The Foundry Steelcase Active Learning Classroom
  Steelcase Education
  $62,000.00
  Co-PI(s): Pedro Arce and Jennifer Pascal, Chemical Engineering

Counseling Center

PI – Christina Mick

- #hopestrongeagles
  Substance Abuse and Mental Health Services Administration
  $99,998.00

University Police

PI – Mark Hillis

- FY2016 GHSO Visibility Grant
  Governor's Highway Safety Office
  $4,999.00

Agriculture and Human Ecology	3 Faculty	$438,933

Administration

PI – Liz Mullens

- Development of a Poultry Science Program
  Tennessee Department of Agriculture
  $85,000.00

Agriculture

PI - Ben Byler

- Administrative Staff for Camp Clements FFA Leadership Training Center 2015-16
  Tennessee Department of Education
  $194,466.00

Human Ecology

PI - Melinda Anderson

- Tennessee Early Childhood Training Alliance (TECTA), 2015-16
  Tennessee State University (via Tennessee Department of Human Services)
  $159,467.00

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Arts and Sciences	30 Faculty	$2,059,979

Biology

PI - Brian Carver

- Bat Sampling at Naval Support Activity Mid-South
  NAVFAC Atlantic
  $57,420.00
  Center: Water

PI – Carla Hurt

- Conservation Genetics of the Barrens Topminnow (Fundulus julisia)
  U. S. Fish and Wildlife Service
  $4,843.00
  Center: Water

PI - Robert Kissell

- Status and Distribution Survey of the Long-Tailed Weasel (Mustela frenatal) in Arkansas
  U. S. Department of the Interior, Arkansas Game and Fish Commission
  $22,620.00
  Center: Water

PI – Shawn Krosnick

- Analysis of Self-Compatibility, Germination, Shade Tolerance, and Plasticity of the Endangered Plant Physaria globosa
  U. S. Fish and Wildlife Service
  $10,000.00
  Center: Water
- TDEC Pilot Wetland Study
  Tennessee Department of Environment and Conservation
  $1,000.00
  Center: Water

PI - Hayden Mattingly

- Life History of the Obey Crayfish, Cambarus obeyensis: Implications for Species Conservation
  Tennessee Wildlife Resources Agency
  $15,000.00
  Co-PI(s): John Johansen, Water Center
  Center: Water
- Environmental DNA Detection, Population Status, and Habitat Use of the Pygmy Madtom, Noturus stanauli
  Tennessee Wildlife Resources Agency
  $24,000.00
  Co-PI(s): Carla Hurt, Biology
  Center: Water

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Biology cont'd

PI - Justin Murdock

- Monitoring for Didymosphenia geminata; An Environmental DNA Approach
  U. S. Fish and Wildlife Service
  $10,804.00
  Center: Water
- Microbial Roles in Water Quality Improvement
  U. S. Department of Agriculture
  $10,000.00
  Center: Water
- Determining Didymosphenia geminata (Didymo) Distribution and Colonization Potential in Tennessee Streams
  Great Smoky Mountains National Park
  $9,777.00
  Center: Water

PI – Joshuah Perkin

- Development of a Fish Index of Biotic Integrity for West Tennessee
  The Nature Conservancy
  $9,961.00
  Center: Water

PI - Thomas Roberts

- Development of a Hydrogeomorphic Guidebook for Riverine and Associated Wetlands within the Piedmont Physiographic Province
  Office of Naval Research
  $65,534.00
  Co-PI(s): Kenneth Morgan, Biology
  Center: Water
- Collecting Biological Data at TWRA Deer Check Stations
  Tennessee Wildlife Resources Agency
  $2,000.00
  Center: Water

PI – Donald Walker

- Inhibition of Chytridiomycosis by Cutaneous Microbiota of Plethodontid Salamanders
  Tennessee Herpetological Society
  $5,500.00
  Co-PI(s): Aubree Hill, Biology
  Center: Water

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Chemistry

PI - Jeffrey Boles

- Project Inspire
  National Science Foundation
  $702,834.00
  Co-PI(s): Jeffrey Wendt, Curriculum and Instruction
  Center: Water

PI – Jesse Carrick

- MRI: Acquisition of a Multinuclear 500 MHz NMR Spectrometer
  National Science Foundation
  $410,480.00
  Co-PI(s): William Carroll, Daniel Swartling, Xuanzhi Zhan, Chemistry; Jeffrey Rice, Chemical Engineering
  Center: Water

PI – Janet Coonce

- Chemistry Before Your Eyes
  Quaker Chemical Foundation
  $1,500.00
  Co-PI(s): Dale Ensor, Chemistry

Cooperative Fisheries Unit

PI - Phillip Bettoli

- TWRA Base Funds
  Tennessee Wildlife Resources Agency
  $30,000.00
  Center:

PI – Mark Rogers

- Status, Management, and Enhancement of Sport Fish Populations in Tennessee Reservoirs
  Tennessee Wildlife Resources Agency
  $70,000.00
  Center: Water
- Asian Carp Impacts on Native Sport Fish
  Tennessee Wildlife Resources Agency
  $35,850.00
  Center: Water

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

English

PI - Anthony Baker

- Tennessee Upper Cumberland Writing Project
  National Writing Project
  $25,000.00
  Co-PI(s): Jane Baker, Curriculum and Instruction
  Center: Water

PI – Mark Creter

- Tech Players | Blood Wedding
  Cookeville Arts Council
  $2,500.00

Physics

PI – Sakir Ayik

- Studies of Heavy-Ion Collisions in Stochastic Mean-Field Approach
  U. S. Department of Energy
  $37,000.00

PI – Adam Holley

- Investigation of Spin Evolution in Magnetic Ultracold Neutron Bottles Used to Measure the Free Neutron Lifetime
  National Science Foundation
  $115,000.00

PI - Raymond Kozub

- Nuclear Physics with Radioactive Ion Beams
  U. S. Department of Energy
  $19,000.00

PI – Mustafa Rajabali

- New High-Resolution Neutron Detector for the Studies of Exotic Nuclei-NEXT
  University of Tennessee (via USDOE)
  $53,009.00
  Center: Energy

PI - Stephen Robinson

- TTU STEM Majors for Rural Teaching (TTU-SMaRT)
  National Science Foundation
  $309,347.00
  Co-PI(s): Holly Anthony, Curriculum and Instruction
  Center: STEM

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Business	4 Staff	$1,808,426

Business Media Center

PI - Michael Aikens

- Governor's School for Business and IT Leadership
  Tennessee Department of Education
  $91,772.00

PI - Kevin Liska

- Diabetes Education Virtual Reality Campaign with Oculus Rift and App Development
  Cookeville Regional Charitable Foundation
  $50,000.00
- Cullman Water Reservoir/Conservation Virtual Reality Education Project
  Cullman, Alabama Economic Development Agency
  $20,000.00
- MakerMinded in Tennessee: Connecting To and Engaging The Next Generation of Manufacturing Leaders
  American Lighweight Materials Manufacturing Innovation Institute (via DOD)
  $180,000.00
- Diabetes Virtual Reality Education for Public Health
  Tennessee Institute of Public Health
  $5,000.00
- TBR Gates Student Advising Grant
  Tennessee Board of Regents
  $50,000.00
- GHSO Occupant Protection
  Governor's Highway Safety Office
  $14,696.00
- Governor's Highway Safety Office Marketing Management Tennessee Traffic Safety Resource 2016
  Governor's Highway Safety Office
  $459,359.00
- Ollie Otter, Booster Seat and Seat Belt Education, 2016
  Governor's Highway Safety Office
  $156,116.00
- TBR Marketing RODP Campaign
  Tennessee Board of Regents
  $659,610.00
- Lightweight Innovations for Tomorrow (LIFT)
  American Lightweight Materials Manufacturing Innovation Institute
  $30,000.00

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Business Media Center cont'd

PI – Kevin Liska

- Perkins IV-2015
  Tennessee Board of Regents
  $7,000.00

Economics, Finance and Marketing

PI - Yolunda Nabors

- Wage Study for the Upper Cumberland Human Resources Agency
  Upper Cumberland Human Resources Agency
  $1,000.00

Small Business Development Center

PI - Jennifer Dangelo

- Tennessee Small Business Development Center-TTU/Online Center
  Tennessee Small Business Development Center
  $83,873.00

Education	**12 Faculty**	**$368,517**

Art

PI – David Gallop

- Experiencing STEM: Demystifying the Practical Classroom Applications of Immersive and Augmented Reality
  Tennessee Higher Education Commission
  $73,659.00
  Co-PI(s): Jonathan Ezell, Communications; Jason Beach, Curriculum and Instruction
  Center: STEM

Counseling and Psychology

PI – Chad Luke

- Effects of Personality, Career and Development Factors on Intent to Return Among At-Risk and Underrepresented College Students
  Tennessee Board of Regents
  $21,941.00
  Co-PI(s): Tony Michael, Counseling and Psychology
  $5,660.00

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Craft Center

PI – Gail Gentry

- Explore Fine Craft Careers Program for High School Students
  Tennessee Arts Commission

Curriculum and Instruction

PI - Jason Beach

- Special Ed Programs and Services, Assistive Technology Grant
  Tennessee Department of Education
  $5,000.00

PI - Martha Howard

- Tennessee Early Childhood Pilot Program
  Putnam County Schools
  $86,532.00

- Healthy Start or Upper Cumberland Families and Young Children
  Holland J. Stephens Center
  $8,175.00

PI - Leslie Suters

- Coding for STEM: Connections between Algebra I and Physical World Concepts
  Tennessee Higher Education Commission
  $74,996.00
  Co-PI(s): Adam Anderson, Electrical and Computer Engineering
  Center: STEM

- Digging Deep Into Science Literacy: Subaward to MSP Submitted through Campbell County Schools
  Campbell County Schools (via Tennessee Department of Education)
  $59,290.00
  Co-PI(s): Kristen Pennycuff-Trent, Curriculum and Instruction; Paula Engelhardt, Physics
  Center: STEM

Education Administration

PI - Jennifer Shank

- Child and Adult Care Food Program (CACFP)
  Tennessee Department of Human Services
  $33,264.00

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Engineering	43 Faculty	$6,255,220

Engineering Administration

PI - Joseph Rencis

- REU Site: Summer Research Internships in Manufacturing and Techno-Entrepreneurship Preparation
  National Science Foundation
  $124,321.00
  Co-PI(s): Vahid Motevalli; Engineering Administration
  Center: Manufacturing
- "Power Into Motion" Proposed Automotive Powertrain Program at Tennessee Tech
  DENSO North American Foundation
  $50,000.00
  Center: Manufacturing
- Tennessee Louis Stokes Alliances for Minority Participation
  Tennessee State University (via NSF)
  $29,000.00
  Co-PI(s): Tony Marable, Engineering Minority Program
  Center: Energy
- Board of Architectural and Engineering Examiners Grant
  Board of Architectural and Engineering Examiners
  $37,322.00
- RET Supplement to REU Site: Summer Research Internships in Manufacturing and Techno-Entrepreneurship Preparation
  National Science Foundation
  $10,000.00
  Co-PI(s): Vahid Motevalli; Engineering Administration
  Center: Manufacturing

PI - Vahid Motevalli

- Center for Manufacturing Research
  Tennessee Higher Education Commission
  $1,476,800.00
  Center: Manufacturing
- Testing and Design
  various
  $47,934.00
  Co-PI(s): Joseph Biernacki; Chemical Engineering
  Center: Manufacturing

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Chemical Engineering

PI - Joseph Biernacki

- Collaborative Research: 3D Printing of Civil Infrastructure Materials with Controlled Microstructural Architectures

  National Science Foundation
  $55,438.00
  Center: Energy

- Collaborative Research: A Multi-Scale Environmental and Kinetics Study on the Pyrolysis of Sustainable Biomass Feedstock

  National Science Foundation
  $127,874.00
  Center: Manufacturing

PI - Laura Chavez

- EAGER: Intrinsic, Universal Fouling Resistance in Membraines for More Sustainable Production, Use and Recovery of Critical Resources

  National Science Foundation
  $35,000.00
  Center: Water

PI - Robby Sanders

- Idea to Commercially-Viable Healthcare Solutions: Enhancement and Expansion of Clinical Immersion at Disciplinary Interfaces Course

  Venturewell
  $11,499.00
  Center: Manufacturing

PI - Holly Stretz

- Improving Interracial Strength of 3-D Printed ABS Weld Lines: Compatibilized 'Stripe' Deposition

  Oak Ridge National Laboratory
  $99,336.00
  Center: Manufacturing

Civil and Environmental Engineering

PI - Daniel Badoe

- Traffic Monitoring Progam

  Tennessee Department of Transportation
  $135,488.00
  Co-PI(s): Steven Click, Civil and Environmental Engineering; Jessica Matson, Manufacturing and Engineering Technology
  Center: Energy

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Civil and Environmental Engineering cont'd

PI - Daniel Badoe

- Development of Tennessee Travel Demand Model Users' Group
  University of Tennessee-Knoxville (via Tennessee Dept. of Transportation)
  $10,900.00
  Center: Energy

PI - L. K. Crouch

- Developing a TDOT Class S-LH (Lower Heat) PCC Mixture Specification
  Tennessee Department of Transportation
  $5,000.00
  Center: Energy

PI - Alfred Kalyanapu

- Development of integrated DHSVM-Flood2D-GPU modeling framework for regional-scale modeling
  Oak Ridge National Laboratory
  $60,019.00
  Co-PI(s): Sheikh Ghafoor, Computer Science
  Center: Water
- Increasing the Resilience of Agricultural Production in the Tennessee and Cumberland River Basins through More Efficient Water Resource Use
  University of Tennessee (via USDA)
  $52,685.00
  Center: Water

PI - Benjamin Mohr

- Environmental & Economic Study of Glider Kit Assemblers
  Fitzgerald Glider Kits
  $70,056.00
- Linking Diversity of Polyphosphate Accumulating Organisms to Improved Functional Stability of the Enhanced Biological Phosphorus Removal Process
  National Science Foundation
  $45,996.00
  Co-PI(s): Tania Datta, Grace McMillan, Civil and Environmental Engineering
  Center: Water

PI - Daniel VandenBerge

- Phase 1 with Luna Innovations: real-time distributed sensing of subsurface in situ stress
  Luna Innovations
  $20,207.00
  Center: Energy

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Civil and Environmental Engineering cont'd

PI - Matthew Yarnold

- Using Temperature-Driven Data
  National Science Foundation
  $63,201.00
  Center: Energy
- Hernando Destoto I-40 Bridge Seismic Instrumentation Upgrade
  University of Memphis
  $25,853.00
  Center: Energy

Computer Science

PI - William Eberle

- III:Small:Collaborative Research: Anomaly Detection in Graph Streams
  National Science Foundation
  $70,821.00
  Center: Manufacturing

PI - Sheikh Ghafoor

- Knowledge-Based Flood Inundation Forecast on Affordable Mobile Platforms to Empower Farmers
  University of Washington (via USAID)
  $17,500.00
  Center: Energy
- Develop and Benchmark Architecture Agnostic Scalable Library of Data Parallel Kernels for Big Data Architecture
  Oak Ridge National Laboratory
  $8,454.00
  Center: Energy
- Develop and Benchmark Architecture Agnostic Scalable Library of Data Parallel Kernels for Big Data Architecture
  Oak Ridge National Laboratory
  $16,546.00
  Center: Energy
- iPDC: Integrating Parallel and Distributed Computing in Introductory Programming
  National Science Foundation
  $49,973.00
  Co-PI(s): Michael Rogers, Computer Science
  Center: Manufacturing

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Computer Science cont'd

PI - Stephen Scott

- Joint Faculty Agreement with ORNL
  Oak Ridge National Laboratories
  $4,718.00
  Center: Manufacturing

PI - Ambareen Siraj

- Tennessee Cybercorps: A Hybrid Program in Cybersecurity
  National Science Foundation
  $613,898.00
  Co-PI(s): Mohammad Rahman; Computer Science
  Center: Manufacturing
- Collaborative Proposal: Capacity Building in Cybersecurity: Broadening Participation of Women in Cybersecurity through Women in Cybersecurity Conference and Professional Development
  National Science Foundation
  $50,000.00
  Center: Manufacturing
- Collaborative Research: CyberWorkshops: Resources and Strategies for Teaching Cybersecurity in Computer Science
  National Science Foundation
  $176,219.00
  Co-PI(s): Sheikh Ghafoor, Douglas Talbert; Computer Science
  Center: Energy

Electrical and Computer Engineering

PI - Ali Alouani

- CAPSTONE: Pacific Instrumentation Data Acquisition Scanner Emulator (PIDASE)
  Arnold Enginnering Development Center
  $12,000.00
  Center: Manufacturing
- CAPSTONE: Profinet to Profinet Encryption Dongle
  Arnold Enginnering Development Center
  $12,000.00
  Center: Manufacturing
- CAPSTONE: Automated Module for Emulation of Load Serving Capacity
  Tennessee Valley Authority
  $5,000.00
  Center: Manufacturing

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Electrical and Computer Engineering cont'd

PI - Ali Alouani

- CAPSTONE: Design and Development of a Digital Frequency Counter
  Arnold Engineering Development Center
  $12,000.00
  Center: Manufacturing
- Reflective Memory to Ethernet Interface Card Design and Development
  Aerospace Testing Alliance, Arnold Engineering and Development Center
  $12,000.00
  Center: Manufacturing
- CAPSTONE: ECE Senior Design
  various
  $21,000.00

PI - Adam Anderson

- Consulting in Areas of Applied Signal Processing and Advanced Communications Techniques
  Oak Ridge National Laboratory
  $101,054.00
  Center: Manufacturing

PI - Rabie Belkacemi

- Self-Charging Autonomous Aerial Vehicle for Power Lines Inspection
  Tennessee Board of Regents
  $40,000.00
  Co-PI(s): Hicham Chaoui, Electrical and Computer Engineering; Satish Mahajan, Energy Center; Vahid Motevalli, Engineering Administration
  Center: Energy

PI - R. Wayne Johnson

- Advancement of Cryogenic Electronics
  MIT Lincoln Laboratory
  $100,000.00
  Co-PI(s): Satish Mahajan, Energy Center; Holly Stretz, Chemical Engineering; Jie Cui and Christopher Wilson, Mechanical Engineering
  Center: Manufacturing

PI - Mohamed Mahmoud

- REU: Security and Privacy-Preserving Cyber Physical Systems
  National Science Foundation
  $119,034.00
  Co-PI(s): Syed Rafay Hasan; Electrical and Computer Engineering
  Center: Manufacturing

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Energy Center

PI – Satish Mahajan

- Center for Energy Systems Research
  Tennessee Higher Education Commission
  $887,000.00
  Center: Energy
- Power-Test-Service Account
  various
  $25,275.00
  Co-PI(s): Jie Cui and Stephen Idem, Mechanical Engineering
  Center: Energy

Mechanical Engineering

PI - Steven Anton

- Enabling Microsecond Condition Monitoring for Real-Time Assessment of Critical Infrastructure
  Vibration Institute
  $10,000.00
  Center: Manufacturing

PI - Stephen Canfield

- TTU-NSF Innovation Corps Sites
  National Science Foundation
  $99,956.00
  Co-PI(s): Ismail Fidan, Manufacturing and Engineering Technology
  Center: Manufacturing

PI - Corinne Darvennes

- National Space Grant College and Fellowship Program (SPACE Grant)
  Vanderbilt University (via NASA)
  $22,100.00
  Center: STEM

PI - Glenn Cunningham

- Public-Private Partnership for a Comprehensive Workforce Development Plan to Stimulate Industrial Energy Efficiency and Demand Reduction
  U. S. Department of Energy
  $260,000.00
  Center: Manufacturing

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Mechanical Engineering cont'd

PI - Chabum Lee

- Collaborative Research: Edge Surface Topography Characterization for Precision Sensing Technology
  National Science Foundation
  $116,138.00
  Center: Manufacturing

PI - Meenakshi Sundaram

- UT-CIS Contract for 2015-16 (CAPSTONE)
  The University of Tennessee
  $15,000.00
  Center: Manufacturing
- UT-CIS Contract for 2015-16
  The University of Tennessee
  $20,000.00
  Center: Manufacturing

PI - Christopher Wilson

- Governor's School for Emerging Technologies
  Tennessee Department of Education
  $133,973.00

PI - Ying Zhang

- Development of Marinized Pt-Modified MCrAlX Coatings with Improved Hot Corrosion and Oxidation Resistance Synthesized via a Low-Cost Electrodeposition Process
  Office of Naval Research
  $390,000.00
  Center: Manufacturing
- Fabricate Alumnizing Ni-based 31V Alloy
  Oak Ridge National Laboratory
  $10,000.00
  Center: Manufacturing

PI - Jiahong Zhu

- Supplement to GOALI: Simple Low Cost Methods for Making Conductive Interfacial Coatings for Solid Oxide Fuel Cells
  National Science Foundation
  $5,000.00
  Center: Manufacturing

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

Mechanical Engineering cont'd

PI – Jiahong Zhu

- GOALI: Environmentally-Assisted Reactive Sintering of Conductive Spinel Layers for Solid Oxide Fuel Cell Application
  National Science Foundation
  $129,425.00
  Center: Manufacturing
- Development of Low-Cost, Highly Sinterable, Co-Free (NiFe3) O4 Spinel-Based Contact Materials for SOFC Cathode-Side Contact Application
  U. S. Department of Energy
  $102,307.00
  Center: Manufacturing

Nursing	**2 Faculty**	**$1,000**

Nursing

PI - Shelia Hurley

- Nursing White Coat Ceremony
  Arnold P. Goldman Foundation
  $1,000.00
  Co-PI(s): James Greer, SACF Nursing

Research and Economic Development	**3 Faculty/1 Staff**	**$1,982,189**

Research and Economic Development

PI - Bharat Soni

- Center for the Management, Utilization and Protection of Water Resources
  Tennessee Higher Education Commission
  $1,154,300.00
  Center: Water
- Water Center Analytical and Computer Services
  Various
  $58,830.00
  Center: Water
- 8th Americas Regional Conference of the International Society for Terrain Vehicle Systems
  Army Research Office
  $15,000.00

Appendix A cont'd

Externally Funded Projects by College/Department/Center, Investigator(s), Project Title, Funding Agency and Funding Amount

STEM Center

PI - Sally Pardue

- AEOP Batelle Consortium
  Batelle
  $185,000.00
  Center: STEM
- Upper Cumberland Rural STEM Initiative: Learning Communities for Manufacturing Careers
  Tennessee Department of Education
  $503,160.00
  Center: STEM

Water Center

PI – Tania Datta

- Building Partnerships and Compiling Data to Assess the Falling Water River Watershed
  Upper Cumberland Development District (via TDEC)
  $15,000.00
  Center: Water

PI – Kendall Moles

- Propagation and Culture of Juvenile Mussels for Restoration Efforts in the Ohio River
  U. S. Geological Survey
  $50,899.00
  Center: Water

Appendix B

Intellectual Property Activity 2015-16

Invention Disclosures

- Antimicrobial therapy using multifunctional engineered bacteriophage by Jeffrey Rice and Paige Spencer
- Apparatus used for producing coatings by Jason Witman, Ying Zhang, and Brian Bates
- Compressed gas flow meter on inlet side of gas compressor by Glenn Cunningham and Athony Taylor
- Displacement sensing apparatus using curved edge diffraction by ChaBum Lee
- Method and apparatus for noninvasive mechanical-based assessment of heart performance by Hamidreza Ghasemi Bahraseman
- Mine detector integration and GPS eyeglass by Christopher Aghwacha
- Perfect-Fit Ostomy wafer and punch by Toni Roberts and Rebecca Turpin
- Redesigned wound vac (negative pressure system) by Ann Hellman
- Training with Tikes --- A system to allow a child with visual impairment to ride a bike by seeing through haptic feedback by Stephen Canfield, April Parkison, and Chance Williams

Provisional Patent Applications Filed

- Advanced selectivity gas permeable anode flow field design for efficient removal of carbon dioxide in a direct formic acid fuel cell by Cynthia Rice, Shadi Saeed, Michael Renfro, and Antonio Pistono
- Apparatus used to produce coatings by Jason Witman, Ying Zhang, and Brian Bates (in process)
- Method and apparatus for non-invasive mechanical-based assessment of heart performance by Ehsan Languri and Hamidreza Bahraseman (in process)
- Reduction or potential inhibition of autogenous and dry shrinkage of Portland cement concrete by Joe Biernacki, Don Visco and Hamed Kayello (University of Akron), one filed for acetates and one for amines
- Compressed gas flow meter on inlet side of gas compressor by Glenn Cunningham and student, Anthony Taylor
- Reduced-temperature sintering of spinel-type coatings and layers with metallic alloy powder precursors by Jiahong Zhu

License Agreement

- Chemistry Games by Janet Coonce licensed to Carolina Biological Company

Appendix C

Faculty Research Committee Awards 2015-16

Track I

Author(s)	Title	Dept.	Amt.	Type
Wonkak Kim	Artist Recital at the 2015 International Clarinet Fest in Madrid, Spain: World Premiere Performance of Works by American Composers	Music	$3,000	Track I
Terezie Tolar Mosby	Development of Tool to Teach Low Literacy Caregivers About Nutrition	School of Human Ecology	$2,961	Track I
Matthew Zagumny	Psychometric Analysis of the Modified Religious Identity Ondex (RII-5): A Theoretical Examination of Religious Extremism	Counseling and Psychology	$3,000	Track I
Martin Sheeham	New Visions: Photographic Representation, Preception and Reception in the German Teacher	Foreign Languages	$3,000	Track I
Kristen Deiter	John Milton and the Tower of London	English	$3,000	Track I
Michael Phillips/ Jason Beach/ Michael Cathey	Examining the Reliability and Validity of the Hexoskin Wearable Boby Metrics Shirt	Exercise Science Physical Ed Wellness/ Curriculum and Instruction	$2,276	Track I
Colleen Hays	Negotiating "Racial" Differences or Reinforcing Stereotypes?: French-North African Relationships in "Il reste du jambon" and "Mohamed Dubois"	Foreign Languages	$2,250	Track I
			$19,487	

Appendix C cont'd

Faculty Research Committee Awards 2015-16

Track III

Author(s)	Title	Dept.	Amt.	Type
Justin Murdock/ Andrew Calendar	Development of a Rapid Spectroscopic Screening Process for Assessing Algal Response to Environmental Change	Biology/ Chemistry	$10,000	Track III
Joshuah Perkin	Multidisciplinary and Ecosystem-level Evaluation of Aquatic Biodiversity Response to Future Water Shortages in Southeastern U.S. Streams	Biology	$9,997	Track III
Cynthia Rice/ Jeffrey Rice/ Jennifer Pascal	Electrochemical Biosensors for Detection of Glycosylated Proteins for Early Cancer Diagnosis	Center For Manufacturing Research/Chemical Engineering	$10,000	Track III
Alireza Pezhman Shirvanian	Development of Guidelines for Optimal Design of Photo Catalytic Materials for Solar Hydrogen Production	Mechanical Engineering	$10,000	Track III
Steven Anton	Integrated Sensing and Energy Harvesting in Total Knee Replacement Implants	Mechanical Engineering	$10,000	Track III
Tania Datta	An Investigation of Simultaneous Biological Nitrogen and Phosphorus Removal at Full-Scale Wastewater Treatment Facilities	Water Center/Civil and Environmental Engineering	$10,000	Track III
Marissa Hartwig	Predicting Class Attendance and Performance: Students' Expectations and Characteristics	Counseling and Psychology	$7,900	Track III
Stephanie Richards/ Kristen Trent	Anti-Bullying Campaign using Exemplary Texts	Curriculum and Instruction	$5,615	Track III
			$73,512	