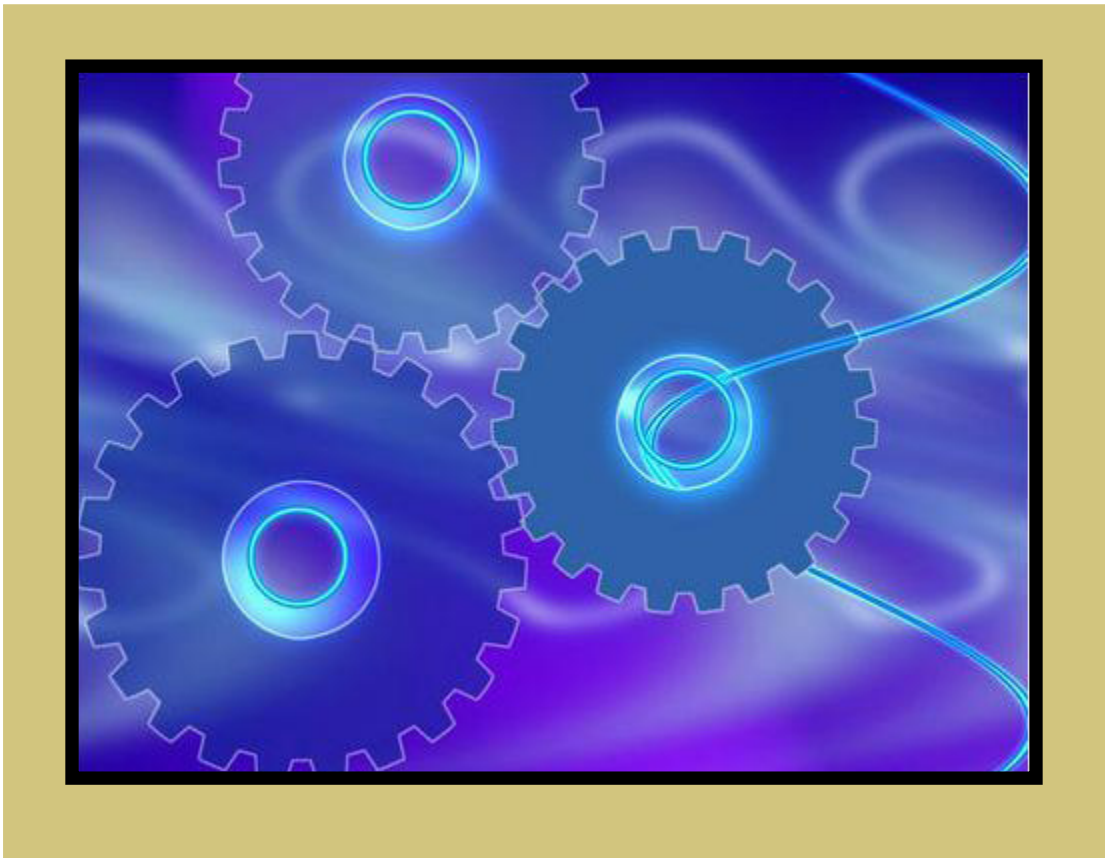


# Annual Report 2013



Supporting research opportunities

## From the Vice President for Research Office of Research

The faculty, staff, and students of WKU had a wonderful year of cutting-edge research and creative activity that reached around the globe. While the funding from federal and state sources may be bleak, the talent and resilience of the WKU community has made this a highly successful year. Because our research mission is student-oriented and focuses on our region, we count success primarily in terms of the impact made on the lives of our students, the economy, and the quality of life in our region.

An important example of this is the National Institute of Standards and Technology-Manufacturing Extension Partnership (NIST-MEP) grant that has allowed WKU to lead a statewide consortium to assist manufacturers with innovations in order to maintain a competitive advantage internationally. Building a diverse portfolio of extramurally funded research is vital to our future and is the only way we can continue to grow our research enterprise. Despite the funding climate, a large number of dynamic and talented faculty have established themselves as respected researchers with highly fundable programs. This success can be seen across all disciplines, ranging from a major research infrastructure grant from National Science Foundation (NSF) to multiple grants from National Endowment for the Humanities (NEH).

Our students also showed impressive initiative, and great success. Close to 100 Faculty-Undergraduate Student Engagement (FUSE) grants were awarded to fund research and creative activities initiated by students. The result produced award-winning research in nano-science, history, art, dance, and a host of disciplines. These students jump-started successful careers before graduation. Students have also been busy creating their own jobs. Over 20 student-run companies have been operating from the student business accelerator – Innoplexx and a number of these companies are showing a profit.

In 2013, the faculty, staff, and students of WKU showed what a positive impact their research and creative activities have on the Commonwealth and the nation. Our team is proud to serve these great scholars.



**Dr. Gordon C. Baylis,**

## From the Director, Office of Sponsored Programs



**Nancy Mager,**

WKU is pleased to provide this summary of our research activity for FY2013 and to report on our progress toward achieving our research goals – expansion of our sponsored projects portfolio and increase in our level of research expenditures.

The past few years have been extremely challenging. Like many of our peer institutions, we have experienced a decline in research dollars. Our faculty have risen to these challenging times by doing more while maintaining high standards to provide quality research and scholarship for our students. Yet, the challenges remain and we must continue to seek innovative ways to maintain and grow the WKU research enterprise.

To this end, in FY13, we initiated a new internal grant program, funded by the Office of Academic Affairs. Faculty Undergraduate Student Engagement (FUSE) was borne through recognition of a need to seed undergraduate student research activities. FUSE grants are designed to support undergraduate students' intellectual development by fostering active engagement in the areas of research, creative and scholarly activities, or artistic performances.

To further collaboration across college lines, the Office of Research established the interdisciplinary Research and Creative Activities Program (iRCAP) awarded to seven multidisciplinary proposals.

While we are best known for research with a regional focus, WKU's research activities generate outcomes having local, national and global impact. Most importantly, these research activities enhance undergraduate education, expanding the reach of knowledge and improving lives in our community and in the world.

# Economic Development

The impact of activities funded by extramural sources to WKU, contributes greatly to the economic development of the region. Approximately \$7,791,447 (49.42%) of WKU sponsored projects are awards for public service projects. This funding contributes to the overall vitality of the region. Through WKU's Center for Research and Development (CRD), WKU works with startup companies by providing support and infrastructure to enhance the development of research innovations into commercially viable companies.

The Small Business Development Center (SBDC) counseled 223 clients during the year, up 10% from last year. SBDC provided 1,048 hours of direct counseling, up 2% from last year. They helped 12 new businesses get started that led to 81 new jobs, sponsored 22 training events on various topics in which 264 individuals attended. In addition, the SBDC hosted the SBA Lenders Conference that brought both SBA directors and key lenders to the CRD for a day-long event.

WKU received \$488,456 from the National Institute of Standards and Technology-Manufacturing Extension Partnership (NIST-MEP) to operate Advantage Kentucky Alliance MEP (see Working toward the Future Article), housed at the WKU Center for Research and Development. The Alliance partners include all Kentucky comprehensive universities, along with Kentucky Innovation Network, Kentucky Association of Manufacturers, Kentucky Association for Economic Development, Greater Owensboro Economic Development Corporation and the Bowling Green Area Chamber of Commerce.

MEP centers are public-private partnerships that receive a portion of their annual budgets from NIST MEP, and the rest from nonfederal agencies or organizations. As a public-private partnership, MEP delivers a high return on investment to taxpayers. For every dollar of federal investment, the MEP generates nearly \$20 in new sales growth and \$20 in new client investment. This translates into \$2.5 billion in new sales annually. For every \$2,100 of federal investment, MEP creates or retains one manufacturing job.



# Center for Research and Development



## **Bucks for Bright Ideas**

A very successful 2012 Bucks for Bright Ideas contest concluded with the annual Awards Banquet with over 100 attendees.

## **Food Science & Waters Laboratory**

The new Food Science & Waters Laboratory was designed and built in part of the space formerly occupied by Dollar General. The co-located facilities were relocated from the main campus to the CRD to allow better utilization of common equipment and instruments.



## **High Performance Computing Center (HPCC)**

The HPCC Lost River Data Center were completed and made operational.

## **Innoplexx**

The Student Business Accelerator was given a permanent home in a 1200 sq. ft. suite remodeled specifically for student-owned start-up companies. It was renamed the "Innoplexx", and currently houses 20 student-owned companies.



## **Innovation and Commercialization Center (ICC)**

The ICC was rebranded as the "Kentucky Innovation Network" with the announcement made by the Governor at the facility.

## **NOVA Center**

The NOVA Center acquired a Scanning Auger Nanoprobe System to supplement the Large Chamber SEM instrument.



## **Outreach**

The Community Farmer's Market utilized the south end of the CRD during the winter months to better support the market while providing an opportunity to showcase the facility.

## **Social Science Research Center (SSRC)**

The SSRC is an interdisciplinary organization that provides faculty members with a location where they can teach students how large social survey research projects are conducted while providing them with practical, first-hand experience in collecting social survey data. The SSRC opened for business in October 2012.

In addition to the applied research labs and the business accelerators, the CRD houses several technology company headquarters and research labs.

With the exception of the Telepresence Room, all laboratory facilities at the CRD are used for applied research, not regular classroom student instruction. Labs are staffed by WKU faculty, staff, student workers and interns.

# REACH Week 2013

REACH Week, an annual conference, encourages student research and creativity across multiple disciplines. WKU's annual Student Research Conference includes a week-long celebration of research and creative engagement. Events included:

Keynote speaker, Sarah Vowell, Author, Humorist, and Public Radio Contributor to "This American Life"  
7:00 p.m. "An Evening With Sarah Vowell"  
Van Meter Auditorium

43RD Annual WKU Student Research Conference where students presented their research and creative activities through talks, posters, performances, and more.

Conference speaker, Dr. Paul Simmons, Professor of Medicine at the University of Louisville, Sigma Xi Distinguished Lecturer spoke on "Intelligent Design: Is This the End of Evolution?"

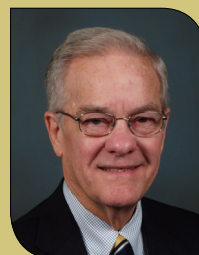
The conference featured a presentation by Kyle O'Donnell on "*Utilizing Energy Saving Performance to Position WKU as a Net-Zero Emissions Campus*" which won Best Graduate Business Paper. Kyle is a full-time MBA student and Dr. Brian Sullivan was his research mentor.

Meg McDonald worked with 60 fifth grade students from Louisville to create Kentucky's first entry into the Kids' Guernica International Children's Peace Mural Project.

Zhibo Yuan's research focused on the synthesis and characterization of metal porphyrin complexes, and catalytic oxidation reactions of organic sulfides, which have provided insightful mechanistic information on cytochrome P450 enzyme mediated reactions, as well as in the developments of enzyme-like methods for organic synthesis.



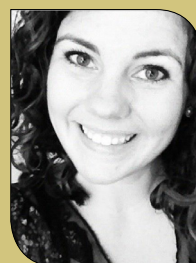
Sarah Vowell



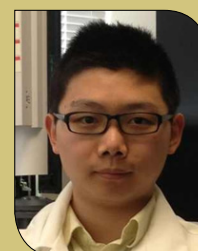
Dr. Paul Simmons



Kyle O'Donnell



Meg McDonald



Zhibo Yuan

# Total Research Expenditures

WKU's peer institutions range in size of research activities, as reflected in Table 1, from University of Southern Mississippi (greater than \$78m) to Indiana State University (less than \$6M).

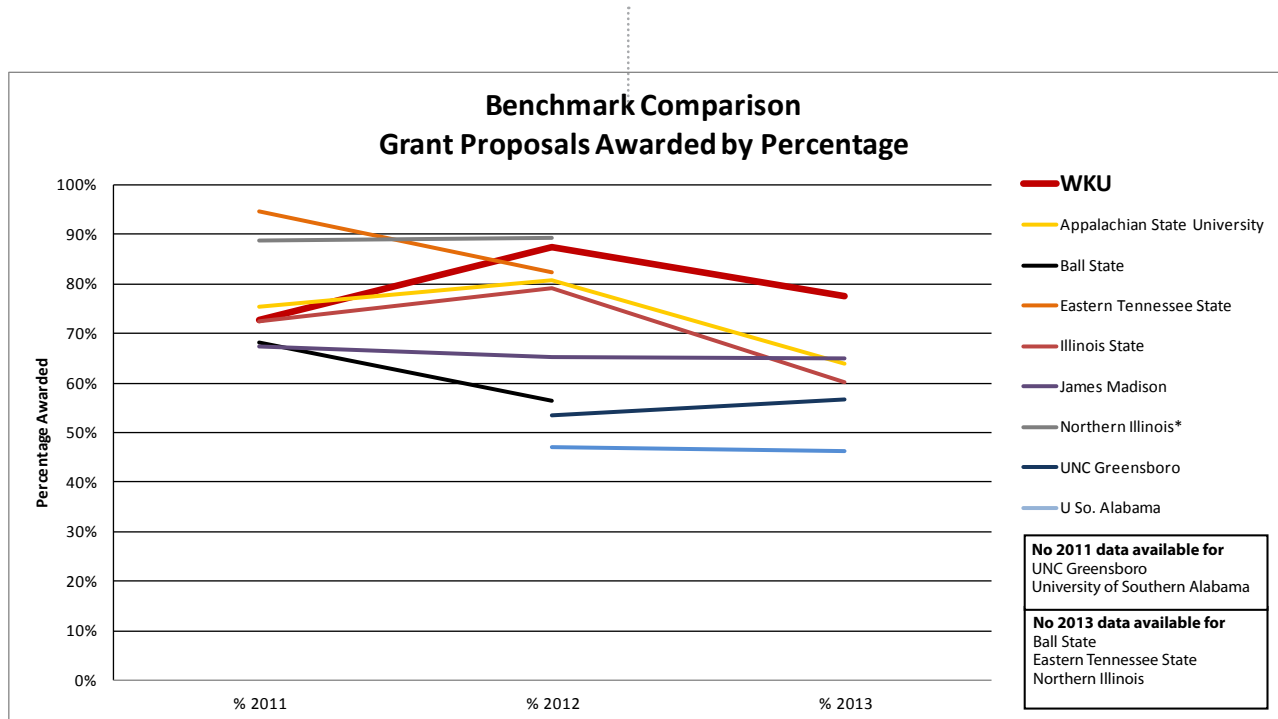
Externally, WKU's research progress is noted by the National Science Foundation (NSF)'s Higher Education Research & Development (HERD) Survey that provides comparative data for WKU to use to measure success.

Recently, the survey was revised to include R&D within non-science and engineering (non-S&E) fields in the totals reported throughout the survey. Previously, non-S&E R&D was reported but not included in the overall totals. The scope of R&D was also broadened to include expenditures on clinical trials and research training grants. In 2012, WKU was ranked 332nd out of 655 respondents in R&D expenditures at universities and colleges. These research expenditures reflect the actual dollars spent to support research programs at the university. The NSF HERD survey offers a complete picture of research activity, including externally funded expenditures, internal grant programs, and university cost share.

University	2011	2012	2013
<b>WKU</b>	<b>\$22,955,803</b>	<b>\$18,978,279</b>	<b>\$15,766,190</b>
Appalachian State University	\$17,552,643	\$11,766,736	\$11,077,426
Ball State	\$16,548,858	\$14,107,651	
Bowling Green State	\$18,547,141	\$13,015,301	
Central Michigan	\$14,600,000	\$12,700,000	
East Carolina University	\$43,779,000	\$41,161,000	
Eastern Tennessee State	\$39,512,605	\$36,111,256	
Florida Atlantic	\$43,208,722	\$47,971,846	
Illinois State	\$36,885,708	\$25,575,192	\$17,922,697
Indiana State	\$8,525,565	\$5,995,471	\$9,198,766
James Madison	\$22,596,252	\$21,450,410	\$16,088,729
MTSU	\$33,700,000	\$31,665,772	
Northern Illinois*	\$107,345,951	\$31,091,155	\$30,698,586
Ohio U	\$63,856,296	\$64,216,800	
Towson	\$8,059,885	n/a	
UNC Charlotte	\$31,000,477	\$28,295,480	\$26,673,503
UNC Greensboro	\$47,774,694	\$32,616,982	\$28,712,632
U So. Alabama	\$42,220,527	\$56,996,784	\$23,520,724
U. So. Mississippi	\$81,139,337	\$78,660,856	

\*Note: \$49m ARRA funding ended in 2011

**Table 1.**  
Total research expenditures from Benchmark Institutions (2011-2013)



**Figure 1.**  
Grant Proposals Awarded by Percentage of Benchmark Institutions (2011-2013)

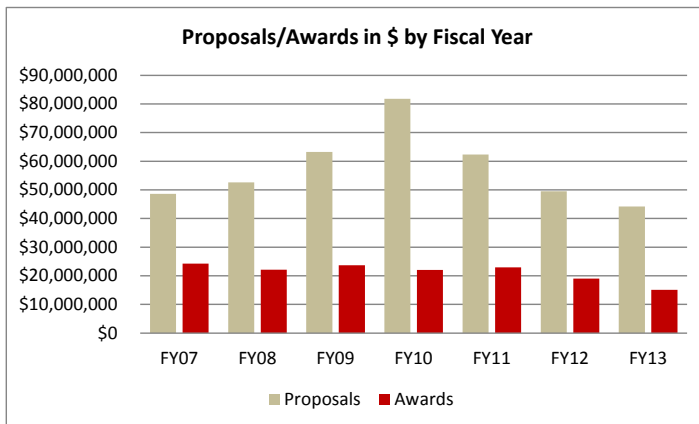
# External Funding Overview

Fiscal year 2013 external funding reflected a year of declining resources. Faculty and staff worked hard to bring in more funding which is measured by looking at the number of proposal submissions, new awards, total expenditures, and individual departments in an effort to gauge overall progress. In

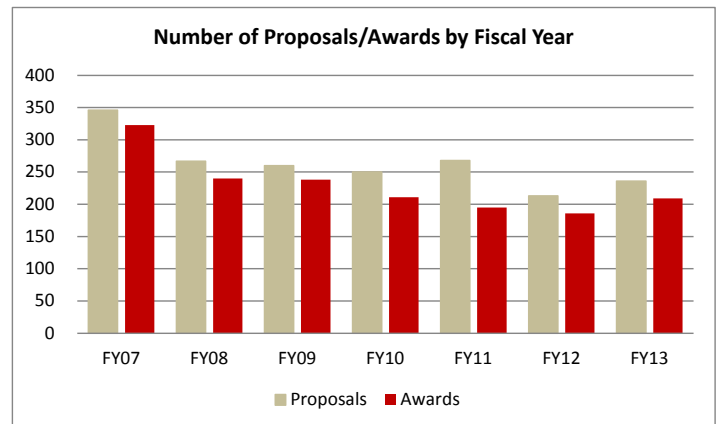
this challenging economy, where there is more competition for less dollars, our researchers continue to persevere.

WKU faculty, staff and students submitted a total of 236 proposals for external funding. During that same period, 209 grants were awarded. These efforts brought in \$15,086,877 in grants

during the period July 1, 2012 through June 30, 2013. These achievements continue to reflect the determination possessed by our faculty, staff and students for scholarly and creative endeavors.



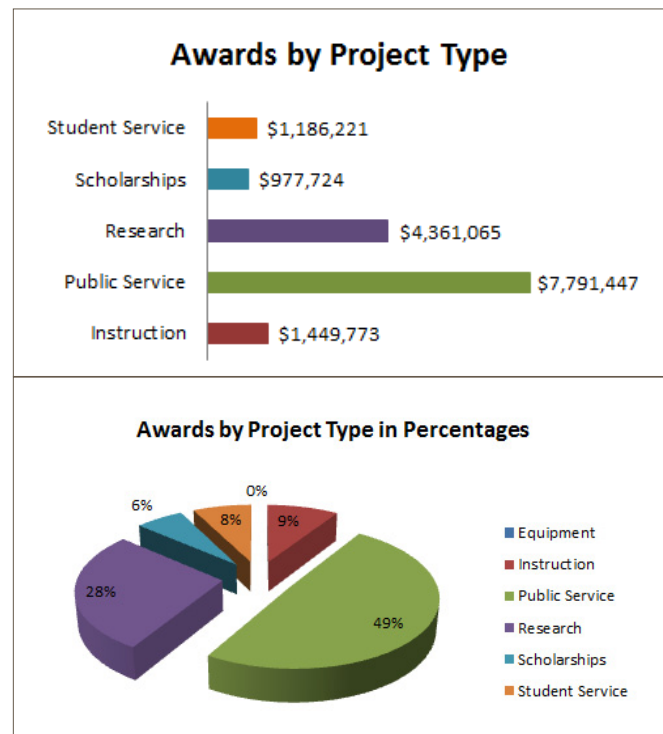
**Figure 2.** Proposals Submitted compared to Awards Received Fiscal Year 2007-2013



**Figure 3.** Number of Proposals Submitted compared to Awards Received Fiscal Year 2007-2013

Awards by Sponsor Type	Dollars	Awards
Federal	\$11,537,379	107
State	\$2,932,041	45
Local	\$23,950	2
Private	\$1,203,664	32
Award Dollars by Colleges and Other Units		
Other Units	Dollars	Awards
Ogden College of Science and Engineering	\$5,355,006	93
Other	\$4,361,432	34
College of Education and Behavioral Sciences	\$3,833,527	36
College of Health and Human Services	\$1,757,911	31
Potter College of Arts and Letters	\$207,160	10
Honors	\$173,934	1
Gordon Ford College of Business	\$49,250	3
University College/Community College	\$27,969	1

**Table 2.** Awards by Sponsor Type and by Colleges and Other Units, 2013



**Figure 4.** Awards by Project Type in Dollars and in Percentages

# Internal Funding Opportunities

## Research & Creative Activities Program (RCAP)

The Research & Creative Activities Program (RCAP) internal Grant program entered its third year of supporting WKU faculty's scientific and artistic pursuits. During fiscal year 2013, 72 proposals were submitted for a total of \$814,889 in requested funds. Thirty-three awards were granted for a total of \$313,560.

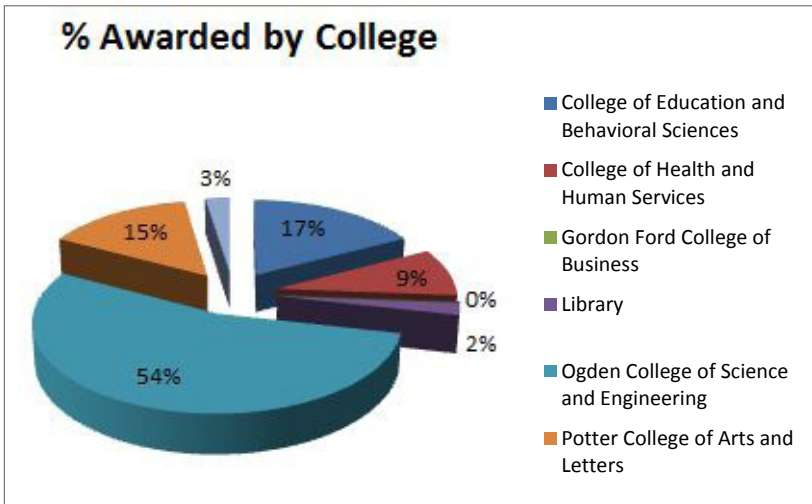


Figure 5. Percentage Awarded by College

	Proposals			Dollar
	RCAP I	RCAP II	TOTALS	Amount
<b>CEBS</b>				
Proposed	5	7	12	\$ 113,764.36
Awarded	3	2	5	\$ 54,328.11
<b>CHHS</b>				
Proposed	2	3	5	\$ 63,829.93
Awarded	1	2	3	\$ 27,857.27
<b>GFCB</b>				
Proposed				0.00
Awarded				0.00
<b>LIB</b>				
Proposed		1	1	\$ 8,000.00
Awarded		1	1	\$ 7,000.00
<b>OCSE</b>				
Proposed	23	10	33	\$ 495,087.33
Awarded	12	2	14	\$ 170,216.00
<b>PCAL</b>				
Proposed		17	17	\$ 113,333.21
Awarded		8	8	\$ 46,324.70
<b>UC</b>				
Proposed		4	4	\$ 20,873.76
Awarded		2	2	\$ 7,834.00
<b>TOTAL</b>				
Proposed	30	42	72	\$ 814,888.59
Awarded	16	17	33	\$ 313,560.08

Table 3. RCAP Awards by College

## Faculty-Undergraduate Student Engagement (FUSE)

FUSE grants are designed to support undergraduate students' intellectual development by fostering active engagement in the areas of research, creative and scholarly activities, and/or artistic performances.

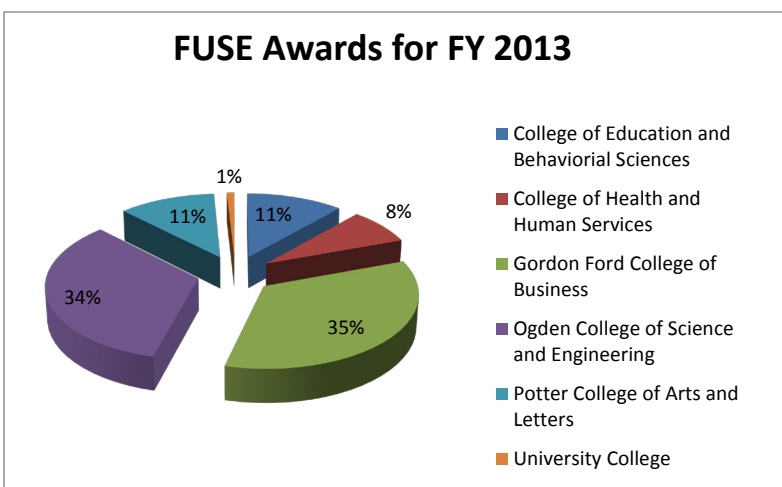


Figure 6. FUSE Awards (FY13)

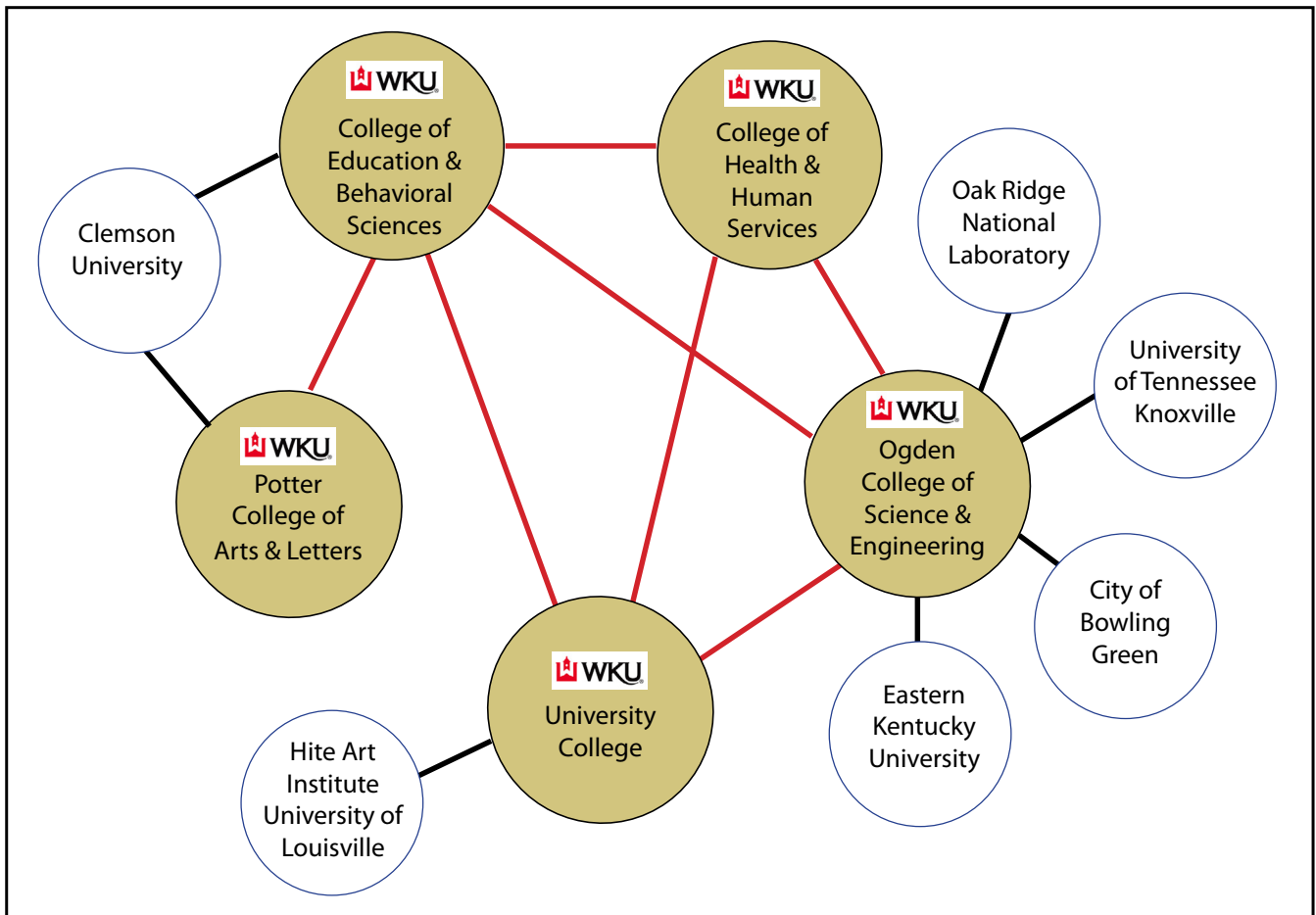


# Interdisciplinary Research & Creative Activities Program (iRCAP)

In addition to the annual round of RCAP funding, the Office of Research & Sponsored Programs initiated a pilot internal grant program in the Spring of 2013. The Interdisciplinary RCAP (iRCAP) was created to foster both inter-collegiate and external multidisciplinary collaborations. Of the 11 iRCAP proposals submitted, seven were funded for a total of \$37,995 in iRCAP awards. Figure 1. illustrates the cross-disciplinary and external collaborations created by the iRCAP program and demonstrates the broader impact of WKU's research initiatives.

iRCAP awarded funds in two tracks:

- Track C (inter-Collegiate): Collaborations between two or more WKU colleges
- Track E (External/inter-institutional): Collaboration with other institutions



**Figure 9.**  
FY2013 Interdisciplinary RCAP Cross-disciplinary and external collaborations

# Leadership and Recognition

The Office of Research is proud of the research our faculty and students are doing and we want to show our support for their efforts. Awards for FY13 include:

## Most Prolific Proposers by College

### Gordon Ford College of Business

Brian Strow Economics

### College of Education and Behavioral Sciences

Amy Hood-Hooten T/TAS  
Terry Wilson School of Teacher Education

### College of Health and Human Services

Lucy Juett South Central AHEC

### Ogden College of Science and Engineering

Rajalingam Dakshinamurthy Chemistry  
Rezaul Mahmood Geography & Geology  
Hemali Rathnayake Chemistry

### Other (Units Not in a College)

James Morgese ED TV & Radio Services

### Potter College of Arts and Letters

Jerry Daday Sociology

### University College

Ron Mitchell Professional Studies



Brian Strow



Rezaul Mahmood



Lucy Juett



Hemali Rathnayake



Rajalingam  
Dakshinamurthy



Jerry Daday

# Junior Investigator Awards

WKU Office of Research and Sponsored Programs aims to cultivate the excellence and ensure the quality of research, public service, and teaching of early career faculty and staff members at WKU. It is expected that this early career

opportunity will advance the research programs through boosting productivity and accelerating their ability to attract significant external funding.

<b>Hemali Rathnayake</b>	Chemistry	Ogden	\$ 522,244
<b>Martha Day</b>	School of Teacher Education	CEBS	\$ 404,235
<b>Rui Zhang</b>	Chemistry	Ogden	\$ 194,000
<b>Vladimir Dobrokhotov</b>	Physics/Astronomy	Ogden	\$ 154,561
<b>Jarrett Johnson</b>	Biology	Ogden	\$ 61,322

# Million Dollar Club

The Million Dollar Club consists of faculty and staff members who have received \$1 million or more in grants for their work in research, public service, student services, or other projects. External funding supports a wide array of initiatives and are the result of a university-wide efforts to enhance grant writing. The growth in

membership is a direct reflection on the University's success in encouraging faculty and staff to seek external funding. The Office of Research and Sponsored Programs offers a number of services to help faculty and staff members identify and secure external grant funding.

<b>Craig Cobane</b>	Honors College
<b>Vladimir Dobrokhotov</b>	Physics & Astronomy
<b>Lynne Holland</b>	Center for Career and Professional Development
<b>James Morgese</b>	Educational TV & Radio Services
<b>Darlene Taylor</b>	Talent Search



Rui Zhang



Lynne Holland



Craig Cobane



Vladimir Dobrokhotov