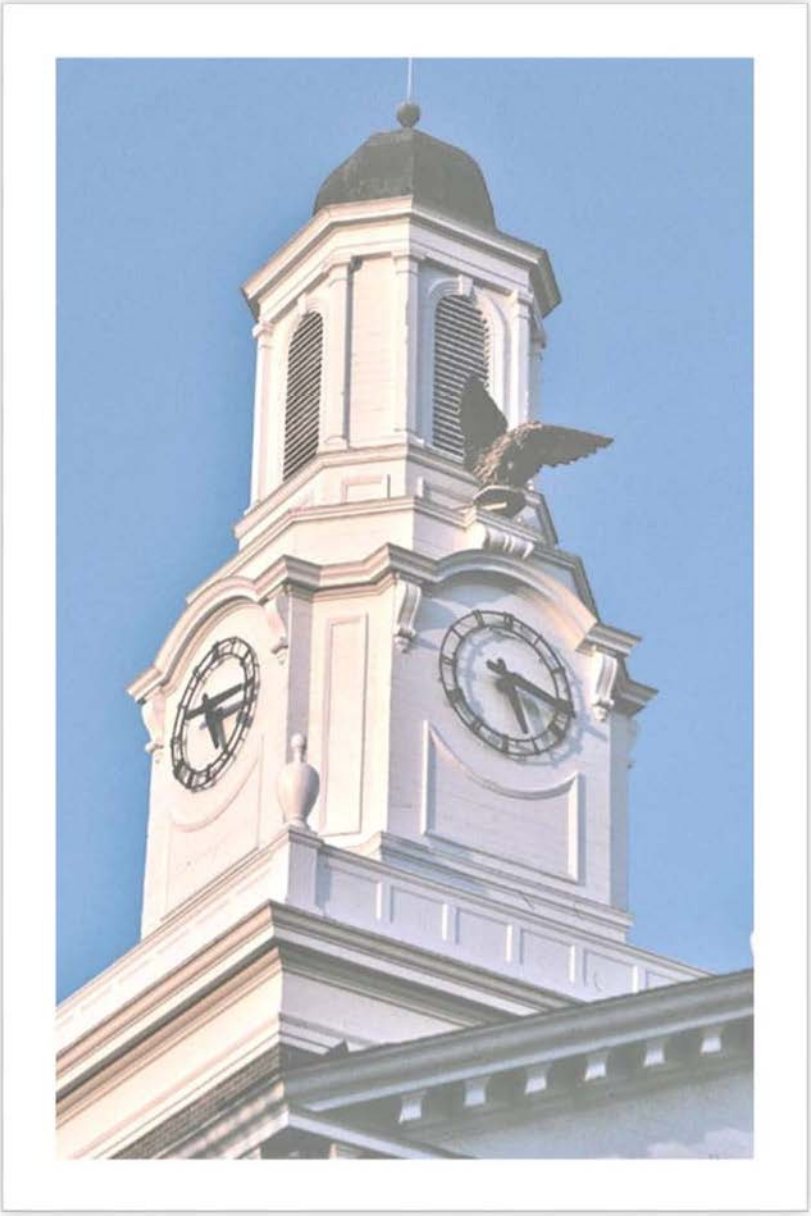

TENNESSEE TECHNOLOCIAL UNIVERSITY
ANNUAL REPORT 2016-17

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 2016-17, the University's Mission was supported through the Office of Research in the following ways: NOTE: YELLOW HIGHLIGHT INDICATES UPDATED NUMBERS.

- Grants and contracts externally funded numbered 153 with a value of $16,910,722, which represents an increase of 29% over the 2015-16 total of $13,088,361.
- Grants and contracts received through the three Centers of Excellence and the STEM Center numbered 100 with a value of $10,644,603, which represents 63% of total dollars and 65% of the total number of grants and contracts received.
- Grants and contracts received through federal agencies numbered 88 with a value of $8,251,229, which represents 58% of grants and contracts and 49% of total dollars received.
- Grants and contracts received through state agencies numbered 44 with a value of $8,147,524, which represents 29% of the total number of grants and contracts and 48% of total grant and contract dollars received.
- Private contracts were at 20 with a value of $505,352, which represents 13% of the total number of grants and contracts and 3% of total grant and contract dollars.
- Local funding came in at 1 with a value of $6,617, which represents .6% of grants and contracts and .04% of total grant and contract dollars.
- Grants and contracts received for research numbered 96 with a value of $9,454,622, which represents 63% of the total number of grants and contracts and 56% of total dollars received.
- Grants and contracts received for public service numbered 33 with a value of $3,501,357, which represents 22% of all grants and contracts and 21% of total grant and contract dollars received.
- Instruction funding received numbered 8 with a value of $1,192,717, which represents 5% of total number of grants and contracts and 7% of total grant and contract dollars.
- Grants and contracts received for student services/scholarships numbered 9 with a value of $415,033, which represents 6% of the total number of grants and contracts and 2% of total dollars received.

- Operation/Capital Projects funding numbered 3 with a value of $2,137,847, which represents 2% of total number of grants and contracts and 13% of total grant and contract dollars.

- Academic Support funding accounted for 4 contracts with a value of $209,146, which represents 3% of the total number of grants and contracts and 1% 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 $3,505,726, the Tennessee Department of Education at $1,475,557, the Tennessee Highway Safety Office at $618,936, and the U. S. Department of Energy at $613,053.

- Proposals submitted for external funding numbered 205 with a value of $52,422,913.

- Proposals submitted through the Centers of Excellence and STEM Center numbered 137 with a value of $36,066,747, which represents 67% of proposals submitted and 69% of funds requested.

- Proposals submitted to federal agencies numbered 132 requesting $41,907,561, which represents 64% of proposals submitted and 80% of dollars requested.

- Proposals submitted to state agencies numbered 35 requesting $8,292,446, which represents 17% of proposals submitted and 16% of dollars requested.

- Proposals submitted to private agencies numbered 37 requesting $2,216,289, which represents 18% of proposals submitted and 4% of dollars requested.

- Proposals submitted to local agencies numbered 1 requesting $6,617 which represents .5% of proposals submitted and .01% of dollars requested.

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FIGURE 1

External Funds Historical, Actual and Projected FY 2012-17

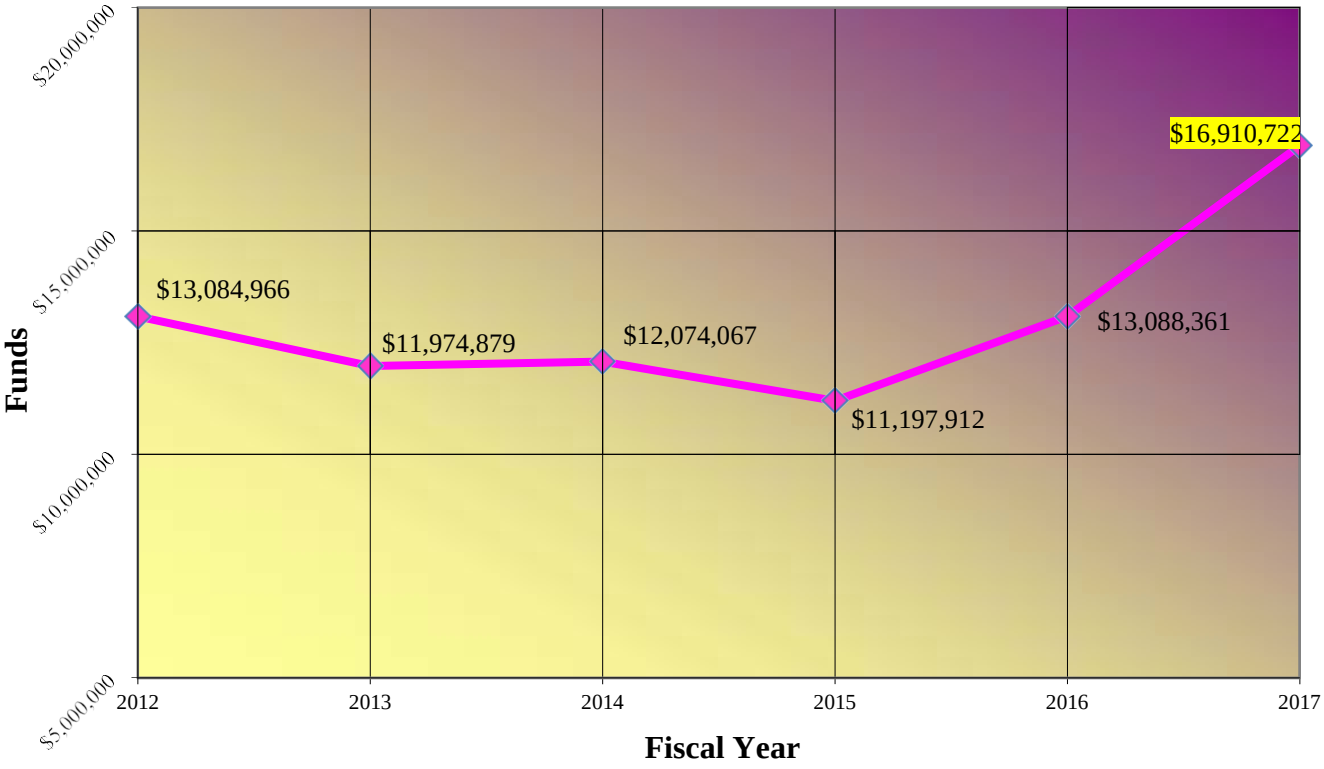

TABLE I

Externally Funded Projects by Department of Project PI*
FY 2016-17

		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	Administration					$17,847	$17,847
	Agriculture					$2,253,962	$2,253,962
	Human Ecology					$184,146	$184,146
Subtotal						**$2,455,955**	**$2,455,955**
Arts and Sciences	Biology			$119,835		$6,800	$126,635
	Chemistry			$479,644		$37,500	$517,144
	Cooperative Fisheries Research Unit			$283,543		$30,000	$313,543
	Earth Sciences					$29,500	$29,500
	Physics	$75,000				$242,481	$317,481
Subtotal		**$75,000**		**$883,022**		**$346,281**	**$1,304,303**
Business	Business Media Center					$2,143,298	$2,143,298
	MBA Program					$2,500	$2,500
	Small Business Development Center					$150,140	$150,140
Subtotal						**$2,295,938**	**$2,295,938**
Education	Administration					$11,000	$11,000
	Counseling and Psychology					$160,051	$160,051
	Curriculum and Instruction				$309,626	$620,708	$930,334
Subtotal					**$309,626**	**$791,759**	**$1,101,385**
Engineering	Administration		$175,009			$33,725	$208,734
	Chemical Engineering	$93,265	$28,501	$146,411			$268,177
	Civil and Environmental Engineering	$85,904		$99,574		$12,500	$197,978
	Computer Science	$319,440	$1,101,033			$141,073	$1,561,546
	Electrical and Computer Engineering	$254,754	$922,547				$1,177,301
	Manufacturing and Engineering Technology		$361,149				$361,149
	Mechanical Engineering	$47,671	$1,088,826		$40,360		$1,176,857
	Student Success Center	$25,000					$25,000
Subtotal		**$826,034**	**$3,677,065**	**$245,985**	**$40,360**	**$187,298**	**$4,976,742**
Fine Arts	Craft Center					$6,300	$6,300
Subtotal						**$6,300**	**$6,300**
Interdisciplinary Studies	Administration					$25,000	$25,000
	Interdisciplinary Studies			$24,000			$24,000
Subtotal				**$24,000**		**$25,000**	**$49,000**
Centers of Excellence	Energy Center Appropriation	$872,800					$872,800
	Energy Center Other	$13,580					$13,580
	Manufacturing Center Appropriation		$1,453,000				$1,453,000
	Manufacturing Center Other		$52,151				$52,151
	Water Center Appropriation			$1,133,100			$1,133,100
	Water Center Other			$329,225			$329,225
Subtotal		**$886,380**	**$1,505,151**	**$1,462,325**			**$3,853,856**

TABLE I cont'd

Externally Funded Projects by Department of Project PI*
FY 2016-17

Nursing	Nursing					$74,581	$74,581
Subtotal						**$74,581**	**$74,581**
Other	Counseling Center					$90,157	$90,157
	Research and Economic Development					$10,000	$10,000
	STEM Center				$692,505		$692,505
Subtotal					**$692,505**	**$100,157**	**$792,662**
Total	All Units	**$1,787,414**	**$5,182,216**	**$2,615,332**	**$1,042,491**	**$6,283,269**	**$16,910,722**

***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 2016-17

University Unit	Proposals Submitted		Awards Received***	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Administration*	6	$1,477,153	2	$100,157
Agriculture and Human Ecology*	2	$2,237,065	6	$2,455,955
Arts and Sciences*	24	$3,533,635	11	$346,281
Business Administration*	12	$1,533,347	16	$2,295,938
Education*	11	$2,826,366	9	$791,759
Engineering*	6	$4,185,529	5	$187,298
CE/Energy Systems**	43	$11,263,637	21	$1,787,414
CE/Manufacturing**	60	$17,271,040	39	$5,182,216
CE/Water Center**	25	$3,780,693	29	$2,615,332
Fine Arts	3	$55,188	1	$6,300
Interdisciplinary Studies*	1	$35,000	1	$25,000
Nursing*	3	$472,883	2	$74,581
STEM Center**	9	$3,751,377	11	$1,042,491
Total	**205**	**$52,422,913**	**153**	**$16,910,722**

* Without Centers of Excellence or STEM Center
**See Table III
***Amount awarded by agency during 2016-17. 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 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 2016-17 Energy Center

Center/Academic Unit	Proposals Submitted		Awards Received*	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Center	1	$872,800	1	$872,800
Center/Civil and Environmental Engineering	1	$397,347	0	$0
Center/Civil and Environmental Engineering/Mechanical Engineering	1	$13,580	1	$13,580
Center/Mechanical Engineering	1	$100,000	0	$0
Chemical Engineering	3	$1,159,637	2	$93,265
Civil and Environmental Engineering	8	$1,264,884	3	$85,904
Civil and Environmental Engineering/ Earth Sciences	1	$497,701	0	$0
Civil and Environmental Engineering/Mechanical Engineering	1	$19,290	0	$0
Computer Science	8	$2,163,990	6	$319,440
Computer Science/Electrical and Computer Engineering	1	$513,821	0	$0
Electrical and Computer Engineering	11	$3,169,414	2	$39,649
Electrical and Computer Engineering/ Center	1	$374,797	1	$60,000
Electrical and Computer Engineering/ Center/Mathematics	1	$247,146	0	$0
Electrical and Computer Engineering/ Chemical Engineering	1	$366,592	0	$0
Electrical and Computer Engineering/ Manufacturing Center	0	$0	1	$155,105
Engineering Administration/ Engineering Minority Program/ Student Success Center	0	$0	1	$29,000
Mechanical Engineering	2	$68,375	1	$18,671
Minority Affairs	1	$34,263	0	$0
Physics	0	$0	1	$75,000
Student Success Center/Engineering Administration/Engineering Minority Program	0	$0	1	$25,000
Total	**43**	**$11,263,637**	**21**	**$1,787,414**

*Amount awarded by agency during 2016-17. 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 2016-17 Manufacturing Center

Center/Academic Unit	Proposals Submitted		Awards Received*	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Center	3	$1,804,628	2	$1,505,151
Center/Chemical Engineering/Electrical and Computer Engineering/Mechanical Engineering	1	$749,592	0	$0
Chemical Engineering	8	$1,976,629	0	$0
Chemical Engineering/Nursing	1	$299,946	2	$28,501
Computer Science	10	$2,279,936	6	$1,101,033
Computer Science/Sociology and Political Science	3	$1,087,752	0	$0
Electrical and Computer Engineering	5	$770,922	6	$398,193
Electrical and Computer Engineering/Chemical Engineering/Engineering Administration/Mechanical Engineering	0	$0	3	$524,354
Electrical and Computer Engineering/ Mechanical Engineering	1	$231,135	0	$0
Engineering Administration	2	$85,000	2	$175,009
Manufacturing and Engineering Technology	2	$352,947	2	$361,149
Mathematics	0	$0	0	$0
Mechanical Engineering	23	$7,335,891	16	$1,088,826
Mechanical Engineering/ Manufacturing and Engineering Technology	1	$296,662	0	$0
Total	**60**	**$17,271,040**	**39**	**$5,182,216**

*Amount awarded by agency during 2016-17. 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 2016-17 Water Center

Center/Academic Unit	Proposals Submitted		Awards Received*	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Center	3	$1,258,114	3	$1,258,114
Agriculture	1	$25,000	0	$0
Biology	14	$1,445,278	9	$119,835
Biology/Agriculture	0	$0	1	$17,150
Biology/Chemistry/ Chemical Engineering	0	$0	0	$0
Chemical Engineering	0	$0	2	$146,411
Chemistry/Curriculum and Instruction	0	$0	1	$479,644
Civil and Environmental Engineering	4	$534,268	7	$294,599
Civil and Environmental Engineering/Biology	1	$209,441	0	$0
Cooperative Fisheries Research Unit	0	$0	3	$258,933
Cooperative Fisheries Research Unit/Biology	0	$0	1	$24,610
Environmental Studies/ Chemistry	1	$284,592	0	$0
Interdisciplinary Studies	1	$24,000	0	$0
Interdisciplinary Studies/ Biology	0	$0	2	$33,186
Total	**25**	**$3,780,693**	**29**	**$2,632,482**

*Amount awarded by agency during 2016-17. 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 2016-17 STEM Center

Center/Academic Unit	Proposals Submitted		Awards Received*	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Center	2	$162,188	5	$692,505
Biology/Curriculum and Instruction/Earth Sciences	1	$74,880	0	$0
Chemistry	1	$40,000	0	$0
Curriculum and Instruction	2	$1,324,618	1	$74,987
Curriculum and Instruction/ Accounting and Business Law/ Nursing	1	$74,827	1	$76,736
Curriculum and Instruction/ Electrical and Computer Engineering	1	$74,999	1	$75,025
Curriculum and Instruction/ Mechanical Engineering	0	$0	1	$40,360
Curriculum and Instruction/ Education	0	$0	2	$82,878
Mechanical Engineering/Center	1	$1,999,865	0	$0
Total	**9**	**$3,751,377**	**11**	**$1,042,491**

*Amount awarded by agency during 2016-17. Does not represent actual expenditures on project.

TABLE IV

Proposals Submitted and Awards Received By Agency Classification FY 2016-17

University Unit	Proposals Submitted		Awards Received*	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Federal	132	$41,907,561	88	$8,251,229
State	35	$8,292,446	44	$8,147,524
Private	37	$2,216,289	20	$505,352
Local	1	$6,617	1	$6,617
Total	**205**	**$52,422,913**	**153**	**$16,910,722**

*Amount awarded by agency during 2016-17. Does not represent actual expenditures on project.

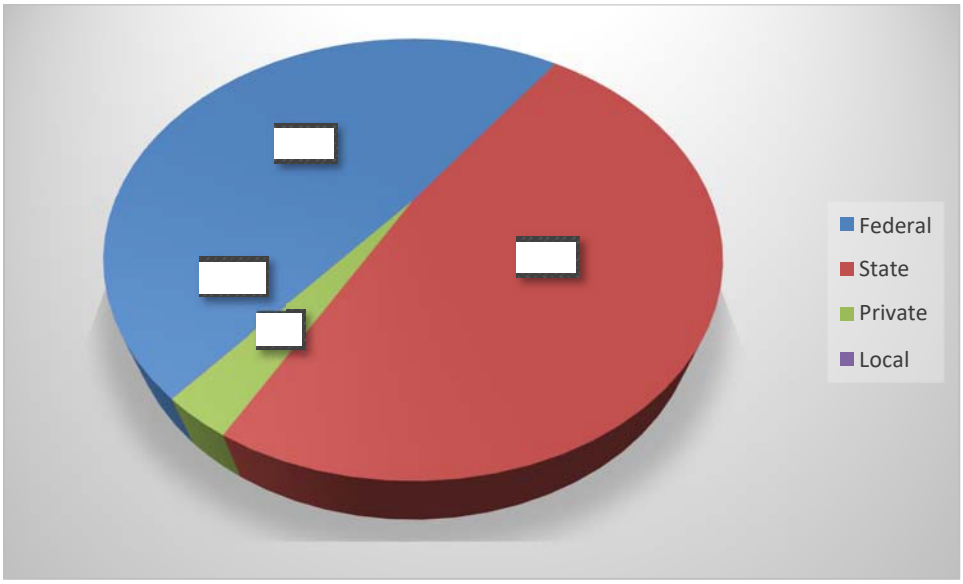

Figure 2
Percentage Funding by Agency Classification

TABLE V

Federal Awards Received By Agency FY 2016-17

Federal Awards	Amount Funded*
American Lightweight Materials Manufacturing	$100,000
Army Research Office	$10,000
Los Alamos National Laboratory	$2,240
Marshall Space Flight Center	$26,500
MIT Lincoln Laboratory	$524,354
NASA	$72,258
National Center for Women and IT	$5,000
National Institute of Health	$146,257
National Institute of Standards and Technology	$9,531
National Park Service	$6,800
National Science Foundation	$3,623,320
National Solar Observatory	$3,470
Oak Ridge National Laboratory	$123,860
Substance Abuse and Mental Health Services	$90,157
Tennessee Department of Education	$1,165,878
Tennessee Higher Education Commission	$226,748
Tennessee Highway Safety Office	$618,936
Tennessee Small Business Development Center	$150,140
Tennessee Wildlife Resources Agency	$282,933
The Nature Conservancy	$9,186
The University of North Carolina at Greensboro	$9,440
U. S. Air Force Office of Scientific Research	$120,000
U. S. Department of Agriculture	$63,574
U. S. Department of Energy	$613,053
U. S. Fish and Wildlife Service	$30,284
U. S. Department of State	$67,650
University of Tennessee-Chattanooga	$6,572
U. S. AID	$17,500
UT-Battelle, LLC	$125,589
Total	**$8,251,230**

*Amount awarded by agency during 2016-17. Does not represent actual expenditures on project.

TABLE VI

Proposals Submitted and Awards Received By Activity FY 2016-17

Activity	Proposals Submitted		Awards Received*	
	# of Proposals	*Amount Requested*	*# of Awards*	*Amount Received*
Research	151	$44,887,039	96	$9,454,622
Public Service	31	$3,620,707	33	$3,501,357
Instruction	11	$751,362	8	$1,192,717
Student Support/Scholarships	6	$447,745	9	$415,033
Operation/Capital Project	4	$2,493,995	3	$2,137,847
Academic Support	2	$222,065	4	$209,146
Total	**205**	**$52,422,913**	**153**	**$16,910,722**

*Amount awarded by agency during 2016-17. Does not represent actual expenditures on project.

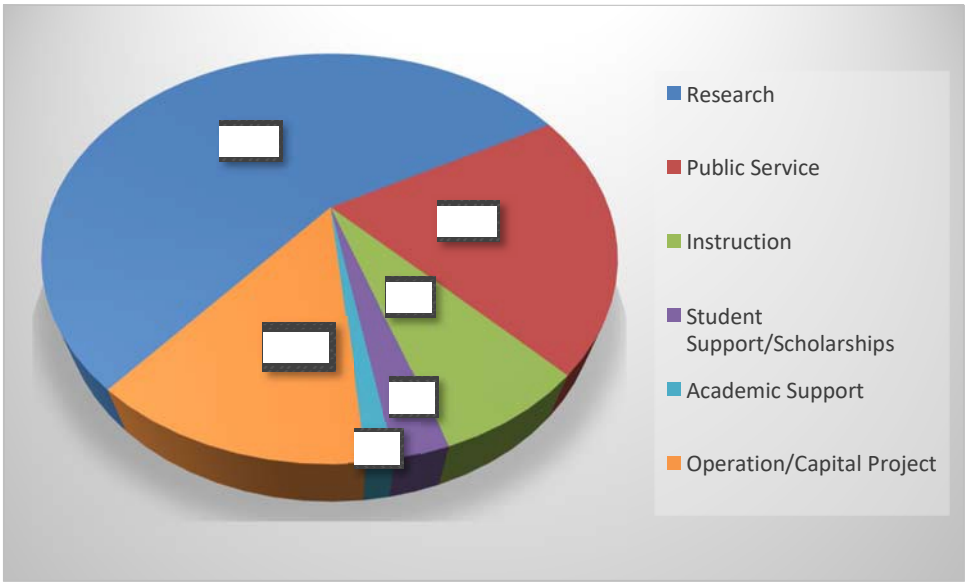

Figure 3
Percentage Funding by Activity

TABLE VII

Proposals Submitted and Awards Received FY 2016-17

Fiscal Year	Proposals Submitted	Amount Requested	Awards Received	Amount Funded*
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
2017	205	$52,422,913	153	$16,910,722

*Amount awarded by agency during 2016-17. Does not represent actual expenditures on project.

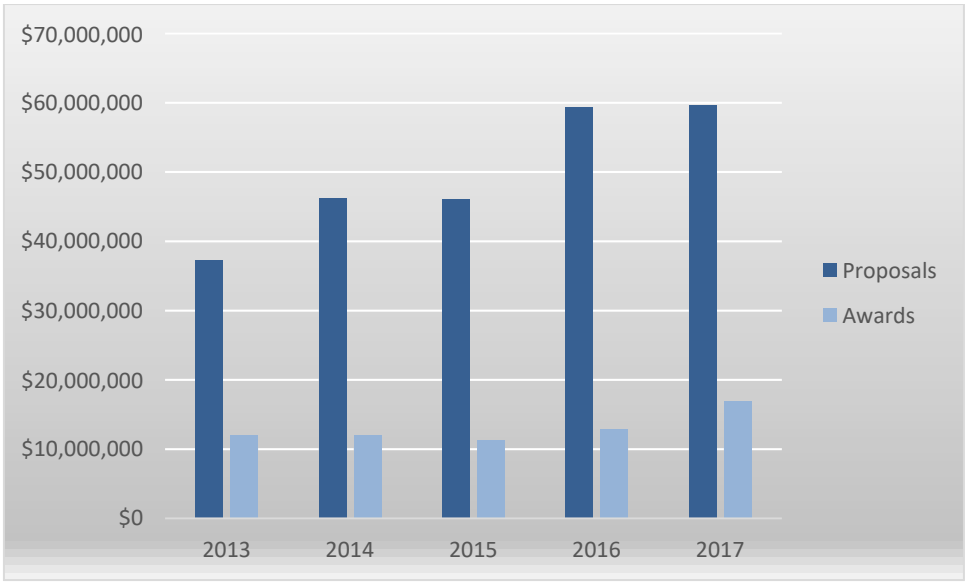

Figure 4
Amount Requested and Amount Funded

TABLE VIII

Awards Received and Award Amounts By Classification FY 2016-17

Fiscal Year	Federal		State		Private		Local	
	No.	Award Amount*	No.	Award Amount*	No.	Award Amount*	No.	Award Amount*
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
2017	88	$8,251,229	44	$8,147,524	20	$505,352	1	$6,617

*Amount awarded by agency during 2016-17. Does not represent actual expenditures on project.

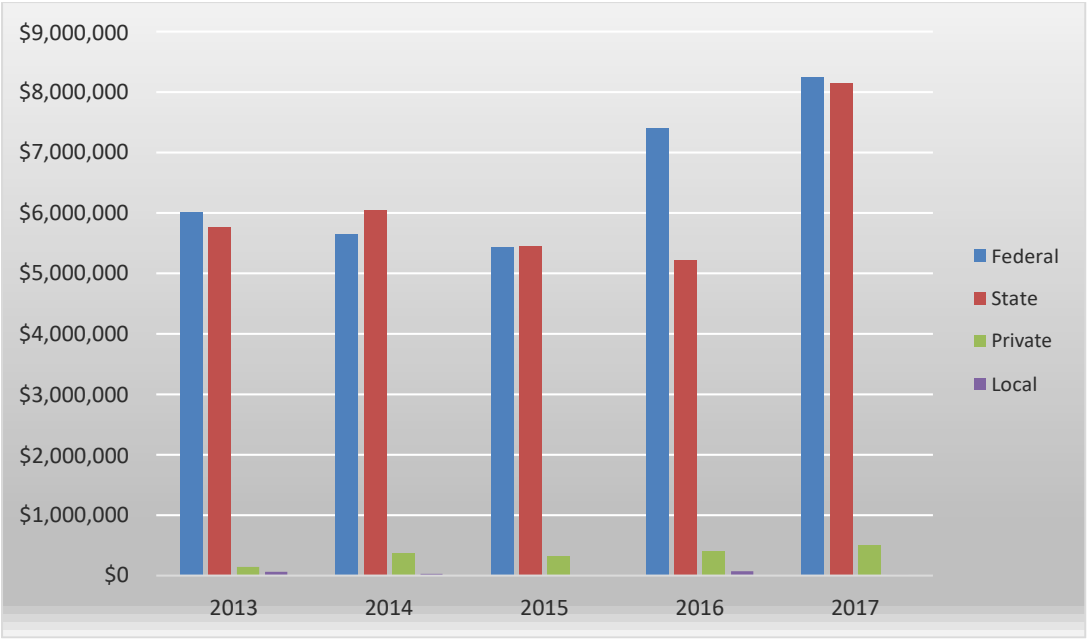

Figure 5
Funding Received by Classification

TABLE IX

Awards Received and Award Amounts By Type of Activity FY 2013-17

Fiscal Year	Research		Public Service		Instruction		Academic Support		Capital Project/Operation /Maintenance		Fellowships/ Scholarships/ Student Services	
	No.	Award Amount*	No.	Award Amount*	No.	Award Amount*	No.	Award Amount*	No.	Award Amount*	No.	Award Amount*
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	$2,337,727	28	$2,337,727	10	$1,608,639	7	$624,314	5	$180,467	2	$54,999
2017	96	$9,454,622	33	$3,501,257	8	$1,192,717	4	$209,146	3	$2,137,847	9	$415,033

*Amount awarded by agency during 2016-17. 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 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 that 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 23, 2016, and March 24, 2017.
  - Applications Approved for the Use of Animals
    - *"Testing Fisher's theory: Maintaining sex ratio equilibria with varying sex determining mechanisms,"* Dr. Chris Murray
    - *"Effects of diet and mineral supplementation on juvenile northern bobwhites,"* Dr. Steven Hayslette
    - *"The probiotic microbiome of endangered Tennessee bats: Implications for biodiversity conservation,"* Dr. Donald Walker
    - *"Phenotypic plasticity in larval amphibians as a function of abiotic factors,"* Dr. Chris Murray
  - The Committee approved a set of appropriate CITI training modules for IACUC training of Tennessee Tech animal researchers. The training will be required of all animal researchers submitting proposals to the Committee for review.

- **Committee Dates**
  - September 15, 2016; March 16, 2017

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. Megan Atkinson, Library, Archives
  - Dr. Chris Burgin, Counseling and Psychology
  - Dr. Michael Clark, Community Representative
  - Dr. Jann Cupp, Counseling and Psychology
  - Dr. Paula Engelhardt, Physics
  - Dr. Paula Greathouse, Curriculum and Instruction
  - Dr. Terry Guo, Center for Manufacturing Research
  - Dr. Seth King, Curriculum and Instruction
  - Dr. Patricia McGee, Community Representative
  - Dr. Susan Piras, Nursing
  - Mr. James Rogers, Community Representative
  - Dr. Steven Seiler, Sociology and Political Science (Chair)
  - Dr. Francis Otuonye, Executive Officer

- **Committee Actions**

  - The Committee processed 206 applications of which 161 were approved for Exempt Status, 23 were approved through Expedited Review, five applications reviewed through Expedited Review were with approval pending appropriate revisions, and eight applications requesting continuation were approved.
  - The Committee approved a new single-form application.
  - A comprehensive list of Certified Departmental Reviewers was established.
  - The Committee established a set of guidelines for reviewing requests from external researchers to conduct research at Tennessee Tech or among students, staff, and faculty at Tech.

- The Committee updated the expedited review decision categories to allow greater clarity for applicants and board members and to ensure compliance.

➢ **Committee Dates**

- September 12, 2016; November 7, 2016; January 23, 2017; April 3, 2017

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
  - Dr. Sherrie Foster, Counseling and Psychology
  - Dr. Steve Frye, Interdisciplinary Studies
  - Mr. Dustin Gardner, Student
  - Dr. Kim Hanna, Nursing
  - Ms. Sharon Holderman, Library (Chair)
  - Mr. Mark Lynam, Administrative
  - Ms. Ann Manginelli, Library
  - Mr. Nick Russell, Student
  - Dr. Manuel Villalba, Foreign Languages
  - Dr. Francis Otuonye, Executive Officer

- **Committee Actions**

  - A complete listing of intellectual property activity for 2016-17 is provided in Appendix B.

- **Committee Actions**

  - The Committee revised the Intellectual Property Policy to eliminate TBR reference and streamline the policy.

- The Committee incorporated the library into prior art search before filing a provisional patent.
- The Committee also revised the disclosure form to require information helpful to the Office of Research and library.

- **Committee Dates**

  - September 6, 2016; October 4, 2016; November 15, 2016; January 10, 2017; February 7, 2017; March 14, 2017

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. Andrew Callender, Chemistry
  - Dr. William Eberle, Computer Science
  - 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 (Chair)
  - Dr. Stephanie Wendt, Teacher Education
  - Dr. Bharat Soni, Executive Officer

- **Committee Actions**

  - 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 15, 2016.

- **Committee Dates**

  - October 6, 2016**;** February 9, 2017**;** February 23, 2017

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 (Chair)
  - Dr. Deborah Barnard, Foreign Languages
  - Dr. Michael Birdwell, History
  - 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. Francis Otuonye, Executive Officer

- **Committee Actions**

  - The Caplenor Faculty Research Award was not awarded during 2016-17.

- **Committee Dates**

  - October 21, 2016; February 10, 2017

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 advise on the development of a comprehensive structure and network of activities to foster externally funded scholarly activities. The Committee reports 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. Debbie Barnard, Foreign Languages
  - Dr. Jason Beach, Curriculum and Instruction
  - Dr. Ferdinand DiFurio, Economics, Finance and Marketing
  - Dr. William Eberle, Computer Science
  - Dr. Steven Frye, Interdisciplinary Studies
  - Dr. Shelia Hurley, Nursing
  - Mr. Dustin Gardner, Graduate Student
  - Dr. Wayne Johnson, Electrical and Computer Engineering
  - Dr. Chad Luke, Counseling and Psychology
  - Dr. Vahid Motevalli, College of Engineering
  - Dr. Justin Murdock, Biology
  - Dr. Terry Saltsman, President's Office
  - Dr. Mark Stephens, Provost's Office
  - Dr. Melinda Swafford, Human Ecology

- Ms. Rachel Tuck, Undergraduate Student
- Dr. Huey-Ming Tzeng, Nursing
- Mr. Jeff Young, Business Office
- Dr. Bharat Soni, Executive Officer
- Mr. Greg Holt, Non-Voting Resource Person

➢ **Committee Actions**

- The Committee revisited the Strategic Plan for Research adopted in 2012. Subcommittees were formed around each goal and reported back to the URAC with recommendations as to future directions.
- The following new initiatives were recommended by the URAC to be forwarded to corresponding committees/organizations within TTU for approval:
  - Waiver of tuition and fees for Ph.D. students on funded grants.
  - Revised budget model to recognize teaching of smaller graduate classes, while still supporting university mission of maintaining Carnegie Ph.D. classification.
- Dr. Soni asked the URAC to approve the creation of three new Scholastic Research Awards (funded by the Office of Research and Economic Development), to be evaluated by the URAC, and awarded to applicants in April 2017. Guidelines were developed and 13 applications received, from which three candidates were selected.

➢ **Committee Dates**

- September 13, 2016; October 18, 2016; November 8, 2016; January 17, 2017; February 14, 2017; March 14, 2017; and April 11, 2017

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	1 Faculty	$90,157

Counseling Center

PI – Christina Mick

- #hopestrongeagles
  Substance Abuse and Mental Health Services Administration
  $90,157.00

Agriculture and Human Ecology	5 Faculty	$2,438,805

Administration

PI – Liz Mullens

- Agricultural Best Management Practices (AgBMPs)
  Tennessee Department of Agriculture
  $17,847.00

Agriculture

PI – Dennis Fennewald

- Drive to 55: Tennessee Center for Poultry Science Excellence: Addressing Tennessee Workforce Needs and Promoting Rural Economic Development
  Tennessee Higher Education Commission
  Co-PI(s): Zachary Williams, Agriculture; Melinda Anderson, Human Ecology
  $2,070,000.00

PI – O. P. McCubbins

- Administrative Staff for Camp Clements FFA Leadership Training Center
  Tennessee Department of Education
  $166,812.00

Human Ecology

PI - Melinda Anderson

- Tennessee Early Childhood Training Alliance (TECTA)
  Tennessee State University (via Tennessee Department of Human Services)
  $184,146.00

Appendix A cont'd

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

Arts and Sciences	22 Faculty	$1,330,639

Biology

PI - Brian Carver

- Field Testing of Wildlife Cameras for Small Carnivore Detection
  Tennessee Wildlife Resources Agency
  $2,996.00
  Center: Water

PI – Steven Hayslette

- Collection of Biological Data at Deer Check Stations
  Tennessee Wildlife Resources Agency
  $2,000.00
  Center: Water

PI – Carla Hurt

- Conservation Genetics of the Barrens Topminnow (Fundulus julisia)
  U. S. Fish and Wildlife Service
  $5,674.00
  Center: Water

PI - Robert Kissell

- Climate Change-Mediated Expansion of Utah Juniper Across the Bighorn Canyan National Recreation Area: Implications for Bighorn Sheep
  National Park Service
  $6,800.00

PI – Shawn Krosnick

- Collaborative Research: Digitization TCN: The Key to the Cabinets: Building and Sustaining a Research Database for a Global Biodiversity
  University of Tennessee-Chattanooga
  $6,572.00
  Center: Water

PI - Justin Murdock

- Microbial Roles in Water Quality Improvement
  U. S. Department of Agriculture
  $10,000.00
  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 – Joshuah Perkin

- Increasing Florida's Aquatic Connectivity by Informing Project Selection through Assessment and Prioritization of Barriers
  Southeast Aquatic Resources Partnership (via Florida State Wildlife)
  $35,000.00
  Center: Water
- Statistical Analysis of the San Marcos and Comal Springs Aquatic Ecosystems Biomonitoring Dataset
  Bio-West
  $41,393.00
  Center: Water
- Prioritizing Fish Reintroduction in Lower Abrams Creek, GSMNP
  American Rivers/Tallahassee Fund
  $17,150.00
  Co-PI(s): Carla Hurt, Biology
  Center: Water
- Development of a Fish Index of Biotic Integrity for WestTennessee
  The Nature Conservancy
  $9,186.00
  Center: Water

PI – Donald Walker

- The Origin, Host and Geographic Range of Snake Fungal Disease with an Emphasis on Species of Greatest Conservation Need in Tennessee
  Tennessee Wildlife Resources Agency
  $6,200.00
  Center: Water
- The Probiotic Microbiome of Endangered Tennessee Bats: Implications for Biodiversity Conservation and Development of WNS Biocontrol Agents
  Tennessee Wildlife Resources Agency
  $10,000.00
  Center: Water

Chemistry

PI - Jeffrey Boles

- Project Inspire
  National Science Foundation
  $479,644.00
  Co-PI(s): Jeffrey Wendt, Curriculum and Instruction
  Center: Water

Appendix A cont'd

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

Chemistry cont'd

PI – Jesse Carrick

- Nuclear Energy University Programs Undergraduate Scholarship
  U. S. Department of Energy
  $7,500.00
  Co-PI(s): Kayla Dean, Student

PI – Xiaohua Jiang

- Synergistic Interdisciplinary Approaches to Design Potential Anticancer Drugs
  Tennessee Board of Regents
  $30,000.00
  Co-PI(s): Jesse Carrick and Edward Lisic, Chemistry

Cooperative Fisheries Unit

PI – Mark Rogers

- TWRA Base Funds
  Tennessee Wildlife Resources Agency
  $30,000.00
  Co-PI(s): Phillip Bettoli, Biology
- 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
  Co-PI(s): Justin Murdock, Biology
  Center: Water
- Relative Population Densities, Movement and Spawning Success of Asian Carp
  Tennessee Wildlife Resources Agency
  $153,083.00
  Co-PI(s): Phillip Bettoli, Biology
  Center: Water
- Effects of Asian Carp Invasion on the Food Web of a Mussel Biodiversity Hotspot in Tennessee
  U. S. Fish and Wildlife Service
  $24,610.00
  Co-PI(s): Phillip Bettoli and Justin Murdock, Biology
  Center: Water

Appendix A cont'd

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

Earth Sciences

PI – Jeannette Wolak

- Mixed Carbonate-Siliciclastic Sediment Gravity Flows: Dispositional Processes in the Mississippian
  American Chemical Society
  $29,500.00

Physics

PI – Sakir Ayik

- Studies of Heavy-Ion Collisions in Stochastic Mean-Field Approach
  U. S. Department of Energy
  $38,000.00

PI – Adam Holley

- CAREER: Investigation of Spin Evolution in Magnetic Ultracold Neutron Bottles Used to Measure the Free Neutron Lifetime
  National Science Foundation
  $120,000.00

PI – Mary Kidd

- Investigation of Neutron-Induced Backgrounds on 134,136Xe for Large-Scale Neutrinoless Double Beta Decay
  National Science Foundation
  $39,849.00
- Scintillator-Layered Imaging Microscope for Environmental Research
  Los Alamos National Laboratory
  $2,240.00
- Hosting Citizen CATEe Training Workshop
  National Solar Observatory
  $3,470.00

PI – Mustafa Rajabali

- The Structure of Neutron-Rich Deformed Nuclei Studied via Beta Decay
  University of Tennessee (via USDOE)
  $75,000.00
  Center: Energy

PI - Stephen Robinson

- A Model of Education Transformation: Developing a Community Implementing NGSS
  University Auxiliary and Research Services Corp. (via National Science Foundation)
  $38,922.00
  Co-PI(s): Paula Engelhardt, Physics

Appendix A cont'd

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

Business	5 Staff	$2,295,938

Business Media Center

PI - Michael Aikens

- Governor's School for Innovation and Entrepreneurship
  Tennessee Department of Education
  $91,772.00
- Tennessee Transfer Pathway
  Tennessee Board of Regents
  $70,000.00
  Co-PI(s): Kevin Liska, Business Media Center

PI - Kevin Liska

- Tennessee Advanced Communications Network System Marketing
  Tennessee Department of Safety and Homeland Security
  $80,000.00
- Tennessee Traffic Safety Resource Service
  Tennessee Highway Safety Office
  $459,317.00
- MakerMinded Detroit
  American Lighweight Materials Manufacturing Innovation Institute
  $100,000.00
- Perkins Portal
  Tennessee Board of Regents
  $7,000.00
- TBR Gates Student Advising Grant
  Tennessee Board of Regents
  $50,000.00
- Tennessee Safety Mobile APP
  Tennessee Department of Safety and Homeland Security
  $108,000.00
- Virtual Reality Education as a Solution for the Opoid Abuse Epidemic
  Tennessee Department of Health
  $200,000.00
- Ollie Otter, Booster Seat and Seat Belt Education
  Governor's Highway Safety Office
  $159,619.00
- TBR Marketing RODP Campaign
  Tennessee Board of Regents
  $692,590.00

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

- National Child Passenger Safety System
  National Safety Council
  $125,000.00

MBA Program

PI – Thomas Payne

- Perceptions of Rick Examination, Reporting and Licensing Processes of the TDFI
  Tennessee Department of Financial Institutions
  $2,500.00
  Co-PI(s): Kathryn Nicewicz, MBA Program

Small Business Development Center

PI - Jennifer Dangelo

- Tennessee Small Business Development Center-TTU/Online Center
  Tennessee Small Business Development Center
  $150,140.00

Education	**12 Faculty**	**$1,101,385**

Counseling and Psychology

PI – Chris Burgin

- Anhedonia and Cardiac Autonomic Effort Deficits in MDD in the Lab and Daily Life
  The University of North Carolina at Greensboro (via NIH)
  $9,440.00

PI – Barry Stein

- Supplement: Expanding Use of the CAT: Assessing and Improving CriticalThinking
  National Science Foundation
  $150,611.00
  Co-PI(s): Ada Haynes, Sociology and Political Science

Curriculum and Instruction

PI – Holly Anthony

- ITQ: Making Mathematics Meaningful with Health Care and Business Applications
  Tennessee Department of Education
  $76,736.00
  Center: STEM

Appendix A cont'd

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

Curriculum and Instruction cont'd

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
  $8,176.00
- Bridges Early Intervention Resource Agency Assessment Vendor
  Tennessee Department of Education
  $19,000.00
- Tennessee Technological University – Bridges Program
  Tennessee Department of Education
  $507,000

PI – Julie Stepp

- ITQ: Librarians and Makerspaces: Enhancing Learning and Literacy Across Content Areas
  Tennessee Higher Education Commission
  $74,987.00
  Co-PI(s): Stephanie Wendt, Curriculum and Instruction
  Center: STEM

PI - Leslie Suters

- ITQ: Literacy in the Classroom to Enable Societal Change
  Tennessee Higher Education Commission
  $75,025.00
  Co-PI(s): Adam Anderson, Electrical and Computer Engineering
  Center: STEM
- Digging Deep Into Science Literacy
  Campbell County Schools (via Tennessee Department of Education)
  $82,878.00
  Co-PI(s): Kristen Pennycuff-Trent, Curriculum and Instruction; Paula Engelhardt, Physics
  Center: STEM

Education Administration

PI – Julie C. Baker

- Assessing Initiatives to Improve Student Teaching
  The Gates Foundation to the American Institutes for Research
  $11,000.00

Appendix A cont'd

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

Engineering	41 Faculty	$11,946.374

Administration

PI – Elizabeth Powell

- Recruitment, Retention and Recognition: A Three-Tiered Approach to Graduating Renaissance Engineers
  Tennessee Board of Regents
  $25,000.00
  Co-PI(s): Tony Marable, Engineering Minority Program; Harry Ingle, Student Success Center
  Center: Energy

PI - Joseph Rencis

- REU Site: Summer Research Internships in Manufacturing and Techno-Entrepreneurship Preparation
  National Science Foundation
  $125,009.00
  Co-PI(s): Vahid Motevalli; Engineering Administration
  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; Harry Ingle and Elizabeth Powell; Student Success Center
  Center: Energy
- Board of Architectural and Engineering Examiners Grant
  Board of Architectural and Engineering Examiners
  $33,725.00
- "Power Into Motion III" Proposed Automotive Powertrain Program at Tennessee Tech
  DENSO North American Foundation
  $50,000.00
  Center: Manufacturing

Chemical Engineering

PI - Joseph Biernacki

- Collaborative Research: 3D Printing of Civil Infrastructure Materials with Controlled Microstructural Architectures
  National Science Foundation
  $38,265.00
  Center: Energy

Appendix A cont'd

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

Chemical Engineering

PI - Laura Chavez

- GOALI: Reclaiming Valuable Resources from Industrial Wastewater
  National Science Foundation
  $140,411.00
  Center: Water
- EAGER: Intrinsic, Universal Fouling Resistance in Membraines for More Sustainable Production, Use and Recovery of Critical Resources
  National Science Foundation
  $6,000.00
  Center: Water
- Nuclear Hybrid Energy Systems: Desalination Case Study
  UT-Batelle, LLC
  $55,000.00
  Center: Energy

PI - Robby Sanders

- Idea Generation to Commercially-Viable Healthcare Solutions
  Venturewell
  $8,501.00
  Center: Manufacturing
- Supplement: Idea Generation to Commercially-Viable Healthcare Solutions
  Venturewell Faculty Grant Program
  $20,000.00
  Center: Manufacturing

Civil and Environmental Engineering

PI - Daniel Badoe

- Development of Tennessee Travel Demand Model Users' Group
  University of Tennessee-Knoxville (via Tennessee Dept. of Transportation)
  $11,200.00
  Center: Energy

PI - Alfred Kalyanapu

- Increasing the Resilience of Agricultural Production in the Tennessee and Cumberland River Basins through More Efficient Water Resource Use
  University of Tennessee (via USDA)
  $53,574.00
  Center: Water

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 - Benjamin Mohr

- Linking Diversity of Polyphosphate Accumulating Organisms to Improved Functional Stability of the Enhanced Biological Phosphorus Removal Process
  National Science Foundation
  $46,000.00
  Co-PI(s): Tania Datta, Water Center; Grace McMillan, Student
  Center: Water
- Environmental & Economic Study of Glider Kit Assemblers
  Fitzgerald Glider Kits
  $12,500.00

PI - Daniel VandenBerge

- Global Stability Analysis of MSE Walls Constructed over Improved Soil Foundations
  GeoPier Foundation Company
  $10,000.00
  Center: Energy

PI - Matthew Yarnold

- Collaborative Research: Structural Identification and Health Monitoring Using Temperature-Driven Data
  National Science Foundation
  $64,704.00
  Center: Energy

Computer Science

PI – Gerald Gannod

- Incorporating the Preferences for Everyday Living Inventory into Ohio's Nursing Homes to Improve Resident Care
  Miami University (via Ohio Department of Medicaid)
  $37,876.00
  Center: Energy

PI - Sheikh Ghafoor

- Benchmark and Analyze Numerical Libraries on HPC Architecture for Performance Prediction
  Oak Ridge National Laboratory
  $25,000.00
  Center: Energy

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 - Sheikh Ghafoor

- Knowledge-Based Flood Inundation Forecast on Affordable Mobile Platforms to Empower Farmers
  University of Washington (via USAID)
  $17,500.00
  Center: Energy

- Tracking Water Storage in Lakes: Citizens and Satellites
  University of North Carolina (via NASA)
  $31,898.00
  Center: Energy

PI – Martha Kosa

- NCWIT Award for Aspirations in Computing 2012-13
  National Center for Women and Information Technology
  $2,100.00
  Co-PI(s): Ambareen Siraj, Computer Science
  Center:

PI – Mohammad Radman

- CRII: CPS: Noninvasive Security Analysis for Smart Grid Energy Management Systems
  National Science Foundation
  $86,494.00
  Center: Energy

PI – Ambareen Siraj

- Supplement: Tennessee Cybercorps: A Hybrid Program in Cybersecurity
  National Science Foundation
  $153,704.00
  Co-PI(s): Mohammad Rahman and Douglas Talbert; Computer Science
  Center: Manufacturing

- Collaborative Research: CyberWorkshops: Resources and Strategies for Teaching Cybersecurity in Computer Science
  National Science Foundation
  $120,672.00
  Co-PI(s): Co-PI - Sheikh Ghafoor, Computer Science
  Center: Energy

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 – Ambareen Siraj

- Summer Bridge Program for CyberCorps SFS
  Prince George's Community College (via NSF)
  $3,000.00
  Co-PI(s): Co-PI - William Eberle, Computer Science
  Center: Manufacturing

- Summer Undergraduate Research Fellowship Program (SURF)
  National Institute of Standards and Technology
  $9,531.00
  Co-PI(s): Weston Smith, Student
  Center: Manufacturing

- Tennessee Cybercorps: A Hybrid Program in Cybersecurity
  National Science Foundation
  $835,145.00
  Co-PI(s): Mohammad Rahman and Douglas Talbert, Computer Science
  Center: Manufacturing

- GenCyber Camp at Tennessee Tech
  National Security Agency (via NSF)
  $99,653.00
  Center: Manufacturing

- Student Seed Fund for Women of CyberEagles-Series of Professional Development Events for Women
  National Center for Women and Information Technology
  $5,000.00

PI – Douglas Talbert

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

Appendix A cont'd

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

Electrical and Computer Engineering

PI - Adam Anderson

- Signal Processing and Communications Research for Global Security Applications
  Oak Ridge National Laboratory
  $50,000.00
  Center: Manufacturing

- Consulting in Areas of Applied Signal Processing and Advanced Communications Techniques
  Oak Ridge National Laboratory
  $38,860.00
  Center: Manufacturing

- EAGER: SC2: A Universal Spectral Language for Blind Rendezvous in Open Spectrum Cognitive Intelligent Radio Networks
  National Science Foundation
  $98,869.00
  Center: Manufacturing

PI - Rabie Belkacemi

- Modeling a Distribution Feeder along with Distribution-Connected Smart Inverters and Composite Load Model in Time Domain
  Electric Power Research Institute
  $60,000.00
  Center: Energy

PI – Syed Hasan

- Investigation of Effective Management of Energy Demand in Distribution Management Systems of Smart Grids using Formal Verification Methods
  Information and Communication Technology Fund
  $10,998.00
  Center: Energy

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 - R. Wayne Johnson

- Advancement of Cryogenic Electronics
  MIT Lincoln Laboratory
  $524,354.00
  Co-PI(s): Satish Mahajan, Energy Center; Holly Stretz, Chemical Engineering; Jie Cui and Christopher Wilson, Mechanical Engineering
  Center: Manufacturing

- Affordable Integrated Circuit Packaging and Assembly for High Temperature Intelligent Components
  Micro-RDC
  $37,866.00
  Center: Manufacturing

PI - Mohamed Mahmoud

- Hybrid AC/DC Islanded Micro-grids in Qatar: Planning, Operation, and Cyber Security
  Texas A&M University (via Qatar National Research Fund QNRF)
  $28,651.00
  Center: Energy

- NeTS: Small: Collaborative Research: Towards Privacy Preserving Autonomous Vehicle Services
  National Science Foundation
  $52,763.00
  Center: Manufacturing

- REU: Security and Privacy-Preserving Cyber Physical Systems
  National Science Foundation
  $119,835.00
  Co-PI(s): Syed Hasan, Electrical and Computer Engineering
  Center: Manufacturing

- TWC: Small: Collaborative: Multi-Layer Approaches for Securing Enhanced AMI Networks Against Traffic Analysis Attacks
  National Science Foundation
  $155,105.00
  Center: Energy

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 2016-17
  Tennessee Higher Education Commission
  $872,800.00
  Center: Energy

- Power-Test-Service Account
  various
  $13,580.00
  Co-PI(s): L. K. Crouch; Civil and Environmental Engineering; Jie Cui and Stephen Idem, Mechanical Engineering
  Center: Energy

Manufacturing Center

PI - Vahid Motevalli

- Center for Manufacturing Research
  Tennessee Higher Education Commission
  $1,453,000.00
  Center: Manufacturing
- Testing and Design
  various
  $52,151.00
  Center: Manufacturing

Manufacturing and Engineering Technology

PI – Ismail Fidan

- AM-WATCH: Additive Manufacturing - Workforce Advancement Training Coalition and Hub
  National Science Foundation
  $311,007.00
  Center: Manufacturing

- ATE-MANEUVER: Manufacturing Education Using Virtual Environment Resources
  Purdue University (via NSF)
  $50,142.00
  Center: Manufacturing

Appendix A cont'd

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

Mechanical Engineering

PI - Steven Anton

- Continuous Real-Time State Monitoring in Highly Dynamic Environments
  Air Force Office of Scientific Research
  $120,000.00
  Center: Manufacturing
- Self-Powered In Vivo Force and Implant Wear Sensing in Knee Anthroplasty
  National Institute of Health
  $146,257.00
  Center: Manufacturing

PI - Stephen Canfield

- Tether Dynamic Modeling for the Electric Sail Tether Deployment System
  Marshal Space Flight Center
  $26,500.00
  Center: Manufacturing

PI - Corinne Darvennes

- National Space Grant College and Fellowship Program (SPACE Grant)
  Vanderbilt University (via NASA)
  $40,360.00
  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
  $112,922.00
  Center: Manufacturing
- Public Private Partnership to Promote Efficient Manufacturing and Workforce Development
  U. S. Department of Energy
  $281,938.00
  Co-PI(s): Ehsan Languri, Mechanical Engineering
  Center: Manufacturing

PI – Stephen Idem

- Experimental Comparison of Pressure Loss in Typical Flexible and Sheet Metal Residential Duct Systems
  Air Duct Council
  $18,671.00
  Center: Energy

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
  $148,487.00
  Center: Manufacturing

PI - Meenakshi Sundaram

- UT-CIS Capstone Contract
  The University of Tennessee
  $15,000.00
  Center: Manufacturing
- UT-CIS Contract
  The University of Tennessee
  $20,000.00
  Center: Manufacturing

PI - Ying Zhang

- Fabricate Alumnizing Ni-based 31V Alloy
  Oak Ridge National Laboratory
  $10,000.00
  Center: Manufacturing

PI - Jiahong Zhu

- GOALI: Environmentally-Assisted Reactive Sintering of Conductive Spinel Layers for Solid Oxide Fuel Cell Application
  National Science Foundation
  $110,029.00
  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
  $97,693.00
  Center: Manufacturing

Appendix A cont'd

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

Fine Arts	1 Faculty	$6,300

Craft Center

PI – Gail Gentry

- Explore Careers in Fine Craft for High School Students
  Tennessee Arts Commission
  $6,300.00

Interdisciplinary Studies	3 Faculty/2 Staff	$49,000

Administration

PI – Alice Camuti

- Impact Adult Learning: Building a High-Impact Career-Ready Adult Learning Community for Degree Attainment
  Tennessee Board of Regents
  Co-PI(s): Tammy Keylon and Jeannie Smith, Interdisciplinary Student Success
  $25,000.00

PI - Hayden Mattingly

- 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

Nursing	4 Faculty	$74,581

Nursing

PI – Melissa Geist

- Fulbright-Hays: Implementation of the Clinical Immersion at Disciplinary Interfaces Course
  U.S. Department of State
  $67,650.00
  Co-PI(s): Robby Sanders, Chemical Engineering

PI – Toni Roberts

- Simulation to Teach Safe Patient Handling for Home Caregivers
  Christopher and Dana Reeve Foundation
  $6,931.00
  Co-PI(s): Jason Hurley; Nursing

Appendix A cont'd

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

Research and Economic Development	4 Faculty	$2,155,829

Research and Economic Development

PI - Bharat Soni

- 8th Americas Regional Conference of the International Society for Terrain Vehicle Systems
  Army Research Office
  $10,000.00

STEM Center

PI - Sally Pardue

- AEOP Battelle Consortium
  Battelle
  $70,588.00
  Center: STEM
- Upper Cumberland Rural STEM Initiative: Learning Communities for Manufacturing Careers
  Tennessee Department of Education
  $557,000.00
  Center: STEM
- Hub Operations and Innovative Educator Workshops
  UT Battelle (via Tennessee Stem Innovation Network)
  $65,102.00
  Center: STEM

Water Center

PI - Bharat Soni

- Center for the Management, Utilization and Protection of Water Resources
  Tennessee Higher Education Commission
  $1,133,100.00
  Center: Water
- Center for the Management, Utilization and Protection of Water Resources Carry Over
  Tennessee Higher Education Commission
  $58,830.00
  Center: Water
- Water Center Analytical and Computer Services
  Various
  $66,184.00
  Center: Water

Appendix A cont'd

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

Water Center cont'd

PI – Tania Datta

- Fall Water River Water Quality Monitoring Study
  Tennessee Department of Environment and Conservation
  $46,307.00
  Co-PI: Alfred Kalyanapu, Civil and Environmental Engineering
  Center: Water

- Instream Monitoring to Assess the Impact of Town Creek from the Optimized Discharge of Nitrogen and Phosphorus from Livingston Wastewater Treatment Plant
  Town of Livingston
  $6,617.00
  Center: Water

- Toward Developing a Watershed Plan for the Falling Water River Watershed
  Upper Cumberland Development District
  Co-PI: Alfred Kalyanapu, Civil and Environmental Engineering
  $22,101.00
  Center: Water

- Tracking the Sources of Nitrogen Pollutants in Tennessee Department of Transportation MS4 Stormwater Discharges
  ENSAFE (via Tennessee Department of Transportation)
  Co-PI: Alfred Kalyanapu, Civil and Environmental Engineering
  $120,000.00
  Center: Water

Appendix B

Intellectual Property Activity 2016-17

Copyrights

- Detailed Library Shelving Report Generator by Dewar and Gaetjens

Invention Disclosures

- Secure Data Communications Using Software Data Diode by Alouani, Pyle, Dyer, Aljarbous, Dailey
- A New Class of Anti-Cancer Agents: Copper Monoxime-Thiosemicarbazone Complexes by Lisic, Jiang, McFadden, Morris, Kent
- InnoDinno First Generation 3D Printed Dinosaur by Villalpandro, Russel, Floyd, Caston, Fidan
- Surgical Basin for Extremities by D. Wilson, B. Wilson, Chaudhari
- Loratadine/Pseudoephedrine Transdermal Patch by Aldossary, Amro, Davidson, Ekart, Reynolds, Sanders
- Volleyball Training Device by Walker, Stockdale, Ripley, Cheatham, Pullen, West, and Zelenock

Provisional Patent Applications Filed

- An Integrated Expert System for the Tolerance of Perturbances in Hybrid Energy by Abegaz, Mahajan
- Reduced-Temperature Sintering of Spinal-Type Coatings and Layers with Metallic Alloy Powder Precursors by Zhu, Yu, Bates
- Compressed Gas Flow Meter Applied on Inlet Side of the Gas Compressor by Cunningham and Taylor (2nd Provisional)
- Volleyball Training Device by Walker, Stockdale, Ripley, Cheatham, Pullen, West, and Zelenock
- Drug Assisted Wound Drainage Line by Hellman, Forde, Lacoursiere, Matei, and Otts
- Method and Apparatus for Noninvasive Mechanical-Based Assessment of Heart Performance (2nd provisional) by Ghasemi and Languri

Patent Cooperation Treaty Request Filed

- Fluidic System for High Throughput Preparation of Microparticles and Nanoparticles by Bentencourt, Massingill, and Stretz

Additional Actions

- Revised Intellectual Property Policy to eliminate TBR reference and streamline
- Incorporated the library into prior art search before filing a provisional patent
- Revised the disclosure form to require information helpful to the Office of Research and library

Appendix C

Faculty Research Committee Awards 2016-17

Track I

Author(s)	Title	Dept.	Amt.	Type
Driggers, Allen	Boundary Stones: Communities of Medico- Chemistry and the Atlantic	History	$2,971	Track I
Loftis, Mark	Alexithymia and Suicide Risk in Nonclinical Populations	Counseling and Psychology	$3,000	Track I
Michael, Tony	The Adult Scale of Parental Attachment: Item Selection, Factor Structure and Psychometric Properties	Counseling and Psychology	$3,000	Track I
Stepp, Julie	The Impact of Full-Time Libraries on Student Achievement in K-12 Schools in Tennessee	Curriculum and Instruction	$3,000	Track I
			$11,971	

Appendix C cont'd

Faculty Research Committee Awards 2016-17

Track II

Author(s)	Title	Dept.	Amt.	Type
Bhattacharya, Indranil	Development and Modeling of High-Energy-Density Solid State Lithium Sulfur Battery	Electrical and Computer Engineering	$10,000	Track II
Hasan, Syed	Towards Run-Time Hardware Trojan Detection Using Circuit Behavior Profiling: Leveraging Game Theory and Formal Verification	Electrical and Computer Engineering	$10,000	Track II
Jiang, Xiaohua	Studying the mechanism of thiosemicarbazone inhibiting topoisomerase II	Chemistry	$10,000	Track II
Languri, Ehsan/Johnson, Wayne	Innovative Diamond Nanoflude in for Enhanced Electronics Thermal Management	Mechanical Engineering/Electrical and Computer Engineering	$10,000	Track II
Leckie, Brian	Characterization of Southern Appalachian Heirloom Green Bean	Agriculture	$10,000	Track II
Pascal, Jennifer	Optimizing Dielectrophoretic Separation of Circulating Tumor Cells from Blood	Chemical Engineering	$10,000	Track II
Walker, Donald	Spatial and temporal changes of fish communities, the fish microbiome and fungal pathogenicity under conditions of increased human water use	Biology	$9,987	Track II
Zhan, Xuanzhi	The Self-activation Mechanisms of Apoptosis Signal-regulating Kinase I	Chemistry	$10,000	Track II
			$79,987	