



Tennessee Technological University

**OFFICE OF RESEARCH
ANNUAL REPORT**

Fiscal Year 2009-10



Tennessee Technological University is one of the member institutions governed by the Tennessee Board of Regents. The 46 institutions in this system include six senior universities, 13 two-year community colleges and 26 technology centers. Approximately 200,000 students attending post-secondary institutions are enrolled in the Tennessee Board of Regents (TBR) system.

Administration and Staff

Office of Research

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Coordinator

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Executive Secretary

Sammie Sparks
Contract Compliance Assistant

Ellen Wolfe
Proposal Development Specialist

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MISSION OF THE OFFICE OF RESEARCH

The mission of the Office of Research is to promote, support, and facilitate research, scholarly, and creative activities of faculty and graduate students. The Office of Research supports the University community in obtaining externally funded support for research, scholarship, instruction/training, and public service in the context of scholarly excellence and sound ethical justification.

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

- Disseminating information on funding opportunities for research, scholarly, and creative activities.
- Providing background information for use in proposals.
- Assisting faculty in the development of proposals.
- Reviewing proposals for accuracy, completeness, and compliance with both University, state, and federal regulations.
- Preparing and negotiating grants/contracts.
- Administering Tennessee's Public Records Act (T.C.A. 49-7-120) relative to sponsored research and services.
- Executing awarded contracts and processing activation forms to establish accounts.
- Assisting faculty in protecting their ideas and implementing technology transfer activities in the best interest of all parties concerned.
- Monitoring compliance with the range of federal policies that regulate research activities in the following areas: responsible conduct of research, research ethics, human subjects research, and the humane care of laboratory animals used in research and experimentation.
- Conducting seminars and workshops on proposal writing and funding sources.

SUMMARY OF ACTIVITIES 2009-10

During fiscal year 2009-10, the University's Mission was supported through the Office of Research in the following ways:

- Grants and contracts externally funded numbered 153 with a value of \$17,071,437, which represents a decrease of 1% over the 2008-09 fiscal year.
- Grants and contracts received through the three Centers of Excellence and the STEM Center numbered 109 with a value of \$13,308,666, which represents 78% of total dollars and 71% of the total number of grants and contracts received.
- Grants and contracts received through federal agencies numbered 89 with a value of \$9,914,695, which represents 58% of grants and contracts and 58% of total dollars received.
- Grants and contracts received through state agencies numbered 48 with a value of \$6,631,280 which represents 31% of the total number of grants and contracts and 39% of total grant and contract dollars received.
- Private contracts were third at 14 with a value of \$418,524, which represents 9% of the total number of grants and contracts and 2% of total grant and contract dollars.
- Local sources accounted for 2 contracts or 1% of total grants and contracts with a value of \$106,938 or 1% of grant and contract dollars.
- Grants and contracts received for research numbered 99 with a value of \$11,619,395, which represents 65% of the total number of grants and contracts and 68% of total dollars received.
- Grants and contracts received for public service numbered 29 with a value of \$2,572,610 which represents 19% of all grants and contracts and 15% of total grant and contract dollars received.
- Instruction funding received numbered 11 with a value of \$1,003,794, which represents 7% of total number of grants and contracts and 6% of total grant and contract dollars.
- Academic Support funding accounted for 11 contracts with a value of \$837,315, which represents 7% of the total number of grants and contracts and 5% of total grant and contract dollars.

- Grants and contracts received for institutional support/capital projects was 3 with a value of \$1,038,323 which represents 2% of all grants and contracts and 6% of total grants and contract dollars.
- Internal funds were provided in the amount of \$146,026 for small grants to support faculty research in the form of ***research initiation and/or research development***. Twenty-four projects involving 31 faculty members were supported. The typical amount of support granted was \$5,000 per faculty member.
- Proposals submitted for external funding numbered 169 with a value of \$60,770,653.
- Proposals submitted through the Centers of Excellence and STEM Center numbered 121 with a value of \$48,521,497, which represents 72% of proposals submitted and 80% of funds requested.
- Proposals submitted to federal agencies numbered 108 requesting \$50,746,652, which represents 64% of proposals submitted and 84% of dollars requested.
- Proposals submitted to state agencies numbered 48 requesting \$9,293,442 which represents 28% of proposals submitted and 15% of dollars requested.
- Proposals submitted to private agencies numbered 11 requesting \$623,621 which represents 7% of proposals submitted and 1% of dollars requested.
- Proposals submitted to local agencies numbered 2 requesting \$106,938 which represents 1% of proposals submitted and .2% of dollars requested.

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FIGURE I

**External Funds
Historical, Actual and Projected
2000-2010**

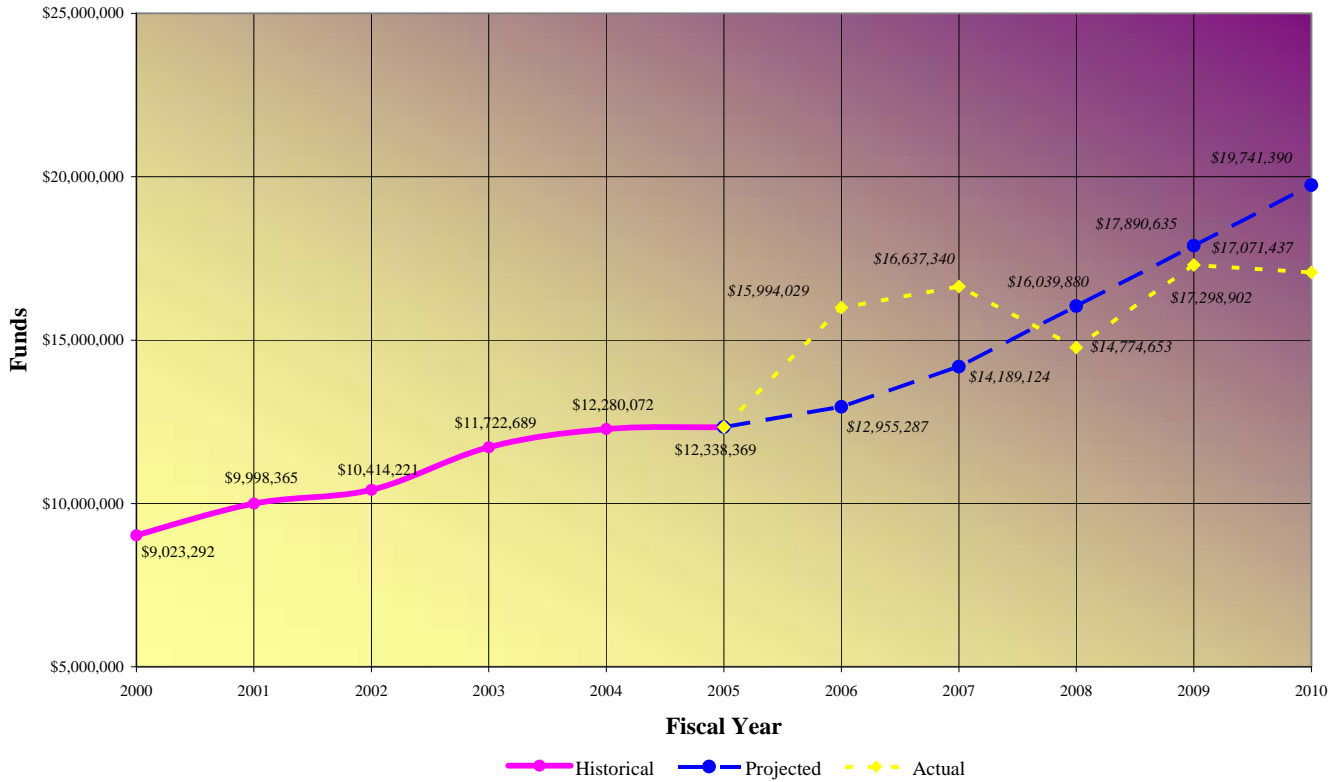


TABLE I

**Proposals Submitted and Awards Received
by University Unit
FY 2009-10**

University Unit	Proposals Submitted	Amount Requested	Awards Received	Amount Received
Agricultural & Human Sciences*	9	\$1,605,686	11	\$1,289,177
Arts & Sciences*	7	\$2,937,257	4	\$128,000
Business Administration*	6	\$409,956	8	\$914,752
Education*	14	\$6,088,328	14	\$1,176,827
Engineering*	4	\$260,465	3	\$245,515
Administrative Offices*	8	\$947,464	4	\$8,500
C/E Energy Systems Research**	32	\$21,756,226	28	\$2,392,433
C/E Manufacturing Research**	45	\$14,969,376	31	\$5,085,408
C/E Water Resources Research**	34	\$6,768,167	35	\$2,702,329
STEM Center**	10	\$5,027,728	15	\$3,128,496
TOTAL	169	\$60,770,653	153	\$17,071,437

* Without Centers of Excellence or STEM Center

** See Table II

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.

TABLE II

**Proposals Submitted and Awards Received
Through Centers of Excellence and STEM Center
by Academic Unit
FY 2009-10**

Center/Academic Unit	Proposals Submitted	Amount Requested	Awards Received	Amount Received
Energy Systems Research				
Center	8	\$15,057,636	8	\$1,710,365
Center/Chemical Engineering	1	\$439,104	-	-
Center/Civil and Environmental Engineering	8	\$1,864,081	8	\$219,500
Center/Civil and Environmental Engineering/Mechanical Engineering	2	\$316,011	1	\$16,044
Center/Computer Science/Electrical and Computer Engineering	1	\$600,000	-	-
Center/Electrical and Computer Engineering	3	\$1,538,408	3	\$256,989
Center/Manufacturing and Industrial Technology	4	\$943,020	-	-
Center/Mathematics	-	-	1	\$34,295
Center/Mechanical Engineering	5	\$997,966	2	\$67,240
Center/Mechanical Engineering/ Basic Engineering	-	-	2	\$35,000
Center/Mechanical Engineering/Civil and Environmental Engineering	-	-	3	\$53,000
Total Energy Center	32	\$21,756,226	28	\$2,392,433

TABLE II, cont'd

**Proposals Submitted and Awards Received
Through Centers of Excellence and STEM Center
by Academic Unit
FY 2009-10**

Center/Academic Unit	Proposals Submitted	Amount Requested	Awards Received	Amount Received
Manufacturing Center				
Center	14	\$5,059,591	9	\$3,339,983
Center/Chemical Engineering	6	\$895,323	4	\$193,277
Center/Chemical Engineering/ Mechanical Engineering	1	\$374,160	1	\$171,083
Center/Computer Science	6	\$2,011,396	1	\$12,491
Center/Electrical and Computer Engineering	3	\$259,847	5	\$281,968
Center/Electrical and Computer Engineering/Chemical Engineering	1	\$235,112	-	-
Center/Electrical and Computer Engineering/Chemical Engineering/ Chemistry	1	\$2,890,238	-	-
Center/Electrical and Computer Engineering/Curriculum and Instruction	-	-	1	\$167,582
Center/Electrical and Computer Engineering/Energy Center	1	\$396,000	1	\$396,000
Center/Engineering Administration/ Engineering Minority Program	1	\$422,732	-	-
Center/Manufacturing and Industrial Technology	-	-	1	\$65,637
Center/Mechanical Engineering	11	\$2,424,977	8	\$457,387
Total Manufacturing Center	45	\$14,969,376	31	\$5,085,408

TABLE II, cont'd

**Proposals Submitted and Awards Received
Through Centers of Excellence and STEM Center
by Academic Unit
FY 2009-10**

Center/Academic Unit	Proposals Submitted	Amount Requested	Awards Received	Amount Received
<u>Water Resources Research</u>				
Center	8	\$1,770,104	6	\$1,500,487
Center/Agriculture	4	\$725,085	1	\$51,538
Center/Biology	4	\$818,397	12	\$191,013
Center/Biology/Civil and Environmental Engineering	1	\$56,534	-	-
Center/Biology/Earth Sciences	1	\$300,000	1	\$380,000
Center/Chemical Engineering	4	\$1,341,706	1	\$2,500
Center/Chemistry	2	\$364,410	1	\$25,000
Center/Civil and Environmental Engineering	10	\$1,391,931	4	\$212,485
Center/Cooperative Fisheries Unit	-	-	9	\$339,306
Total Water Center	34	\$6,768,167	35	\$2,702,329

TABLE II, cont'd

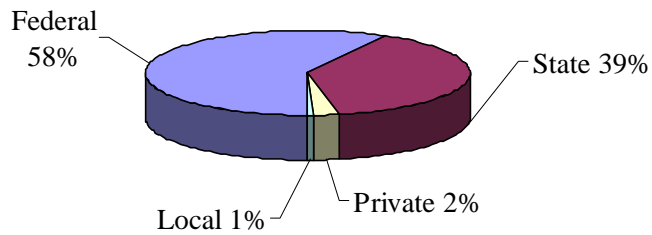
**Proposals Submitted and Awards Received
Through Centers of Excellence and STEM Center
by Academic Unit
FY 2009-10**

Center/Academic Unit	Proposals Submitted	Amount Requested	Awards Received	Amount Received
STEM Center				
Center/Basic Engineering/ Engineering Administration	-	-	2	\$549,611
Center/Biology/Curriculum and Instruction/History	1	\$74,999	-	-
Center/Curriculum and Instruction	2	\$149,436	6	\$845,759
Center/Curriculum and Instruction/ Academic Affairs/Economics, Finance and Marketing/Mathematics	-	-	1	\$57,607
Center/Curriculum and Instruction/Industrial and Systems Manufacturing/Mathematics	1	\$72,978	-	-
Center/Exercise Science and Physical Education/Minority Affairs	1	\$69,756	-	-
Center/Facilities and Business Services	2	\$1,224,836	2	\$1,221,240
Center/Mathematics	1	\$957,468	1	\$379,130
Center/Mechanical Engineering	-	-	2	\$26,000
Center/Physics	1	\$2,078,255	1	\$49,149
Center/University Advancement	1	\$400,000	-	-
Total STEM Center	10	\$5,027,728	15	\$3,128,496
GRAND TOTAL	121	\$48,521,497	109	\$13,308,666

TABLE III

**Proposals Submitted and Awards Received
by Agency Classification
FY 2009-10**

Agency Classification	Proposals Submitted	Amount Requested	Awards Received	Amount Received
Federal	108	\$50,746,652	89	\$9,914,695
State	48	\$9,293,442	48	\$6,631,280
Private	11	\$623,621	14	\$418,524
Local	2	\$106,938	2	\$106,938
TOTAL	169	\$60,770,653	153	\$17,071,437



**Figure 2. Percentage Funding by Agency Classification
FY 2009-10**

TABLE IV

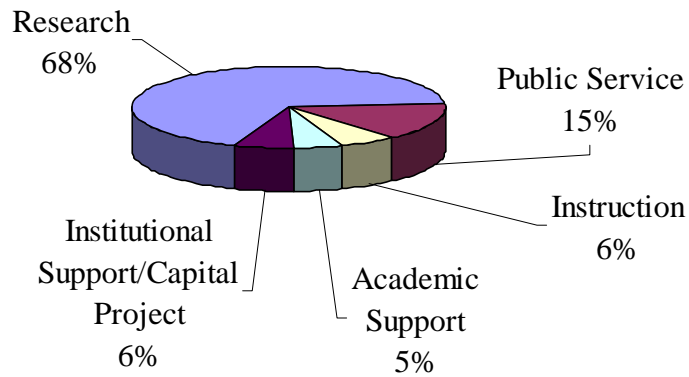
**Federal Awards Received by Agency
FY 2009-10**

Federal Agencies	Awards Received
Alignment Nashville	\$65,637
BerrieHill Research Corporation	\$60,000
Federal Highway Administration	\$16,186
GM Powertrain	\$66,583
Governor's Highway Safety Office	\$112,585
Health Resources and Services Administration	\$471,240
Missouri Department of Conservation	\$4,598
National Aeronautics and Space Administration	\$957,485
National Council for the Social Studies	\$2,500
National Park Service-Great Smoky Mountains	\$90,070
National Science Foundation	\$1,725,770
National Writing Project	\$46,000
Oak Ridge National Laboratories	\$485,804
Office of Naval Research	\$577,990
Slippery Rock University	\$15,000
Tennessee Department of Education	\$1,898,822
Tennessee Department of Environment and Conservation	\$21,484
Tennessee Department of Human Services	\$33,264
Tennessee Department of Transportation	\$99,500
Tennessee Higher Education Commission	\$260,749
Tennessee Small Business Development Center	\$77,696
Tennessee State University	\$70,000
Tennessee Wildlife Resources Agency	\$100,000
The Nature Conservancy	\$380,000
U. S. Army	\$1,383,438
U. S. Department of Agriculture	\$51,538
U. S. Department of Energy	\$511,309
U. S. Fish and Wildlife Service	\$40,500
U. S. Geological Survey	\$156,035
Upper Cumberland Human Resources Agency	\$32,000
Vanasse Hangen Brustlin, Inc.	\$27,421
Vanderbilt University	\$38,491
West Virginia University	\$35,000
Total Federal Dollars	\$9,914,695

TABLE V

**Proposals Submitted and Awards Received
by Activity
FY 2009-10**

Activity/Use	Proposals Submitted	Amount Requested	Awards Received	Amount Received
Research	116	\$51,564,874	99	\$11,619,395
Public Service	26	\$3,632,313	29	\$2,572,610
Instruction	11	\$644,218	11	\$1,003,794
Academic Support	10	\$1,278,025	11	\$837,315
Institutional Support/Capital Project	6	\$3,651,223	3	\$1,038,323
TOTAL	169	\$60,770,653	153	\$17,071,437

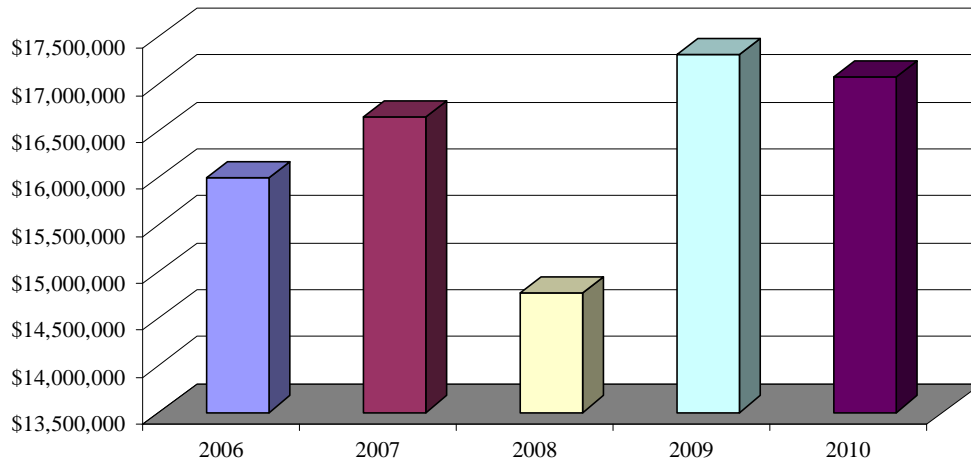


**Figure 3. Percentage Funding by Activity
FY 2009-10**

TABLE VI

**Proposals Submitted and Awards Received
FY 2009-10**

Fiscal Year	Proposals Submitted	Amount Requested	Awards Received	Amount Received
2006	194	\$55,412,527	174	\$15,994,029
2007	190	\$36,986,928	171	\$16,637,340
2008	165	\$33,811,304	174	\$14,774,653
2009	170	\$38,582,380	157	\$17,298,902
2010	169	\$60,770,653	153	\$17,071,437

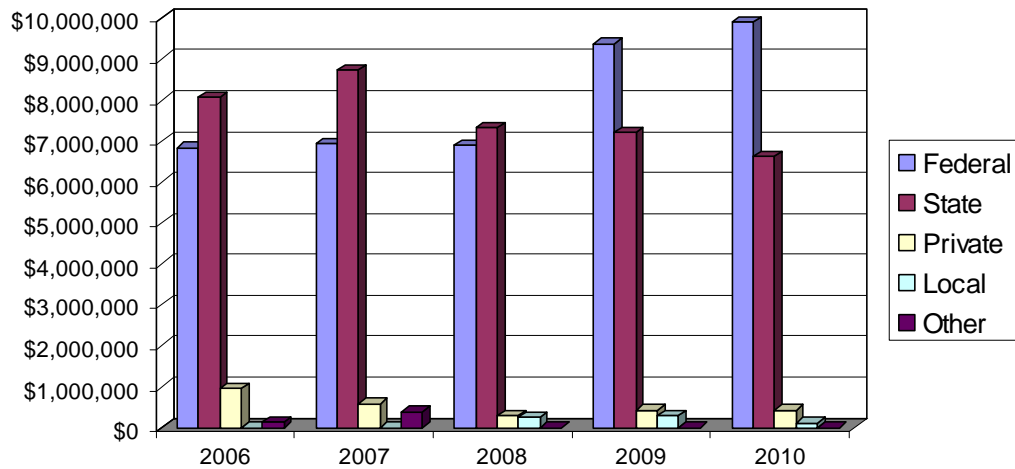


**Figure 4. External Funds Received
FY 2006-FY 2010**

TABLE VII

**Awards Received and Award Amounts
by Classification
FY 2006-10**

Fiscal Year	Federal		State		Private		Local		Other	
	No.	Award Amount	No.	Award Amount	No.	Award Amount	No.	Award Amount	No.	Award Amount
2006	74	\$6,840,614	69	\$8,060,198	22	\$952,514	-	-	9	\$140,703
2007	79	\$6,933,526	70	\$8,742,157	10	\$578,532	-	-	12	\$383,125
2008	99	\$6,896,065	55	\$7,326,215	16	\$299,931	4	\$252,442	-	-
2009	98	\$9,371,492	41	\$7,214,141	14	\$423,821	4	\$289,448	-	-
2010	89	\$9,914,695	48	\$6,631,280	14	\$418,524	2	\$106,938	-	-



**Figure 5. Funding Received by Classification
FY 2006-10**

TABLE VIII

**Awards Received and Award Amounts
by Type of Activity
FY 2006-10**

Fiscal Year	Research		Public Service		Instruction		Operation/ Maintenance		Academic Support		Institutional Support		Capital Project		Fellowship/ Scholarships	
	No.	Award Amount	No.	Award Amount	No.	Award Amount	No.	Award Amount	No.	Award Amount	No.	Award Amount	No.	Award Amount	No.	Award Amount
2006	123	\$10,079,726	34	\$3,331,969	16	\$2,547,334	-	-	-	-	-	-	1	\$35,000	-	-
2007	112	\$11,576,413	47	\$3,711,068	10	\$1,114,859	-	-	-	-	-	-	2	\$235,000	-	-
2008	108	\$10,722,678	45	\$2,808,781	12	\$969,961	4	\$168,415	3	\$81,068	1	\$18,750	-	-	1	\$5,000
2009	98	\$12,121,341	38	\$2,728,441	14	\$1,217,069	-	-	3	\$761,608	-	-	1	\$196,000	3	\$274,443
2010	99	\$11,619,395	29	\$2,572,610	11	\$1,003,794	-	-	9	\$804,795	-	-	3	\$1,038,323	2	\$32,520

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.

It is the responsibility of the Research Office personnel to make sure these compliances are adhered to by the investigator(s) involved in the research. A research contract may involve both federal and state compliances in addition to those required by the funding agency, which could be private.

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 Advisory Committee on Patents and Copyrights, the Faculty Research Committee, and the Caplenor Faculty Research Award 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
2009-10**

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.

Meeting Dates

September 17, 2009 March 18, 2010

Committee Members

Dr. Gerald Barker, Veterinarian	Ms. Tammy Howard, Nursing
Dr. Chris Brown, Biology	Dr. Christy Killman, Health and Physical Education
Dr. Bruce Greene, Agriculture	Dr. Jessica Matson, Industrial and Systems Engineering
Dr. Steve Hayslette, Biology (Chair)	Dr. Francis Otuonye, Executive Officer
Dr. Wesley Henry, Clergy	

Committee Actions

- The Committee performed laboratory inspections in 2009-10 on September 21, 2009, and March 22, 2010.
- One application for the use of animals in research was reviewed by the Committee. The application, from Dr. Chris Brown and Ms. Ponda Armstrong from the Department of Biology, was approved.
- Revision of the form used to submit applications to the Committee for animal use was completed, and a revision from was presented to the Committee at the Spring 2010 meeting. The Committee approved the revised form, which will now be used for all new applications for animal use.
- At the Spring 2010 meeting, the Committee considered and approved a proposal to modify the name of the Committee to conform to the federal guidelines and standard nomenclature used at most other institutions. The Committee is now the Institutional Animal Care and Use Committee (IACUC).

**INSTITUTIONAL REVIEW BOARD FOR THE
PROTECTION OF HUMAN SUBJECTS
2009-10**

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.

Meeting Dates

September 14, 2009	January 25, 2010
November 2, 2009	April 5, 2010

Committee Members

Dr. Michael Clark, Music and Art (Chair)	Dr. Shannon Morgan, Counseling and Psychology
Dr. Shannon Collins, Curriculum and Instruction	Dr. Lachelle Norris, Sociology and Political Science
Dr. Jan Cupp, Counseling and Psychology	Mr. James Rogers, Community Representative
Dr. Linda Giesbrecht-Bettoli, Counseling and Psychology	Dr. Lenly Weathers, Civil and Environmental Engineering
Dr. Don Loskot, Counseling and Psychology	Dr. Lisa Zagumny, Curriculum and Instruction
Dr. Shelia Green, Nursing	Dr. Francis Otuonye, Executive Officer

Committee Actions

- During the 2009-10 academic year, the Committee received 210 research proposals classified as exempt and 27 proposals for expedited review. Seven of these were approved on first submissions, one was rejected, 11 were approved pending minor revisions, and seven were required to be revised and resubmitted for additional review.
- Since many proposals are submitted which relate to educational strategies and evaluations conducted as part of regular classroom activities, the guidelines were revised to more accurately pinpoint those proposals which do not present risk; and therefore, qualify for exempt review. Many of these proposals are not classified as exempt. As a result, the number of proposals for expedited review was lower than that of the previous year.
- IRB Form A, an informational form which must be submitted for all proposals, and Form B, a form used for proposals anticipating expedited or full board review have been revisited and modified to make them clearer and more understandable and to structure responses to be more useful to reviewers.
- The Committee approved a name change that was subsequently approved by the Administrative Council in conformance with federal guidelines and standard nomenclature.
- The Committee has developed and refined written procedures for all of its activities to ensure compliance with federal regulations and to begin preparations to apply for accreditation.
- The Committee has begun the process of circulating and reviewing proposals in digital format. As a result, the Committee has implemented procedures that reduce the number of copies of any IRB application that must be submitted to the Office of Research for review.

**ADVISORY COMMITTEE ON
PATENTS AND COPYRIGHTS
2009-10**

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 Advisory Committee on Patents and Copyrights 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.

Meeting Dates

September 8, 2009 November 10, 2009
October 6, 2009 February 2, 2010
March 16, 2010

Committee Members

Dr. Mohamed Abdelrahman, Electrical and Computer Engineering	Dr. Christine Miller, Decision Sciences and Management
Dr. Ali Alouani, Electrical and Computer Engineering	Mr. Matt Nisbet, Student
Dr. Michael Best, Agriculture (Chair)	Dr. Scott Northrup, Chemistry
Dr. Sherrie Foster, Counseling and Psychology	Mr. Will Walker, Student
Dr. Kim Hanna, Nursing	Dr. Ken Wiant, Economics, Finance and Marketing
Ms. Pat McGee, Library	Dr. Francis Otuonye, Executive Officer

Committee Actions

Please see Appendix C for a complete listing of intellectual property activity for 2009-10.

FACULTY RESEARCH COMMITTEE 2009-10

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.

Meeting Dates

October 8, 2009	February 11, 2010
January 28, 2010	March 18, 2010

Committee Members

Dr. Ferdinand DiFurio, Economics, Finance and Marketing	Dr. Josephine McQuail, English
Dr. Melissa Geist, Nursing	Dr. Deborah Setliff, Curriculum and Instruction (Chair)
Dr. John Harwood, Chemistry	Dr. Kim Stearman, Water Center
Dr. Richard Le Borne, Mathematics	Dr. Donald Visco, Chemical Engineering
Dr. Jessica Matson, Industrial and Systems Engineering	Dr. Francis Otuonye, Executive Officer

Committee Actions

- The Faculty Research Committee awarded 24 projects involving 31 faculty members for a total amount of \$146,026.
- Two (2) Research Initiation proposals were funded, and 22 Research Development proposals were funded.
- The Committee held two proposal development workshops on November 19, 2009.
- The Committee voted to approve electronic submission of proposals.
- The Committee revised Appendix G of the *Handbook for Faculty Research Committee Grants*.

**CAPLENOR FACULTY RESEARCH AWARD COMMITTEE
2009-10**

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.

Meeting Dates

September 3, 2009

November 5, 2009

Committee Members

Dr. Halina Ablamowicz, English	Dr. Kwun Lon Ting, Mechanical Engineering
Dr. Phillip Bettoli, Biology	Dr. Hong Zhang, Chemistry
Dr. Tor Guimaraes, Business Administration	Dr. Ziahong Zhu, Mechanical Engineering
Dr. Melissa Geist, Nursing	Dr. Francis Otuonye, Executive Officer
Dr. Joseph Ojo, Electrical Engineering	

Committee Actions

- Dr. Mohamed Abdelrahman, Electrical and Computer Engineering, and Dr. Joseph Biernacki, Chemical Engineering, were the co-recipients of the 2009-10 Caplenor Faculty Research Award.

Appendices

Appendix A gives the external funds brought into the University by College/Area and by Departments/Units. Appropriations from the Tennessee Higher Education Commission (THEC) to the three Centers of Excellence are included in the external funding, which makes up 21% of the total external funds received. Administrators, faculty, and staff were responsible for approximately \$13.5 million, or the remaining 79% of the total grant income.

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

Appendix D summarizes the Faculty Research Committee awards.

Appendix A

Externally Funded Projects by Department of Project PI Fiscal Year 2009-10

PI's College	PI's Department, Center, or Unit	Centers of Excellence				STEM Center	Departments/ Other Units	Total
		Energy Center	Manufacturing Center	Water Center				
Agricultural and Human Sciences	Agriculture					\$153,792	\$153,792	
	Human Ecology					\$1,101,885	\$1,101,885	
	Dean's Office					\$33,500	\$33,500	
Subtotal							\$1,289,177	
Arts and Sciences	Biology			\$571,013			\$571,013	
	Chemistry					\$25,000	\$25,000	
	Computer Science		\$12,491				\$12,491	
	Cooperative Fisheries Research Unit			\$339,306		\$30,000	\$369,306	
	Foreign Languages					\$3,000	\$3,000	
	Mathematics	\$34,295				\$379,130	\$413,425	
	Physics				\$49,149	\$95,000	\$144,149	
Subtotal							\$1,538,384	
Business	Small Business Development Center					\$77,696	\$77,696	
	Decision Sciences and Management					\$123,300	\$123,300	
	Business Media Center					\$713,756	\$713,756	
Subtotal							\$914,752	
Education	Academic Development					\$3,000	\$3,000	
	Counseling and Psychology					\$260,943	\$260,943	
	Curriculum and Instruction				\$903,366	\$577,884	\$1,481,250	
	Education Administration					\$320,000	\$320,000	
	Exercise Science, Physical Education, Wellness					\$15,000	\$15,000	
Subtotal							\$2,080,193	

Appendix A, cont'd

**Externally Funded Projects
by Department of Project PI
Fiscal Year 2009-10**

PI's College	PI's Department, Center, or Unit	Centers of Excellence				STEM Center	Departments/ Other Units	Total
		Energy Center	Manufacturing Center	Water Center				
Engineering	Basic Engineering				\$549,611	\$212,000	\$761,611	
	Chemical Engineering		\$364,360	\$2,500			\$366,860	
	Civil and Environmental Engineering	\$219,500		\$212,485			\$431,985	
	Electrical and Computer Engineering	\$256,989	\$449,550				\$706,539	
	Manufacturing and Industrial Technology		\$65,637				\$65,637	
	Mechanical Engineering	\$155,240	\$457,387		\$26,000		\$638,627	
	Engineering Administration		\$33,515				\$33,515	
Subtotal							\$3,004,774	
Centers of Excellence	Energy Center Appropriation	\$883,400					\$883,400	
	Energy Center Other	\$843,009					\$843,009	
	Manufacturing Center Appropriation		\$1,492,200				\$1,492,200	
	Manufacturing Center Other		\$2,243,783				\$2,243,783	
	Water Center Appropriation			\$1,171,400			\$1,171,400	
	Water Center Other			\$380,625			\$380,625	
Subtotal							\$7,014,417	
Other	Counseling Center					\$7,780	\$7,780	
	Facilities and Business Services				\$1,221,240		\$1,221,240	
	Student Affairs					\$720	\$720	
Subtotal							\$1,229,740	
Total	All Units	\$2,392,433	\$5,118,923	\$2,702,329	\$3,128,496	\$3,729,256	\$17,071,437	

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Administration: 5 Researchers, 6 Projects	\$1,229,740
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Counseling Center

Smith, Patricia

Social Norms Media Campaign for Alcohol and Drugs Summer 2009 to Spring 2010
Tennessee Independent Colleges and Universities Association
\$5,014.00

Co-PI(s):

Center:

Incentives for 2010 Alcohol and Drug Core Survey
Tennessee Independent Colleges and Universities Association
\$1,766.00

Co-PI(s):

Center:

Spring 2010 Alcohol Free Alternative Campus Programming
Tennessee Independent Colleges and Universities Association
\$1,000.00

Co-PI(s):

Center:

Facilities and Business Services

Binkley, Glenn

Center for Teaching & Learning in Science, Technology, Engineering and Math (STEM)
NASA
\$750,000.00

Co-PI(s): Sally Pardue-STEM Center

Center: STEM

Center for Teaching and Learning in Science, Technology, Engineering and Mathematics Construction
Health Resources and Services Administration
\$471,240.00

Co-PI(s): Sally Pardue-STEM Center

Center: STEM

Student Affairs

Boucher, Ed

EUDL Grant Program
Medication Services of Putnam County
\$720.00

Co-PI(s):

Center:

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Agricultural and Human Sciences: 6 Researchers, 10 Projects	\$1,289,177
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Administration

Bagley, Pat

Evaluation of Flaxseed and Organic Selenium on Reproduction Performance of Beef Cows
 Cooperative Research Farms
 \$33,500.00
Co-PI(s):
 Center:

Agriculture

Airhart, Douglas

Cookeville Urban Forestry Programming
 Tennessee Department of Agriculture
 \$6,721.00
Co-PI(s):
 Center:

Byler, Ben

Tennessee Association FFA Camp Clements Leadership Grant 2007-2010
 Tennessee Department of Education
 \$100,587.00
Co-PI(s):
 Center:

Tennessee Association FFA Camp Clements Maintenance Worker 2009-12
 Tennessee Association of FFA
 \$32,386.00
Co-PI(s):
 Center:

Agricultural Education In-Service Program 2007-2010
 Tennessee Department of Education
 \$14,098.00
Co-PI(s): David Frazier-Agriculture
 Center:

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Agricultural and Human Sciences cont'd

Human Ecology

Bailey, Sue

Upper Cumberland Child Care Resource and Referral 2009-10
Signal Centers (via DHHS)
\$550,317.00

Co-PI(s): Leeann Jolley-Human Ecology
Center:

Tennessee Early Childhood Training Alliance 2008-10
Tennessee Department of Human Services/TSU
\$458,518

Co-PI(s):
Center:

Tennessee Early Childhood Training Alliance (TECTA) New Initiative Funds
Tennessee State University (via Tennessee Department of Education)
\$70,000.00

Co-PI(s):
Center:

FACS Career Technical Education Grant 2009-12
Tennessee Department of Education
\$18,050.00

Co-PI(s):
Center:

Upper Cumberland Child Care Resource and Referral 2009-10
Signal Centers (via DHHS)
\$5,000.00

Co-PI(s):
Center:

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Arts and Sciences: 19 Researchers, 30 Projects	\$1,538,384
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Biology

Combs, Daniel

Distribution, Status, and Species-Habitat Relationships of the Green Salamander, *Aneides aeneus*
Tennessee Wildlife Resources Agency
\$5,000.00
Co-PI(s):
Center: Water

Cook, Bradford

Recovery Evaluation of Threatened and Endangered Fishes in Abrams Creek, GSMNP (Year 2 and 3)
Great Smoky Mountain National Park
\$65,995.00
Co-PI(s):
Center: Water

Benthic Macroinvertebrate Assessment Associated with Brook Trout Restoration of Lynn Camp Prong, GSM
Great Smokey Mountains National Park
\$24,075.00
Co-PI(s):
Center: Water

Conduct Hydrologic Delineation Training for the Tennessee Department of Environment and Conservation
Tennessee Department of Environment and Conservation
\$21,484.00
Co-PI(s):
Center: Water

Effects of Antimycin Application for Native Brook Trout Restoration to Benthic Macroinvertebrate Communities in Lynn Camp Prong Watershed, GSMP
Carlos C. Campbell 2010 Memorial Fellowship
\$4,920.00
Co-PI(s): W. Keith Gibbs-Biology
Center: Water

Mattingly, Hayden

Scientific Coordination for the Cumberland Habitat Conservation Plans in 2009-10
The Nature Conservancy
\$380,000.00
Co-PI(s): Sean Blomquist-Biology; Evan Hart-Biology; Trisha Johnson-Biology
Center: Water

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Arts and Sciences cont'd

Biology cont'd

Mattingly, Hayden

Population Monitoring Strategies for the Imperiled Barrens Topminnow and Barrens Darter, with an Evaluation of Barrens Topminnow Movement Patterns

U. S. Fish and Wildlife Service
\$30,000.00

Co-PI(s):

Center: Water

Swimming Performance of the Endangered Roanoke Logperch, *Percina rex*

U. S. Fish and Wildlife Service
\$10,500.00

Co-PI(s):

Center: Water

Life History and Reproductive Ecology of the Imperiled Williams' Crayfish, *Orconectes williamsi* Fitzpatrick 1966 (Cambaridae)

Missouri Department of Conservation
\$4,598.00

Co-PI(s):

Center: Water

Roberts, Thomas

Monitoring Groundwater Hydrology and Selected Plant Communities at the Three Rivers Mitigation Bank

Tennessee Wildlife Resources Agency
\$16,260.00

Co-PI(s): Kenneth Morgan-Biology

Center: Water

Monitoring the Plant Community at the Yuchi Waterfowl Project

Tennessee Wildlife Resources Agency
\$5,181.00

Co-PI(s): Kenneth Morgan-Biology

Center: Water

Collection of Data at Deer Check Stations

Tennessee Wildlife Resources Agency
\$3,000.00

Co-PI(s):

Center: Water

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Arts and Sciences cont'd

Chemistry

Ensor, Dale

Nuclear Energy Research Initiative for Consortia (NERI-C)
Washington State University
\$25,000.00

Co-PI(s):

Center: Water

Computer Science

Talbert, Douglas

VEHI Subcontract with Vanderbilt
Vanderbilt University (via AHRQ)
\$12,491.00

Co-PI(s): Michael Rogers-Computer Science

Center: Manufacturing

Cooperative Fisheries Research Unit

Bettoli, Phillip

Assessment of Biotic Integrity, Water Quality and Habitat, Fishing Pressure, and Economic Value of the Fishery in the Caney Fork River below Center Hill Dam

U. S. Geological Survey

\$109,433.00

Co-PI(s):

Center: Water

Reservoir Trout Fisheries

Tennessee Wildlife Resources Agency

\$70,000.00

Co-PI(s):

Center: Water

Evaluation of Fish Stockings into Tennessee Warm Water and Cool Water Reservoirs

Tennessee Wildlife Resources Agency

\$35,850.00

Co-PI(s):

Center: Water

Layzer, James

TWRA FU Base 7-11

Tennessee Wildlife Resources Agency

\$30,000.00

Co-PI(s): Phillip Bettoli-Cooperative Fisheries Unit

Center:

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Arts and Sciences cont'd

Cooperative Fisheries Research Unit cont'd

Layzer, James

Establish Non-essential Populations of Two Endangered Mussel Species in the Lower French Broad River, Tennessee

U. S. Geological Survey
 \$27,735.00

Co-PI(s):

Center: Water

Assessment of the Mussel Fauna in the Area Impacted by Dredging for the Green River Ferry Vanasse Hangen Brustlin, Inc.

\$27,421.00

Co-PI(s):

Center: Water

The Reintroduction of Mussels into the Little Tennessee River at the Calderwood Dam By-Pass, Blount and Monroe Counties

Tennessee Wildlife Resources Agency
 \$25,000.00

Co-PI(s):

Center: Water

Research Directed at the Recovery of Endangered Mussels

U. S. Geological Survey
 \$18,867.00

Co-PI(s):

Center: Water

Laurel Dace Habitat Identification

Tennessee Wildlife Resources Agency
 \$15,000.00

Co-PI(s): Kendall Moles-Water Center

Center: Water

Barrens Heelsplitter Ecology and Population Dynamics

Tennessee Wildlife Resources Agency
 \$10,000.00

Co-PI(s):

Center: Water

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Arts and Sciences cont'd

Foreign Languages

Baker, Julia

A&D: Global Studies Immigration Colloquium
Tennessee Board of Regents
\$3,000.00

Co-PI(s):

Center:

Mathematics

Le Borne, Sabine

Algebraic Hierarchical Matrix Preconditioners for Two- and Three-Dimensional Saddle Point Problems
National Science Foundation
\$34,295.00

Co-PI(s):

Center: Energy

Mills, Allan

STEP: Math Success for STEM Majors
National Science Foundation
\$379,130.00

Co-PI(s):

Center: STEM

Physics

Ayik, Sakir

Studies of Fluctuation Processes in Nuclear Collisions
U. S. Department of Energy
\$37,000.00

Co-PI(s):

Center:

Engelhardt, Paula

CCLI: Developing a Learner-centered Environment for Algebra-based Physics (LEAP)
National Science Foundation
\$49,149.00

Co-PI(s): Stephen Robinson-Physics

Center: STEM

Kozub, Raymond

Nuclear Physics with Radioactive Ion Beams
U. S. Department of Energy
\$58,000.00

Co-PI(s):

Center:

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Business Administration: 5 Researchers, 8 Projects	\$914,752
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Business Media Center

Liska, Kevin

TBR Marketing RODP Campaign
Tennessee Board of Regents
\$482,211.00

Co-PI(s): Ferdinand Difurio/J. D. Weinrauch-Economics, Finance and Marketing
Center:

Tennessee Ollie Otter's Statewide Seatbelt and Boosterseat Education Campaign
Governors Highway Safety Office
\$112,585.00

Co-PI(s):
Center:

TBR Marketing RODP Campaign
Tennessee Board of Regents
\$50,000.00

Co-PI(s): Ferdinand Difurio/J. D. Weinrauch-Economics, Finance and Marketing
Center:

TBR-26 Tennessee Technology Centers Statewide Marketing
Tennessee Board of Regents
\$45,000.00

Co-PI(s):
Center:

Web PC459 Project
Nashville State Community College
\$13,960.00

Co-PI(s): Curtis Armstrong-Decision Sciences and Management
Center:

TBR - Teaching Quality Initiative Marketing
Tennessee Board of Regents
\$10,000.00

Co-PI(s):
Center:

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Business Administration cont'd

Decision Sciences and Management

Armstrong, Curtis

Governor's School for IT Leadership 2010
Tennessee Department of Education
\$123,300.00

Co-PI(s):

Center:

Small Business Development Center

Henley, Vicki

Tennessee Small Business Development Center at TTU 2010
Tennessee Small Business Development Center
\$77,696.00

Co-PI(s):

Center:

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Education: 25 Researchers, 19 Projects	\$2,080,193
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Academic Development

Whiteaker, Janet

A&D: Academic Development Learning Center (ADLC) Enhancement
Tennessee Board of Regents
\$3,000.00
Co-PI(s):
Center:

Administration

Peach, Larry

Positive Behavior Support and Inclusion (PBS&I) Project 2009-12
Tennessee Department of Education
\$320,000.00
Co-PI(s):
Center:

Counseling and Psychology

Stein, Barry

CAT National Dissemination Assessment and Improvement of Learning
National Science Foundation
\$260,943.00
Co-PI(s): Ada Haynes-Sociology and Political Science; Michael Redding-Biology
Center:

Curriculum and Instruction

Anthony, Holly

Developing K-5 Teachers' Mathematics Knowledge for Teaching (Math Partnership)
Tennessee Department of Education
\$378,434.00
Co-PI(s):
Center: STEM

ITQ - Supporting the New High School Geometry Standards: Focus on Processes and Technology
Tennessee Higher Education Commission
\$74,703.00
Co-PI(s):
Center: STEM

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Education cont'd

Curriculum and Instruction cont'd

Anthony, Holly

Developing K-5 Teachers' Mathematics Knowledge for Teaching (Math Partnership)
Tennessee Department of Education
\$68,000.00
Co-PI(s):
Center: STEM

Baker, Jane

Tennessee Early Childhood Pilot Program 2009-10
Putnam County School Board
\$82,670.00
Co-PI(s):
Center:

Collins, Shannon

ITQ - Upper Cumberland Institute for Writing and Critical Thinking
Tennessee Higher Education Commission
\$73,746.00
Co-PI(s): Anthony Baker-English
Center:

Upper Cumberland Writing Project
National Writing Project
\$46,000.00
Co-PI(s): Sandra H. Smith-Curriculum and Instruction
Center:

Dainty, Helen

TDE Special Education Institute - Strand I (2009-12)
Tennessee Department of Education
\$187,889.00
Co-PI(s):
Center:

TTU Base-TN Teaching Program - 2009-12
Tennessee Department of Education
\$75,000.00
Co-PI(s): Michael Mayton-Curriculum and Instruction
Center:

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Education cont'd

Curriculum and Instruction cont'd

Dainty, Helen

TDE Special Education - Strand II (2009-12)
Tennessee Department of Education
\$58,954.00

Co-PI(s):

Center:

Gore, Susan

Upper Cumberland Middle Grades Science Partnership
Tennessee Department of Education
\$298,786

Co-PI(s):

Center: STEM

Graves, Laura

Effects of Teaching w/ Tablet PC's w/ Asynchronous Student Access in Postsecondary STEM Courses on Students w/ Learning Disabilities

National Science Foundation
\$57,607.00

Co-PI(s): Michael Allen-Mathematics; Sally Pardue-STEM Center; Kenneth Wiant-Economics, Finance and Marketing

Center: STEM

REU Supplement: Effects of Teaching with Tablet PCs with Asynchronous Student Access in Post-Secondary STEM Courses on Students with Learning Disabilities

National Science Foundation
\$25,836.00

Co-PI(s):

Center: STEM

Howard, Martha

Healthy Start for Upper Cumberland Families and Young Children 2009-10
Stephens Center
\$12,861.00

Co-PI(s): Elouise Jackson-Curriculum and Instruction

Center:

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Education cont'd

Curriculum and Instruction cont'd

Owens, Carl

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

Co-PI(s):

Center:

Smith, Matthew

Child and Adult Care Food Program 2009-10
Tennessee Department of Human Services
\$33,264.00

Co-PI(s):

Center:

Zagumny, Lisa

Incorporating the Geography of Muslims and Islam into Social Studies
National Council for the Social Studies
\$2,500.00

Co-PI(s): Melissa Creek-Curriculum and Instruction

Center:

Exercise Science and Physical Education

Killman, Christy

I Can Do It, You Can Do It, Upper Cumberland
Slippery Rock University (via U. S. DHHS)
\$15,000.00

Co-PI(s): J. P. Barfield-Exercise Science and Physical Education

Center:

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Engineering: 41 Researchers, 67 Projects	\$10,019,191
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Administration

Huddleston, David

College of Engineering Equipment Grant 2009-10
Department of Commerce and Insurance
\$33,515.00

Co-PI(s):
Center:

Basic Engineering

Hunter, Kenneth

TTU Pre-Engineering Math Science Research Partnership
Tennessee Department of Education
\$549,611.00

Co-PI(s): Roy Loutzenheiser-Engineering Administration; Margaret Phelps-STEM Center
Center: STEM

Governor's School for Emerging Technologies 2010
Tennessee Department of Education
\$180,000.00

Co-PI(s):
Center:

2010 President's Academy for Emerging Technologies
Upper Cumberland Human Resources Agency
\$32,000.00

Co-PI(s): Susan Elkins-Extended Education
Center:

Chemical Engineering

Arce, Pedro

Ivanhoe Fellowship
The Ivanhoe Foundation
\$2,500.00

Co-PI(s):
Center: Water

Biernacki, Joseph

MRI: Acquisition of XRD Attachments for Extending X-Ray Lab Capabilities with Temperature and Atmosphere Control

National Science Foundation
\$171,083.00

Co-PI(s): Jiahong Zhu, Mechanical Engineering
Center: Manufacturing

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Engineering cont'd

Chemical Engineering cont'd

Biernacki, Joseph

RUI: Controlling the Properties and Performance of Concrete Using Computer Aided Molecular Design
National Science Foundation
\$145,036.00

Co-PI(s): Donald Visco, Chemical Engineering

Center: Manufacturing

Identification of Fungicides for *Aspergillus niger* Using a Compound Classifier and the Signature
Molecular Descriptor

W. R. Grace & Co.

\$20,055.00

Co-PI(s): Donald Visco, Chemical Engineering

Center: Manufacturing

International Travel Support for the International Summit on Cement Hydration Kinetics and Modeling
Federal Highway Administration

\$16,186.00

Co-PI(s):

Center: Manufacturing

REU Supplement to NSF 0928539-Controlling the Properties and Performance of Concrete

National Science Foundation

\$12,000.00

Co-PI(s): Donald Visco, Chemical Engineering

Center: Manufacturing

Civil and Environmental Engineering

Click, Steven

Field Evaluation of Traffic Signal Based Interchange Treatments

Tennessee Department of Transportation

\$53,600.00

Co-PI(s):

Center: Energy

Field Evaluation of Traffic Signal Based Interchange Treatments

Tennessee Department of Transportation

\$13,400.00

Co-PI(s):

Center: Energy

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Engineering cont'd

Civil and Environmental Engineering cont'd

Crouch, L. K.

Optimum Air Content Range (Plastic and Hardened) for TDOT Class D PCC
Tennessee Department of Transportation
\$60,000.00

Co-PI(s): Benjamin Mohr-Civil and Environmental Engineering
Center: Energy

Preliminary Investigation of Beneficial Uses of Kingston Ash Material
Tennessee Department of Transportation
\$60,000.00

Co-PI(s):
Center: Energy

Hossain, Faisal

Advancing the Hydrologic Potential of NASA's TRMM-Based Satellite Rainfall Estimation System for
Global Flood Monitoring
NASA
\$128,420.00

Co-PI(s):
Center: Water

Advancing the Hydrologic Potential of NASA's TRMM-Based Satellite Rainfall Estimation System for
Global Flood Monitoring
NASA
\$51,465.00

Co-PI(s):
Center: Water

Modeling the Hydrologically-Relevant Features of Uncertainty of NASA's High Resolution
Precipitation Products for Advancing Global Applications Over Ungauged Regions (Ling Tang)
NASA (NESSF Program)
\$27,600.00

Co-PI(s):
Center: Water

Ivanhoe Fellowship-Siddique Akbor
The Ivanhoe Foundation
\$5,000.00

Co-PI(s):
Center: Water

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Engineering cont'd

Civil and Environmental Engineering cont'd

Huo, Sharon

Simplified Live Load Distribution Factor Equations for Tennessee Highway Bridge Design
Tennessee Department of Transportation
\$32,500.00

Co-PI(s):

Center: Energy

Electrical and Computer Engineering

Abdelrahman, Mohamed

RET: Research Experience for Teachers in Manufacturing for Competitiveness in the U.S.
National Science Foundation
\$167,582.00

Co-PI(s): Holly Anthony-Curriculum and Instruction

Center: Manufacturing

REU Supplement to RET Project-NSF Award 0908672
National Science Foundation
\$10,000.00

Co-PI(s):

Center: Manufacturing

He, Xubin

RUI: Automatic Identification of I/O Bottleneck and Run-time Optimization for Cluster Virtualization
National Science Foundation
\$100,464.00

Co-PI(s):

Center: Manufacturing

Collaborative Research: Cross-Layer Exploration of Non-Volatile Solid-State Memories to Achieve Effective I/O Stack for High-Performance Computing Systems

National Science Foundation
\$85,754.00

Co-PI(s):

Center: Manufacturing

CSR-PDOS: A Benchmarking Framework for High-Availability Distributed Storage Systems
National Science Foundation
\$75,000.00

Co-PI(s):

Center: Manufacturing

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Engineering cont'd

Electrical and Computer Engineering cont'd

He, Xubin

REU Supplement to NSF Award 0720617 CRS-PDOS
National Science Foundation
\$10,750.00

Co-PI(s):

Center: Manufacturing

Mahajan, Satish

Development of a Wire Core Transformer
Buswell Energy, LLC
\$74,999.00

Co-PI(s):

Center: Energy

Ojo, Joseph

Performance Optimization and Extended Speed Control of Multi-Phase Open Winding Induction and Interior Permanent Magnet Machines Actuated with Dual Multi-Phase, Multi-Level Converters

Office of Naval Research
\$105,668.00

Co-PI(s):

Center: Energy

Performance Optimization and Extended Speed Control of Multi-Phase Open Winding Induction and Interior Permanent Magnet Machines Actuated with Dual Multi-Phase, Multi-Level Converters

Office of Naval Research
\$76,322.00

Co-PI(s):

Center: Energy

Energy Center

Gao, Wenzhong

Multi-Level Energy Storage and Controls for Large-Scale Wind Energy Integration
U. S. Department of Energy
\$131,309.00

Co-PI(s):

Center: Energy

CAREER: Wind Power-Multi-Level Control, Intelligent Grid Integration and Real-Time Digital Simulation

National Science Foundation
\$80,000.00

Co-PI(s):

Center: Energy

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Engineering cont'd

Energy Center cont'd

Gao, Wenzhong

NSF Travel Support for Students Attending the 5th IEEE Vehicular Power and Propulsion Conference
National Science Foundation
\$5,800.00

Co-PI(s):
Center: Energy

Munukutla, Sastry

Center for Energy Systems Research 2009-10
Tennessee Higher Education Commission
\$883,400.00

Co-PI(s):
Center: Energy

Smart Grid Research
Oak Ridge National Laboratories
\$415,000.00

Co-PI(s):
Center: Energy

Center for Energy Systems Research Carryover 2009-10
Tennessee Higher Education Committee
\$98,956.00

Co-PI(s):
Center: Energy

ARRA Energy Center 2009-10
Tennessee Higher Education Commission
\$48,300.00

Co-PI(s):
Center: Energy

Maintenance of Effort (MOE) for the Center of Energy Systems Research 2009-10
Tennessee Higher Education Commission
\$47,600.00

Co-PI(s):
Center: Energy

Power-Test-Service Account 2009-10
various
\$16,044.00

Co-PI(s): L. K. Crouch-Civil and Environmental Engineering; Stephen Idem-Mechanical Engineering
Center: Energy

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Engineering cont'd

Manufacturing and Industrial Technology

Fidan, Ismail

From Art to STEM - A Creative Journey of Discovery and Transformational Project for Nashville
Middle School Students

Alignment Nashville

\$65,637.00

Co-PI(s):

Center: Manufacturing

Manufacturing Center

Currie, Kenneth

Center for Manufacturing Research - State Appropriation 2009-10

Tennessee Higher Education Commission

\$1,492,200.00

Co-PI(s):

Center: Manufacturing

Advanced Portable Power Institute-Phase IV

U. S. Army Communications Command (CECOM)

\$1,383,438.00

Co-PI(s):

Center: Manufacturing

Center for Manufacturing Research - ARRA Stimulus Funds 2009-10

Tennessee Higher Education Commission

\$81,500.00

Co-PI(s):

Center: Manufacturing

UT-CIS Contract for Employee Services 2009-10

The University of Tennessee Center for Industrial Services

\$80,000.00

Co-PI(s):

Center: Manufacturing

Center for Manufacturing Research - MOE Stimulus Funds 2009-10

Tennessee Higher Education Commission

\$79,600.00

Co-PI(s):

Center: Manufacturing

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Engineering cont'd

Manufacturing Center cont'd

Currie, Kenneth

Center for Manufacturing Research 2008-09 Carryover
Tennessee Higher Education Commission
\$72,220.00

Co-PI(s):

Center: Manufacturing

Testing & Design 2009-10
various
\$35,684.00

Co-PI(s):

Center: Manufacturing

Qiu, Robert

DURIP: A Cognitive Radio Network Testbed
Office of Naval Research
\$396,000.00

Co-PI(s): Wenzhong Gao-Energy Center; Nan Guo-Manufacturing Center; Joseph Ojo-Electrical and
Computer Engineering

Center: Manufacturing

Wideband Digital Nulling and NIMO Radar
BerrieHill Research Corporation (via Wright Patterson AFB)
\$60,000.00

Co-PI(s):

Center: Manufacturing

Collaborative Research: Wideband Cognitive Radio Communication Systems: Modeling, Algorithms
and Test-Bed

National Science Foundation
\$55,341.00

Co-PI(s):

Center: Manufacturing

Mechanical Engineering

Canfield, Stephen

Enabling Children with Disabilities and Their Families in Tennessee Through Technology - EIME
Project 2009-10

Tennessee Department of Education
\$35,000.00

Co-PI(s): Kenneth Hunter-Basic Engineering

Center: Energy

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Engineering cont'd

Mechanical Engineering cont'd

Cunningham, Glenn

Tennessee 3-Star Industrial Assessment Center: Recovery Act Proposal for Enhanced Assessments and Technical Assistance

U. S. Department of Energy
\$125,000.00

Co-PI(s): Kenneth Currie-Manufacturing Center
Center: Manufacturing

Tennessee 3-Star Industrial Assessment Center
U. S. Department of Energy
\$160,000.00

Co-PI(s): Kenneth Currie-Manufacturing Center
Center: Manufacturing

Modeling Air Blast Atomization
Goodrich Turbine Fuel Technologies
\$44,800.00

Co-PI(s):
Center: Energy

Darvennes, Corinne

Tennessee Space Grant Consortium Award
Vanderbilt University via NASA
\$26,000.00

Co-PI(s):
Center: STEM

Idem, Stephen

Laboratory Testing of Increased Area (Pressed) Saddle Tap Tees to Determine Loss Coefficients
Spiral Duct Manufacturers Association
\$22,440.00

Co-PI(s):
Center: Energy

Panchagnula, Mahesh

Development of a Regional Assessment/Implementation SEN Delivery Partnership System
West Virginia University
\$35,000.00

Co-PI(s):
Center: Manufacturing

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Engineering cont'd

Mechanical Engineering cont'd

Peddieson, John

Modeling of Moisture Diffusion in Composites
United Launch Alliance
\$53,000.00
Co-PI(s): Jane Liu-Civil and Environmental Engineering
Center: Energy

Yoon, Hwan-Sik

System Simulation Methods/Processes Used to Accelerate Engine Control System Calibrator
GM Powertrain
\$66,583.00
Co-PI(s):
Center: Manufacturing

Zhang, Ying

Alumina-Forming Coatings for Power-Generation Applications
Oak Ridge National Laboratory
\$50,001.00
Co-PI(s):
Center: Manufacturing

Fabrication of Coatings via a Pack-Aluminizing Process on Large Specimens
Oak Ridge National Laboratory
\$15,000.00
Co-PI(s):
Center: Manufacturing

Alumide Coatings to Protect High-Temperature Cast Stainless Steel CF8C-Plus
Oak Ridge National Laboratory
\$5,803.00
Co-PI(s):
Center: Manufacturing

Water Center

George, Dennis

Center for the Management, Utilization and Protection of Water Resources 2009-10
State of Tennessee
\$1,171,400.00
Co-PI(s):
Center: Water

Appendix B
Externally Funded Projects By
College/Area, Department, Investigator(s), Project Title,
Funding Agency and Funding Amount
Fiscal Year 2009-10
(Principal Investigator/Co-PI(s))

Engineering cont'd

Water Center cont'd

George, Dennis

Water Quality and Benthic Biological Assessment of Discharge of Water Treatment Residuals from the Florence and Platte South Potable Water Treatment Plants, Omaha, Nebraska

EE&T, Inc.
\$116,266.00

Co-PI(s):

Center: Water

Water Center Analytical and Computer Services
various

\$71,254.00

Co-PI(s):

Center: Water

ARRA Water Center 2009-10

State of Tennessee
\$64,000.00

Co-PI(s):

Center: Water

MOE Water Center

State of Tennessee
\$62,800.00

Co-PI(s):

Center: Water

Center for the Management, Utilization and Protection of Water Resources
Tennessee Higher Education Commission

\$14,767.00

Co-PI(s):

Center: Water

Stearman, Kim

Compost and Drip Irrigation Effects on Soil and Water Quality, Soil Carbon/Nitrogen Ratios, Earthworms and Crop Yields in Organic Vegetable Plots

U. S. Department of Agriculture
\$51,538.00

Co-PI(s): James Baier, Michael Best, Janice Branson, Bruce Greene, Jed Young-Agriculture

Center: Water

Appendix C

FY 2009-10 Intellectual Property Activity

The Office of Research received five invention disclosures, filed four provisional patents, and two utility patent applications.

Copyrighted Materials:

1. The Committee on Patents and Copyrights voted to proceed with a copyright filing for the “Project Tracking Database” developed by Sammie Sparks.

Invention Disclosures:

1. AIMTEC—Adaptive Interactive Monitor for Therapeutic Educational Communication (Gilbert Humberg, Student)
2. Wearable Electronic Tracking Device to Prevent Unlawful Drivers from Driving (Ali Alouani & Rod McClellan)
3. Metallic Nanoparticle Templated Composite Gels for Separations (Jeffrey Thompson, Student; Holly Stretz; Pedro Arce)
4. Heterogeneous Maximal Service Scheduling Technique (Omar Elkeelany & Mohamed Abdallah)
5. Blind Spectrum Sensing Based on Feature Extraction (Robert Qiu and Peng Zhang)

Provisional Patents:

1. Wearable Electronic Tracking Device to Prevent Unlawful Drivers from Driving (Ali Alouani & Rod McClellan)
2. Metallic Nanoparticle Templated Composite Gels for Separations (Jeffrey Thompson, Student; Holly Stretz; Pedro Arce)
3. Heterogeneous Maximal Service Scheduling Technique (Omar Elkeelany & Mohamed Abdallah)
4. Blind Spectrum Sensing Based on Feature Extraction (Robert Qiu and Peng Zhang)

Utility Patents:

1. Wind Aeolipile (Charles Van Neste & Wenzhong Gao)
2. Compliant, Parallel-gravity Suspension System for a Tracked, Climbing Robot (Steven Canfield & Jamie Beard)

The Innovation Tennessee Conference was held May 10 and 11, in Nashville, Tennessee. Sponsored by the Tennessee Technology Development Corporation, the conference provided universities and small businesses the opportunity to present selected inventions to a panel of experts and receive feedback on the development, refinement, financing and marketing of the inventions.

Four inventions from Tennessee Technological University were selected for this conference, the most of any of the TBR institutions:

- Compliant, Parallel-gravity Suspension System for a Tracked, Climbing Robot (Steven Canfield & Jamie Beard)
- Metallic Nanoparticle Templated Composite Gels for Separations (Jeffrey Thompson, Student; Holly Stretz; Pedro Arce)
- Nanoparticle Templated Composite Gels for Separations (Jeffrey Thompson, Student; Holly Stretz; Pedro Arce)
- A System for Monitoring and Evaluating Greensand Molds (Mohamed Abdelrahman & Michael Baswell)

Mark Lynam coordinated the presentations and attendance with the TBR and the inventors.

Appendix D
FY 2009-10 Faculty Research Committee Awards

Author(s)	Title	Dept.	Amt.	Type
Michael Best	An Economic Analysis of Yield and Quality Differences Associated with Two Different High-Tunnel Production Techniques for Heirloom Tomatoes	Agriculture	\$5,000	Research Development
Bruce Greene/J. W. Baier	Study of effect of genetic variability and the use of an organically approved miticide for control of Varroaosis in honey bees	Agriculture	\$9,562	Research Development
Kim Stearman	Soil Carbon and Nitrogen Relationships in Composed Organic Vegetable Plots	Agriculture	\$5,000	Research Development
Daniel Combs	Field-Testing a Habitat Model for Predicting the Presence of Green Salamanders on Rock Outcrops	Biology	\$4,840	Research Development
Steven Hayslette	Distribution and Activity Patterns of Allegheny Woodrats (<i>Neotoma magister</i>) at Catoosa Wildlife Management Area	Biology	\$5,000	Research Development
Titus Albu	A Computational Study on the Nucleophilic Attack on the C=C Double Bond of Quinones	Chemistry	\$4,500	Research Development
John Harwood	Estimation of Organic Pollution Source Loads by LC-MS/MS	Chemistry	\$5,000	Research Development
Martha Wells	Development hyphenated chromatographic-mass spectrometric techniques for analysis of endogenous and exogenous microconstituents	Chemistry	\$5,000	Research Development
Daniel Badoe	Modeling the Interrelationship between Trip generation and Household Vehicle Ownership	Civil and Environmental Engineering	\$5,000	Research Development
Steven Click	Applicability of Bluetooth-Based Traffic Data Collection in Rural Areas: Market Penetration Study	Civil and Environmental Engineering	\$5,000	Research Development
Jane Liu	Application of Groebner Basis Methodology to Vibration Control Problems with Geometrically Nonlinear Hygrothermal-Elastic Composite Plates	Civil and Environmental Engineering	\$5,000	Research Development
Benjamin Mohr	Development of Leachate Test for Identifying the Potential for Delayed Ettringite Formation in Cement-Based Material	Civil and Environmental Engineering	\$5,000	Research Development
William Eberle	Using Data Mining and Machine Learning for Retention of College Students	Computer Science	\$4,380	Research Initiation
Ambareen Siraj	Towards the Development of a Community Information Infrastructure for Smart Grid Security Resources (CII-SGSR)	Computer Science	\$5,000	Research Initiation
Shannon Morgan	Visual Processing and Attentional Focus in Typically Developing Individuals and Individuals with Autism Spectrum Disorders	Counseling and Psychology	\$5,000	Research Development
Lisa Zagumny	(Re)presenting "the Muslim world": An analysis of high school world geography textbooks (2008-2014 adoption cycle-Tennessee)	Curriculum and Instruction	\$5,000	Research Development
Evan Hart/Hugh Mills	Dating Marine Terrace Deposits of the Coquimbo Bay Area, Chile using Optically Stimulated Luminescence (OSL)	Earth Sciences	\$10,000	Research Development

Appendix D, cont'd
FY 2009-10 Faculty Research Committee Awards

Author(s)	Title	Dept.	Amt.	Type
Robert Qiu	Control Techniques for Cognitive Radio Network and Smart Grid	Electrical and Computer Engineering	\$5,000	Research Development
Halina Ablamowicz/Kevin Christianson	Translation of Poems included in 'Sybirackie Refleksje' and Translations of Poems by Selected Polish Poets	English and Communications	\$10,000	Research Development
Yun Ding	Between Confucianism and Pragmatism: Rhetorical Positioning of the Confucius Institute	English and Communications	\$4,500	Research Development
Colleen Hays	French National Identity and the "Mission Civilatrice" in Pierre Dupont's <i>Sur L'Algerie</i>	Foreign Languages	\$5,000	Research Development
Andrzej Gutek	Shift Operators on Banach Spaces of Continuous or Holomorphic Functions and their Generalizations	Mathematics	\$5,000	Research Development
Alexander Shibakov	Probability models in extreme uncertainty	Mathematics	\$4,500	Research Development
Joshua Hauser/Charles Decker/Chris McCormick/ Greg Danner/R. Winston Morris	Research and Recording of Significant New and Existing Works for Brass Ensemble	Music and Art	\$14,744	Research Development
			\$146,026	