



Supporting research and creative activity

Office of  
**Research & Sponsored Programs**  
Annual Report 2013-2014



# From the Vice President for Research Office of Research

What a great year! It is exciting to see how a robust student-centered mission of research, creative activity, and regional engagement has taken root at Western Kentucky University. Over the last year, exciting progress has been made in developing the individual and collective portfolios of research and creative activity. As faculty, staff, and students pursue their creative dreams, WKU positively impacts the quality of life and economy of the local region. The role of the Office of Research is to support faculty, staff, and students in identifying the resources needed to turn dreams into plans that have an impact on student learning.



**Dr. Gordon C. Baylis**

In an interconnected world with growing global competition, the future of this country depends on constant innovation. This entails a close relationship between universities and commercial business, an engagement that Dr. Ransdell articulated for WKU many years ago. I am delighted that an increasing number of faculty, staff, and students see the value – and fun – of this kind of engagement. Staff at the Center for Research and Development have worked hard to facilitate what can be described as a meeting of different cultures to ensure that we can meet the demands of industry, while at the same time pursuing our research passion.

Extramural funding is not, of course, an end in itself, but it is one mechanism to maximize the resources available to carry out research and outreach. The funds received from outside agencies typically include direct costs – expenses identified by a faculty member needed to carry out the research – and indirect costs. Indirect costs are collected from granting agencies in order to reimburse the university for infrastructure costs. However, the policy of WKU is that all collected indirect costs are used to support research; none are allocated to central funds, and the vast majority are directly expended by faculty after funds are allocated to their research or creative activity.

This past year, faculty and staff have been particularly successful at garnering extramural funds, with a substantial increase in total funding compared to last year, and indirect recovery running ahead of budget. I applaud the work of the staff of the Office of Sponsored Programs in providing outstanding customer-focused support for faculty and staff in their grant awards. We saw the launch of the Center for Faculty Development, with Molly Swietek providing wraparound professional development in research and creative activity. Paul Mooney is to be congratulated on building the most research-friendly Office of Compliance that nevertheless ensures rigorous adherence to regulations.

In closing I would like to say what a pleasure it is to work for a President with a mission involving engaged research. As WKU faculty continue to be more involved in research we contribute to the quality of life as well as the regional economy. I am proud that WKU has established itself as a leader in the state.



## From the Director, Office of Sponsored Programs

The staff in WKU's Office of Sponsored Programs have spent the past few years working to bring together faculty, staff and students from different backgrounds, forming dynamic and productive research teams. Alongside faculty and staff, they work to create teams, facilitate communication, develop research concepts, and negotiate tasks to build collaborative projects. Collaborative research partnerships have proven to work faster, have greater impact, engage more students and take advantage of resources already in place, as well as external resources.

The data in this report shows this strategy to be successful in developing faculty and student research, with impacts regionally and globally.

I am pleased to present the Office of Sponsored Programs Annual Report for fiscal year 2014. In the following pages we highlight the extramural contract and grant funding awarded across the WKU campus. This report documents WKU's outstanding ability to attract external support for research and other sponsored programs.



**Nancy Mager**

This report is organized to cover the time period from July 1, 2013 through June 30, 2014. It includes a summary of the numbers and dollar volumes of extramural proposals and awards for WKU. Graphs and tables are included that show trends over time and give breakdowns by type of activity and type of sponsor.

A total of 172 awards for a total of \$20,913,079 were received from extramural sponsors during the year. The awarded projects involved 87 faculty and professional staff representing 48 departments or units. This compares with 209 awards received in FY2013 involving 110 faculty and staff with total project costs of \$15,766,190.

WKU faculty and staff submitted a total of 250 proposals during FY 2014. A total of \$39,381,185 was requested from extramural sponsors. This compares to \$44,183,256 requested in FY 2013.

Of the new funding received, 20% was for research, 25% for instruction, and 55% for other activities.

As always, I extend my deep appreciation to all those who put in the hard work required for preparing grant proposals and managing awards. I wish to recognize the additional productivity and commitment proposal development and successful grant management requires.





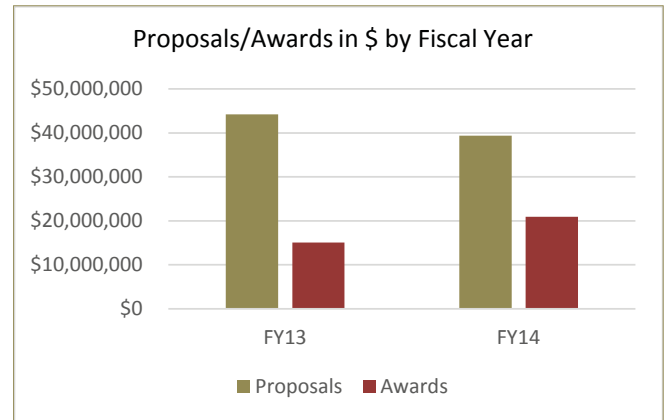
# External Funding Overview

## Number of Awards and by Dollars

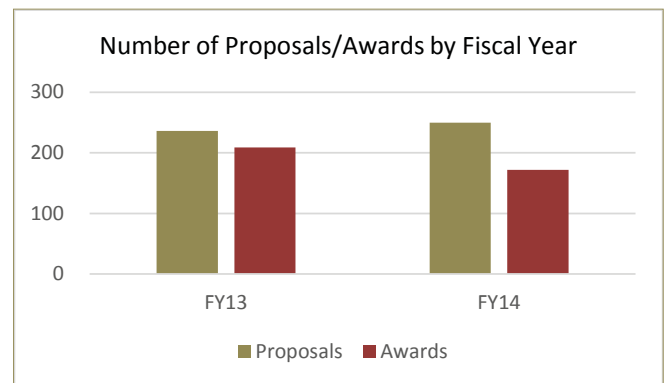
Fiscal year 2014's external funding reflects a year of increased dollar awards. The numbers indicate the effort faculty and staff put forth in the amount of proposals submitted overall, which was up from the two previous funding cycles.

While overall the economy is getting better, the competition for external funding for research continues to be challenging.

WKU faculty, staff and students were awarded 172 awards out of the 250 proposals submitted. These efforts brought in \$20,913,079 in grants during the period July 1, 2013 through June 30, 2014. These achievements continue to reflect the talent possessed by our faculty, staff and students for scholarly and creative endeavors.



**Figure 1.** Proposals Submitted Compared to Awards Received for Fiscal Year's 2013-2014



**Figure 2.** Number of Proposals Submitted Compared to Awards Received for Fiscal Year's 2013-2014

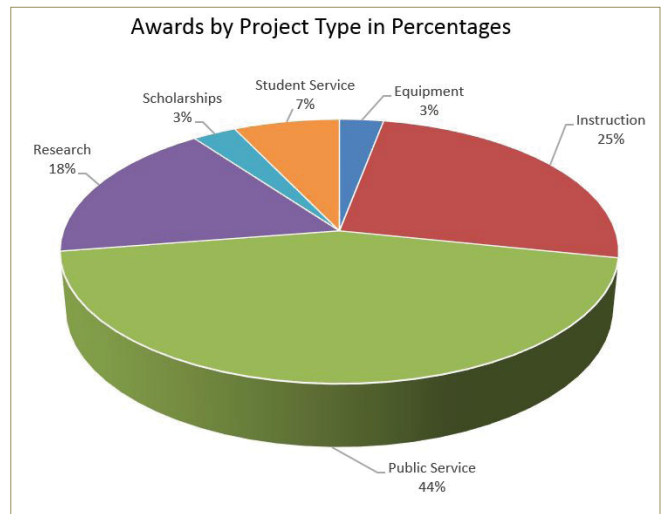
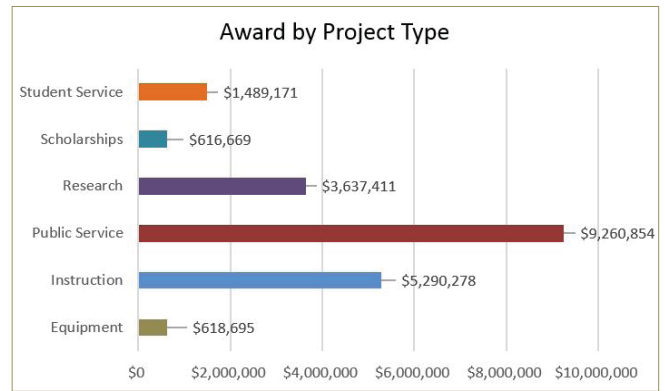


# Awards by Sponsor and Project Type

The Office of Sponsored Programs works with faculty and staff to make sure their time and efforts are well spent. Although identifying a sponsor's interest in the research topic is critical there are other questions to consider.

- Does the proposal identify a specific need or problem?
- Is the type of research, program, service, or training proposed supported by the funding agency?
- Does the funding agency make awards to public universities?
- Is the geographic area where the project will be conducted supported by the funding agency?
- Are you asking for more funding than this agency typically awards?

The most common reason why the University accepts outside funding is to help faculty, staff, and students engage in sponsored projects that support one or more of the three missions of the University: research, instruction, and public service.



**Figure 3.** Awards by Project Type in Dollars and in Percentages

Awards by Sponsor Type	Dollars	Awards
Federal	\$8,988,892	79
State	\$3,536,998	36
Local	\$62,540	4
Private	\$4,620,184	51
International	\$3,704,465	2
Award Dollars by Colleges and Other Units	Dollars	Awards
GFCOB	\$1,500	1
CEBS	\$5,843,963	35
CHHS	\$886,833	19
OCSE	\$9,486,194	76
PCAL	\$189,868	7
UC/Comm	\$29,583	2
Honors	\$13,568	1
Other	\$4,461,570	31
<b>TOTAL</b>	<b>\$20,913,079</b>	<b>172</b>

**Table 1.** Awards by Sponsor Type and by Colleges and Other Units, 2014

# Internal Funding Opportunities

## The Research & Creative Activities Program (RCAP)

RCAP plays a pivotal role in growing the research and scholarly enterprise at WKU. Since its inception in 2010, the internal grant program has awarded \$1,426,052 in support of WKU faculty's scientific and artistic pursuits.

The program often serves as the first step in developing an individual or collaborative research project, providing funds to establish preliminary findings that become the seeds for further, more in-depth investigations. Other times, the funds are used to create and showcase works of arts. From dance performances to visual arts exhibitions, the faculty at WKU are as diverse as the arts themselves, and their creative works often garner national attention.

Two years of closeout data show the results of RCAP funds awarded during fiscal years 2011 and 2012. Most noteworthy is the active participation of over 200 WKU undergraduate and graduate students in numerous faculty's RCAP projects. These students richly benefit from the hands-on, real-world experiences of working side-by-side with faculty conducting scientific or artistic discoveries.

The outcomes of the faculty's challenging work are also presented in a variety of academic and professional settings. In the two years data has been collected, faculty made 156 presentations; published 48 journal articles and six books; and developed 66 creative works. Faculty also engaged in collaborations with over 95 collegial scholars, both from within and outside of WKU.

One of RCAP's intended goals is to complement and strengthen the support of research and creative activities that begins at the departmental and college levels, then foster the transition to obtaining extramural funding. Of the 50 external grant proposals submitted resulting from RCAPs awarded in 2011-12, fourteen grant awards have been made to the University for a total of \$1,013,733, thus far.



# Research & Creative Activities Program (RCAP)

As RCAP entered its fourth year of operation in fiscal year 2014, it received 78 proposals for a total of \$743,570.32 in requested funds and subsequently granted 44 awards for a total of \$344,540.46.

Eligible faculty apply for funding through two program categories:

**Category I** – awards up to \$16,000 per application with the stated objective of enhancing the competitiveness of a proposal for external grant funding.

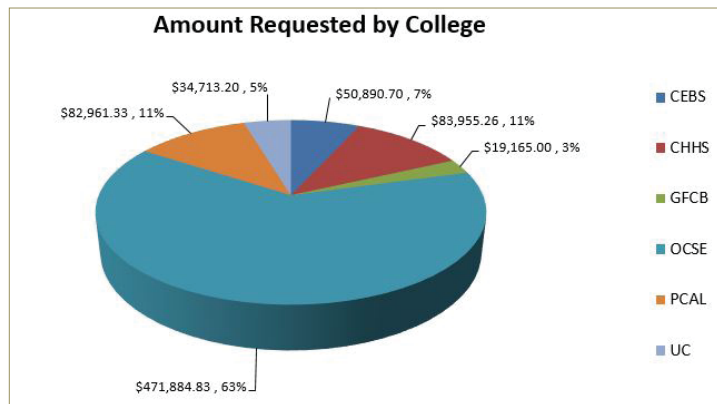
**Category II** – awards up to \$8,000 per application to support the general development, expansion, or enhancement of faculty research and scholarly activity.

To foster both inter-collegiate and external collaborations, each category is divided into three program tracks:

- **Track S** (Singular): A single, focused research, scholarly, or creative project
- **Track C** (inter-Collegiate): Collaborations between two or more WKU colleges
- **Track E** (External/inter-institutional): Collaborations with other institutions

The interdisciplinary component of Tracks C and E align with the goals of many Federal granting agencies seeking to broaden the impacts of funded support among multiple disciplines.

Fiscal year 2014 witnessed the most competitive round of RCAP applications thus far, demonstrating a profound breadth of scholarship and depth of commitment by the WKU faculty.



**Figure 4.**  
Amount Requested by College

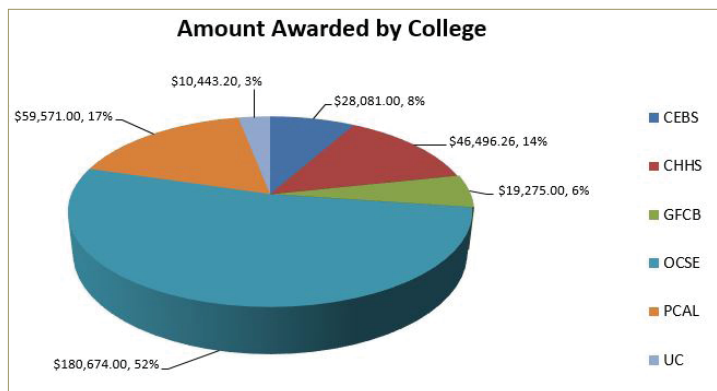
Proposals by Category and Track, by College

Category College\Track	RCAP I			RCAP II		
	Track S	Track C	Track E	Track S	Track C	Track E
CEBS	4	1	0	1	0	0
CHHS	3	2	0	1	0	2
GFCB	0	0	1	2	0	0
LIB	0	0	0	0	0	0
OCSE	29	0	2	7	0	0
PCAL	3	1	0	13	0	0
UC	0	0	0	6	0	0
<b>Total</b>	<b>39</b>	<b>4</b>	<b>3</b>	<b>30</b>	<b>0</b>	<b>2</b>

Total RCAP I	46
Total RCAP II	32

**Table 2.**  
Proposals by Category and Track, by College



**Figure 5.**  
Amount Awarded by College

Awards by Category and Track, by College

Category College\Track	RCAP I			RCAP II		
	Track S	Track C	Track E	Track S	Track C	Track E
CEBS	3	1	0	0	0	0
CHHS	1	2	0	0	0	1
GFCB	0	0	1	2	0	0
LIB	0	0	0	0	0	0
OCSE	16	0	2	1	0	0
PCAL	3	1	0	8	0	0
UC	0	0	0	2	0	0
<b>Total</b>	<b>23</b>	<b>4</b>	<b>3</b>	<b>13</b>	<b>0</b>	<b>1</b>

Total RCAP I	30
Total RCAP II	14

**Table 3.**  
Awards by Category and Track, by College



# Faculty-Undergraduate Student Engagement (FUSE)

The FUSE program was launched in 2012 by the Office of Research in collaboration with the Office of Academic Affairs to underscore the fact that undergraduate students are at the core of our research mission.

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.

A group of engineering students (below) received FUSE funding to explore modifications to a quad rotor that could refine its performance and applications. These modifications were first put into action when a sinkhole

collapsed inside the National Corvette Museum taking with it eight Corvettes.

Although a security camera captured the initial collapse, whose footage has been seen around the world, another video grabbed lots of attention in the first few hours. The quad copter built and operated by WKU Mechanical engineering students provided an inside view of the sinkhole.

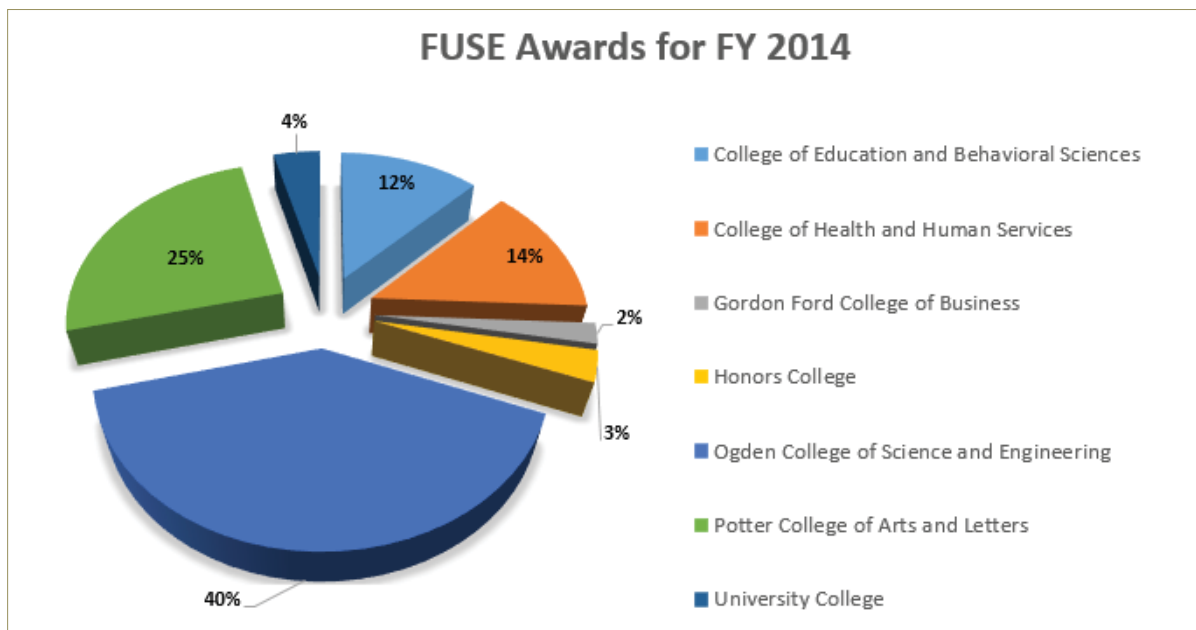
"We got to fly in and see how the cracks propagated," said Darren Tinker a WKU Mechanical Engineering student. "We could see the throat of the sinkhole and see if they thought it was quite deep or expected to grow."



The sinkhole inside the National Corvette Museum.



Zach Lancaster, Darren Tinker, Jesse Reesor, and Joel Lenoir





## 2014 Faculty/Staff Awards

A number of Western Kentucky University faculty and staff were honored during an awards reception hosted by the Office of Sponsored Programs. External funding supports research, teaching, public service and creative activities initiated by faculty and staff at the university. The 2014

Recognition Reception, held on December 10, at the Kentucky Museum, acknowledged the recipients for their efforts in submitting grant proposals and/or receiving awards from federal, state, local, private and international sponsoring agencies.

## First Time Awardees

A key dimension for effective leadership involves encouraging, reinforcing and motivating others to achieve superior performance. The Office of Research is proud to honor first-time awardees who have exhibited excellence in leading research at WKU.



John Baker

John Baker  
 Jason Crandall  
 Debra Crisp  
 Russell Curley  
 Nahid Gani  
 Lindsey Gilmore  
 Elizabeth Gish  
 Sanju Gupta  
 Amy Hood-Hooten  
 Michelle Hollis  
 Muhammad Jahan  
 Molly Kerby  
 John Khouryieh  
 Moon-Soo Kim  
 Scott Lasley

School of Professional Studies  
 Kinesiology, Recreation & Sport  
 Counseling & Testing  
 AARC  
 Geography & Geology  
 Enrollment Management  
 Honors College  
 Physics/Astronomy  
 T/TAS  
 Dean's Office  
 AMS  
 University Experience  
 AMS  
 Chemistry  
 Political Science

Other  
 CHHS  
 Other  
 Other  
 Ogden  
 Other  
 UC  
 Ogden  
 CEBS  
 UC  
 Ogden  
 Other  
 Ogden  
 Ogden  
 PCAL



Moon-Soo Kim



Debra Crisp



Jason Crandall

## Junior Investigator Awards

WKU Office of Research and Sponsored Programs works with faculty and staff to cultivate the culture and ensure the quality of research, public service, and teaching of early career faculty and staff members. 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.

Moon-Soo Kim	Chemistry	Ogden	\$249,978
Jason Crandall	Kinesiology, Recreation & Sport	CHHS	\$ 74,860
Noah Ashley	Biology	Ogden	\$ 56,090
Jill Maples	Kinesiology, Recreation & Sport	CHHS	\$ 54,300
Eric Kondratieff	History	PCAL	\$ 35,000
Nahid Gani	Geography & Geology	Ogden	\$ 34,000
Farhad Ashrafzadeh	Engineering	Ogden	\$ 24,859
Christina Noel	School of Teacher Education	CEBS	\$ 22,455
Debra Crisp	Counseling & Testing	Other	\$ 20,000
Elizabeth Gish	Honors College	UC	\$ 13,568
Stephen O'Connor	Psychological Sciences	Ogden	\$ 15,000
John Baker	School of Professional Studies	Other	\$ 8,000

## Most Prolific Proposers by College

The Most Prolific Professors by College recognizes the achievements and significant contributions of leading researchers within their college.

### Gordon Ford College of Business

Leyla Zhuhadar CIS  
 Brian Strow Economics

### College of Education and Behavioral Sciences

Marce Verzaro-O'Brien T/TAS

### Ogden College of Science and Engineering

Rajalingam Dakshinamurthy Chemistry

### Other (Units Not in a College)

David Brinkley ED TV & Radio Services

### Potter College of Arts and Letters

Brent Bjorkman Folk Studies & Anthropology  
 Peggy Otto English

### University College

Elizabeth Gish Honors College  
 Ron Mitchell Professional Studies  
 Julia Shadoan Professional Studies  
 Michelle Hollis Dean's Office



Marce  
 Verzaro-O'Brien



Ron Mitchell



Brent Bjorkman



Elizabeth Gish



Peggy Otto

## Million Dollar Club

External funding supports a wide array of initiatives and are the result of a university-wide efforts to enhance grant writing. **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. Membership growth in **The Million Dollar Club** is a direct result on the University's success in encouraging faculty and staff to seek external funding.

David Brinkley  
 Nahid Gani  
 Chris George  
 Anthony Norman

Public Radio Services  
 Geography & Geology  
 Student Support Services  
 Ed Leadership Doctoral Program



David Brinkley



Nahid Gani



Anthony Norman



Chris George

# REACH Week 2014 and Student Research Conference

**REACH Week** is dedicated to students who have engaged in research, creative endeavors, and other scholarly activities at WKU.



**Dr. Michio Kaku** kicked off REACH Week. Dr. Michio Kaku is a theoretical physicist, best-selling author, and popularizer of science. He's the co-founder of string field theory (a branch of string theory), and continues Einstein's search to unite the four fundamental forces of nature into

one unified theory. **This event was part of the Cultural Enhancement Series and co-sponsored by the Carol Martin Gatton Academy of Mathematics & Science in Kentucky.**

**Anthropologist John Shea**, was the Sigma Xi Distinguished Lecturer, he spoke on "Myths of 'Modern' Human Origins." Shea's research focuses on the archaeology of human evolution, namely the origin of our species, Homo sapiens, and the extinction of the Neanderthals. He is an expert at making, using, and analyzing stone tools whose work has been featured in more than a dozen television documentaries and in exhibits in the American Museum of Natural History and the National Museum of Natural History (Smithsonian Institution).



WKU has a rich history of scholarly engagement of students. The Student Research Conference is the capstone of an entire week of Research, Engagement and Creative Heights in which students engage in across campus in multiple disciplines.

A reception for students and faculty mentors was held on Friday evening to kick-off the Student Research Conference that took place on Saturday, March 22, 2014. The reception featured performances by eleven honor students and concluded with remarks from Dr. John Shea.

Students presented their research and creative activities through talks, posters, performances, and more at the 44th Annual WKU Student Research Conference. The conference featured 383 research presentations, and is by far the biggest in the event's history. There were 185 oral presentations and 198 posters/exhibits, plus eight spotlight performances. A total of 281 undergraduate students and 102 graduate students presented. In addition, 65 students are co-primary authors and 144 are secondary authors.

WKU faculty members served as mentors, these 186 faculty mentors supported students in scholarly activities while preparing them for the conference. A total of 114 WKU faculty/staff served as conference session judges.

Among the presentations during the reception were a group of students that assisted in assessing the damage sustained after a sinkhole opened at the National Corvette Museum's Skydome area February 12, 2014 (full story on page 8).





# ARTP UPDATE



The Applied Research and Technology Program (ARTP) is a multidisciplinary program consisting of scientific and service-oriented Centers and Institutes designed to prepare students for the knowledge-based 21st Century global economy. Students grow intellectually and professionally through participation in supervised, hands-on applied research and technological projects.

Each Center operates within a cooperative and interdisciplinary framework to apply state-of-the-art science toward finding cost effective solutions to environmental and health issues and to the technological problems of government and industry. The ARTP program serves as a catalyst for economic development in the region and beyond.

## **Applied Physics Institute (API)**

Dr. Vladimir Dobrokhotov developed integrated nano-sensors for analysis of chemical compounds (i.e., electronic nose) in natural gas applications for gaseous analyses for commercial kitchens. With assistance from EMCC, Dobrokhotov started a spin-off company and is working on several projects.

## **Kentucky Climate Center**

Dr. Rezaul Mahmood, served as a member of the Climate Assessment Development and Advisory Committee, a national committee of experts that submitted a report to the President regarding climate change predictions.

Dr. Stuart Foster, served as President of the American Association of State Climatologists (AASC) through Fiscal Year 2014 and now serves as Past-President. AASC is a professional scientific organization comprised of state climatologists across the nation.

Both Drs. Mahmood and Foster continue to oversee operation of the Kentucky Mesonet, a statewide real-time weather network used by several state agencies, companies and farmers.

## **Engineering-Manufacturing-Commercialization-Center (EMCC)**

Dr. Stacy Wilson and Ron Rizzo worked with Oscarware, Inc. to provide a prototype to Walmart. Oscarware contacted EMCC after a consultation with Advantage Kentucky Alliance, a Manufacturing Extension Partnership. Prototypes created by EMCC also supported the efforts of inventors Theresa Avery, Jamie Hatfield, Kyle O'Donnell, and Murray Adams. Partnerships with BoH, EWA, VhTek, Blue Moon, Oscarware, TOYO Auto Parts, BGMU, and Allied Remedial resulted in a variety of projects over the past year.

## **Good News About ARTP Faculty**

Dr. Aaron Celestian is Chairperson of the Single Crystal Neutron Diffraction Science Review Committee at Oak Ridge National Laboratory. This selective international committee reviews scientific proposals to conduct research at the Spallation Neutron Source and High Flux Isotope Reactor.

## **Collaborative Efforts**

Professors Dr. Fred DeGraves (WKU Agriculture), Dr. Bruce Schulte (WKU Biology), and Dr. Patricia Todd (WKU Marketing) collectively wrote and submitted a grant to Kentucky Science and Technology Corporation (KSTC) for the commercialization of a dairy cow sensor. The collaborative proposal supports the development and marketing efforts of a device to detect when dairy cows are ready to be artificially inseminated and then notify farmers of the cow's status.

Drs. Rodney King and Claire Rinehart partnered with the Kentucky Biomedical Research Infrastructure Network (KBRIN) to extend the Howard Hughes Medical Institute Genome Discovery and Exploration (HHMI-GDE) to 15 Kentucky community colleges and universities through the establishment of the Small Genome Discovery (SGD) Support Center. The SGD Support Center will train two faculty from 15 institutions across the Commonwealth and support the implementation of the program into these schools. A NIH INBRE grant will provide funding to hire two full-time staff for five years. One staff member will possess expertise in biotechnology (BS level) and one with expertise in bioinformatics (MS level). These individuals will also strengthen and support the core mission of the Biotechnology Center.

Dr. Aaron Celestian, Dr. Yan Cao (Institute for Combustion Science and Environmental Technology), Stuart Burris, and Dr. Quinten Lineberry (Advanced Materials Center), worked with Vector Horizon Technologies (VHTek), a start-up company located in the WKU Center for Research and Development. The Phase I project was funded by a major Canadian company in collaboration with VHTek. Faculty and students from WKU developed a cutting-edge approach to assessing metal corrosion. Phase II of the project is projected to begin soon.

# Economic Development

**United States Department of Agriculture** - A long-term lease was signed with the USDA to move the Agricultural Research Station from aging facilities at the University Farm to the Center. Approximately 13,000 sq. ft. of office and lab space will be remodeled to accommodate the research scientists and technicians associated with this entity.

**Desk Accelerator** - Some of the space vacated by Hitcents was remodeled into a community Desk Accelerator facility. This room houses nine high-end cubicle units that each can be rented for a very modest monthly rate to individuals starting new companies and needing the amenities available at the Center.

**Outreach** - A variety of entrepreneurial training and social events were sponsored and held at both downtown venues as well as at the Center during the year. In addition to the WKU applied research labs and the Business Accelerators, the CRD houses several technology company headquarters and research facilities. With the exception of the Telepresence Room, all laboratory facilities at the CRD are used for applied research, rather than regular classroom student instruction. Labs are staffed by WKU faculty, staff, student workers and interns.

**Bucks for Bright Ideas** encourages residents in the WKU service region to move forward with their "bright ideas." A very successful 2014 Bucks for Bright Ideas contest concluded with the annual Awards Banquet in May 2014 with over 100 attendees. A total of 23 award winning ideas were announced, including eight high school and college student ideas.



**Company Growth** - One of the first tenants of the Small Business Accelerator at the Center for Research and Development has grown tremendously over the years. An important milestone was reached when Hitcents, a web and app design company moved into their own facility in downtown Bowling Green. This growth was triggered by rapid growth in their international business.

**Innoplexx** - Hangout Creative, LLC a marketing company that continues to grow has graduated out of the student accelerator and now located on Magnolia Street in Bowling Green. Hangout Creative works with small business owners that want to utilize web and smart phone based marketing services in order to build a community around their business. Other services they offer include print advertising, graphic design, web design and branding.

## A Partner for Business and Industry

Manufacturing is a significant economic force within the Commonwealth and an important sector to enhance to make them competitive globally. Advantage Kentucky Alliance (AKA), funded by National Institute of Standards and Technology is a Manufacturing Extension Partnership (NIST-MEP) network affiliate. The AKA is a coalition among statewide partners, led by WKU and headquartered at the WKU Center for Research and Development.

AKA utilizes faculty at the comprehensive universities with expertise needed to lower manufacturing costs and improve efficiency, such as advanced manufacturing, computer programming, logistics, applied statistics, engineering, business, entrepreneurship, and industrial organization. AKA also assists manufacturers with training programs, technology innovation implementation strategies Innovation Engineering (IE), and technology transfer.

