WKU. Office of Research & Creative Activity

Annual Report FY20

The mission of the Office of Research & Creative Activity at Western Kentucky University is to provide outstanding support for the research, service, creative, and scholarly endeavors of our faculty, staff, and students.

Message from the Associate Provost for Research and Graduate Education

It gives me immense pleasure in sharing the Annual Report for the Office of Research and Creative Activity (ORCA) for FY20. This report provides a snapshot of the incredible achievements of faculty and staff in advancing the research and creative scholarship mission of Western Kentucky University (WKU) during FY20. The last quarter from March to June 2020 was disrupted by the COVID-19 pandemic. Despite the challenges associated with the pandemic, faculty and staff demonstrated remarkable creativity in finding innovative solutions by pivoting their projects, mentoring students effectively, and in the process showcasing resilience and ingenuity.

We remain grateful to faculty and staff in navigating the complexities posed by the pandemic and by their unwavering commitment to the pursuit of excellence in research and creative scholarship.

New knowledge has been generated that has been shared in peer-reviewed journals, conferences, regional and international in scope, and some of these discoveries have resulted in Intellectual Property (IP) disclosures. Taken together, the hard work, creativity, outstanding grantsmanship, and mentoring, of faculty and staff has made a deep impact internally and externally.

The successes of faculty and staff in FY20 is built upon the outstanding services by ORCA staff. These include the services of current ORCA staff, Ms. Regina Allen, Assistant Director; Ms. Ryanne Gregory, Budget and Grants Resources Manager, Ms. Robin Pyles, Compliance Manager, Mr. LaTravius Robinson, Compliance Associate, and Ms. Emily Wallace, Grants and Contracts Administrator. I remain grateful to the services of Dr. Cheryl Davis, Associate Provost for Research and Creative Activity and Interim Dean of Graduate School who retired from WKU in 2020. I am also grateful to Ms. Marilyn Anderson, who served as Grants and Contracts Administrator until her retirement from WKU in August 2020. Ms. Katie Muchmore, a former ORCA staff also played a key role for grant activities in FY20. Our operations currently include new employees, Ms. Laura Burchfield, Research and Graduate Education Outreach Coordinator, Ms. Kathryn Garrett, Grants Coordinator, and Ms. Rachel Marr, Grants Coordinator. I remain grateful to each of them for their passion and commitment for research and creative scholarship activities.

On a personal note, I want to express my deep gratitude to WKU President Dr. Timothy C. Caboni and Provost Cheryl Stevens for giving me an opportunity to head two important offices, ORCA and the Graduate School at WKU since July 1, 2020.

Ranjit T. Koodali, Ph.D., FRSC

Faculty and Staff Awards

WKU recognizes outstanding contributions of faculty in teaching, research and creativity, service, and student advising each year. During the Fiscal Year (FY) 20, the following faculty were recognized by the respective units for excellence in research and creativity.

Excellence in Research & Creativity

- Monica Burke, Department of Counseling & Student Affairs, CEBS
- Austin Griffiths, Department of Social Work, CHHS
- David Zimmer, Department of Economics, GFCB
- Farhad Ashrafzadeh, School of Engineering & Applied Sciences, OCSE
- Michael Nichols, Department of Art, PCAL
- Nancy Richey, Department of Library Special Collections, UL

University Faculty Award for Research/Creativity

- Farhad Ashrafzadeh, School of Engineering & Applied Sciences, OCSE

In addition to these awards given by the six units and the University, the Office of Sponsored Programs (OSP) recognizes the contributions and success of faculty and staff who are dedicated to the research and creative scholarship mission of WKU. The following faculty are commended for their outstanding contributions during FY20 despite the challenges encountered during the final four months due to COVID-19.

Office of Sponsored Programs

The following Office of Sponsored Programs' Award Ceremony honor Faculty and Staff for external proposals and awards during FY20.

First Time Lead Awardees

This award honors lead Principal Investigator's (PI's) who received their first award at WKU during FY20.

- Austin Griffiths, Department of Social Work
- Phillip Gunter, Agriculture and Food Science
- Gretchen Macy, Public Health
- Ahmet Ozkan Ozer, Mathematics
- Jay Stottman, Folk Studies and Anthropology

- William (Dan) Strunk, Agriculture and Food Science
- Brian Weiler, Communication Sciences & Disorders
- Aaron Wichman, Psychological Sciences

Prolific Proposer

This award honors individuals who have submitted four or more proposals during FY20 as either PI or Co-PI.

- David Brinkley, WKU Public Broadcasting
- Vladimir Dobrokhotov, Physics and Astronomy
- Ali Er, Physics and Astronomy
- Michael Galloway, Computer Science
- Kirolos Haleem, School of Engineering & Applied Sciences
- Mary Lloyd Moore, Suzanne Vitale Clinical Education Complex
- Ivan Novikov, Physics and Astronomy
- Shane Palmquist, School of Engineering & Applied Sciences
- Dave Pollack, Folk Studies and Anthropology
- Chris Watkins, Training/Technical Assistance Services

Million Dollar Club

This award honors PI's who reached $1 million in external awards during FY20.

- Mark Doggett, School of Engineering & Applied Sciences
- Laura McGee, Modern Languages

Department Awards

These awards honor academic departments with the largest percentage of proposing faculty and the largest percentage of faculty awardees in FY20.

- Department of Chemistry, Department with the largest percentage of proposing faculty
- Department of Physics and Astronomy, Department with the largest percentage of faculty awardees

Associate Provost for Research and Creative Activity's Innovation & Impact Award

This award is given to an individual or team for innovation and impact in FY20.

- The Kentucky Museum received this award in recognition of their creativity in providing enriching cultural and educational experiences during FY20.

Office of Sponsored Programs

The Office of Sponsored Programs (OSP) is the coordinating office for both externally and internally funded research and sponsored projects at WKU. OSP serves as the principal point of contact for faculty and staff seeking and managing external funding for research, public service, instruction, student services and equipment/ instrumentation. OSP staff members offer assistance across the entire spectrum of sponsored programs activities, from identifying a potential source of funding to reviewing the terms and conditions of awards made to the institution. Data pertaining to extramural grants and contracts in FY20 are summarized below.

Proposals and Awards

Each year, faculty and staff work diligently to prepare and submit proposals to external sponsors to request support for their research and projects. Each proposal must follow specified guidelines, outline the proposed project, and justify the budgetary requirements to complete the project. OSP's Pre-Award team assists with the entire proposal development process, including finding funding, reviewing requirements and guidelines, budget development, compliance review, and proposal submission. The Post-Award team in OSP is also committed to providing timely and accurate assistance to faculty, staff, and external sponsors. They assist PI's in exercising good fiscal management practices for the administration of externally funded programs at WKU from award receipt to closeout. They also provide expertise in interpreting guidelines and promoting compliance with sponsor and University policies.

The following data provide a glimpse of the research and creative activities of WKU faculty and staff. In FY20, 201 proposals were submitted compared to 165 proposals in FY19. An average of 195 proposals were submitted annually over 5 years. This is indicated in Figure 1.
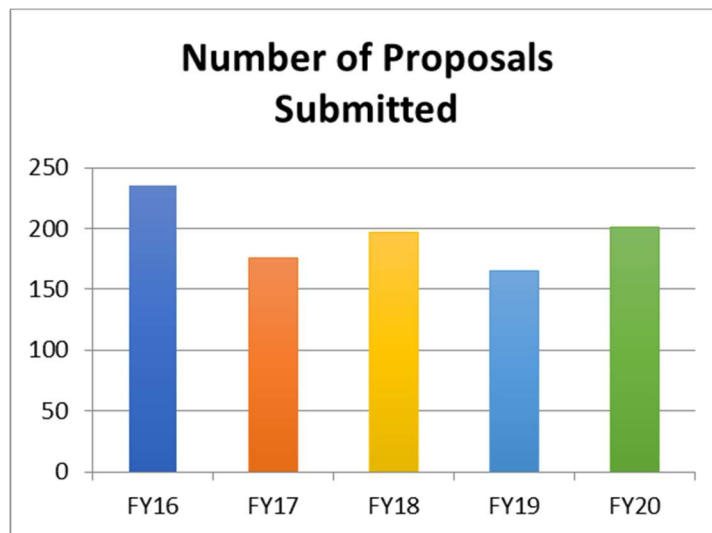

Figure 1. A five-year comparison of the number of proposals.

The total amount requested for FY20 was $46,222,966, which was an increase of $18,383,127 (that includes CARES funding) as compared to FY19. This is shown in Figure 2.
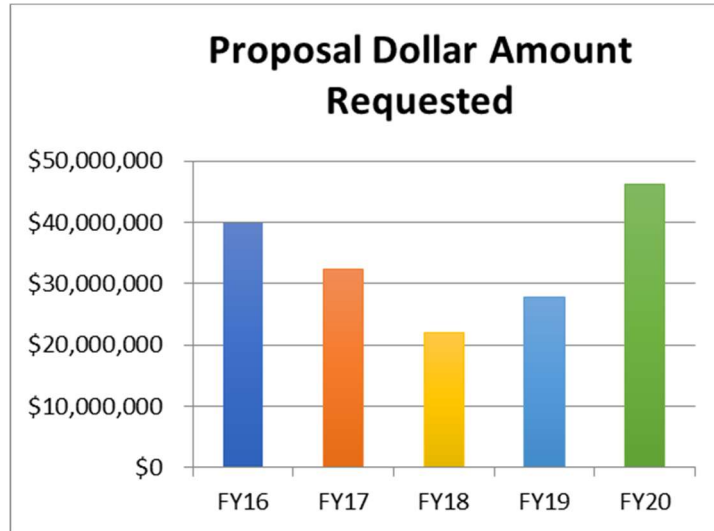

Figure 2. A five-year comparison of the total dollar amount requested in external proposals.

Proposals are submitted to multiple sponsors, that include Federal, State, Private etc. by faculty and staff. The following table provides information about proposals by sponsor type. The highest number of proposals (125/201) was submitted to federal sponsors. The second highest number of proposals (55/201) went to private sponsors. Figure 3 provides this information.
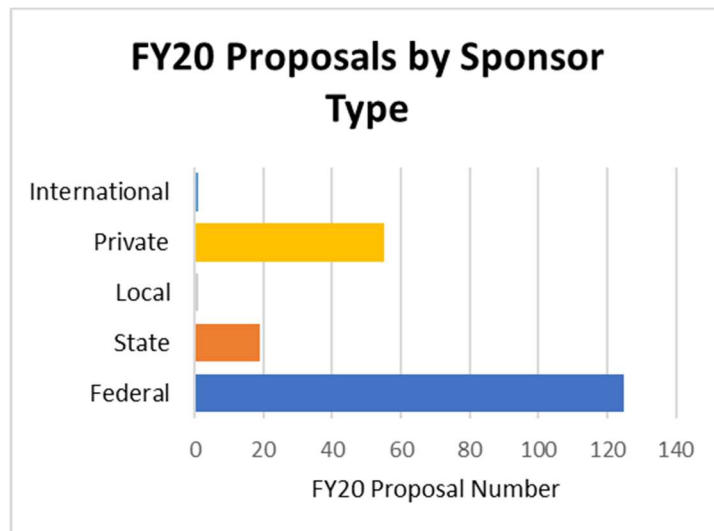

Figure 3. Breakdown of proposal number by sponsor type in FY20.

Figure 4 provides details of proposals by project type. Of the 201 proposals submitted, the majority, 114 of them were research proposals.
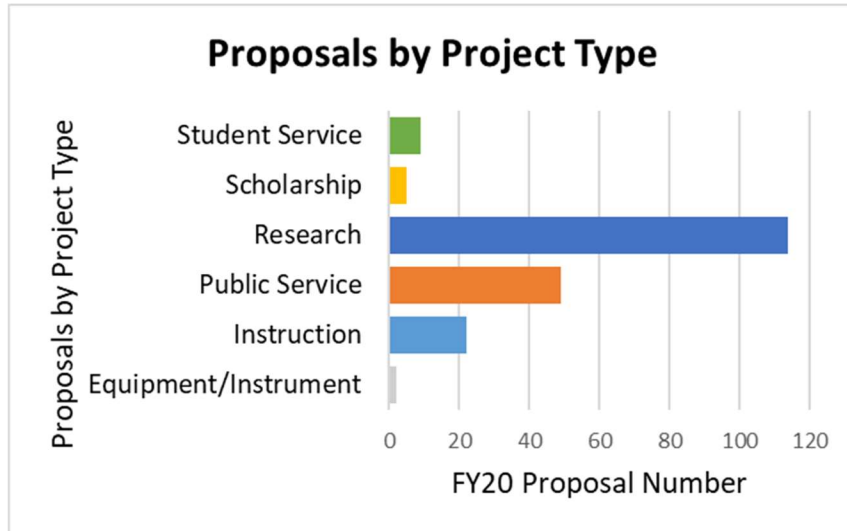

Figure 4. Representation of FY20 proposals by project type.

Figure 5 provides data about the number of Grants and Contracts for the past five fiscal years. The number of Grants and Contracts received in FY20 was 176.
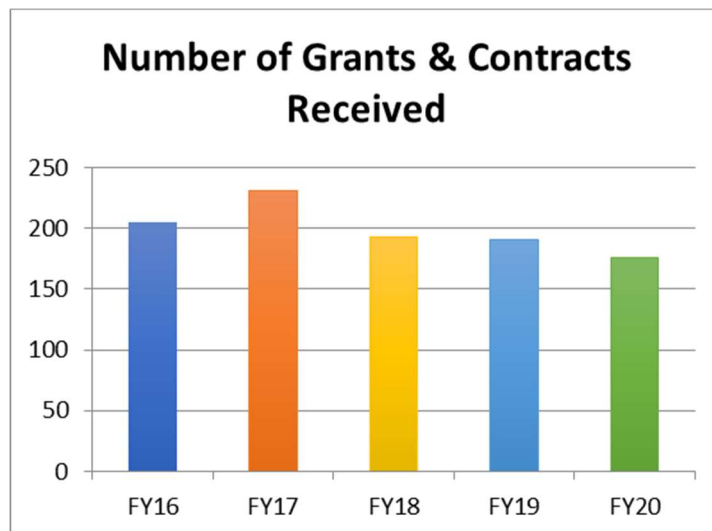

Figure 5. A six-year comparison of the number of Grants and Contracts received annually.

Figure 6 provides information regarding the total amount awarded annually since FY16. The total dollar amount awarded in FY20 ($27,058,010). The increase is mainly due to federal funding received through the CARES Act.
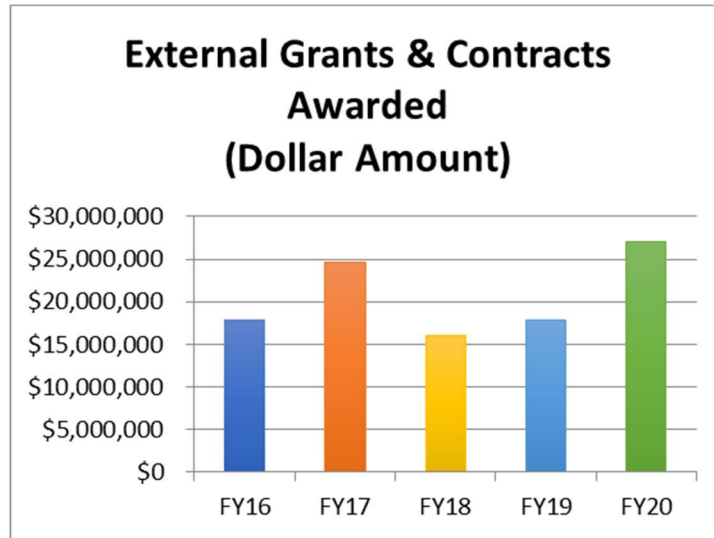

Figure 6. The total dollar amount awarded annually from FY16 to FY20.

Classification of awards by sponsor type is indicated in Figure 7. Federal sources constitute the majority of the dollar amounts awarded for FY20. This is mainly due to infusion of funds through the Federal Coronavirus Aid, Relief, and Economic Security (CARES) Act.
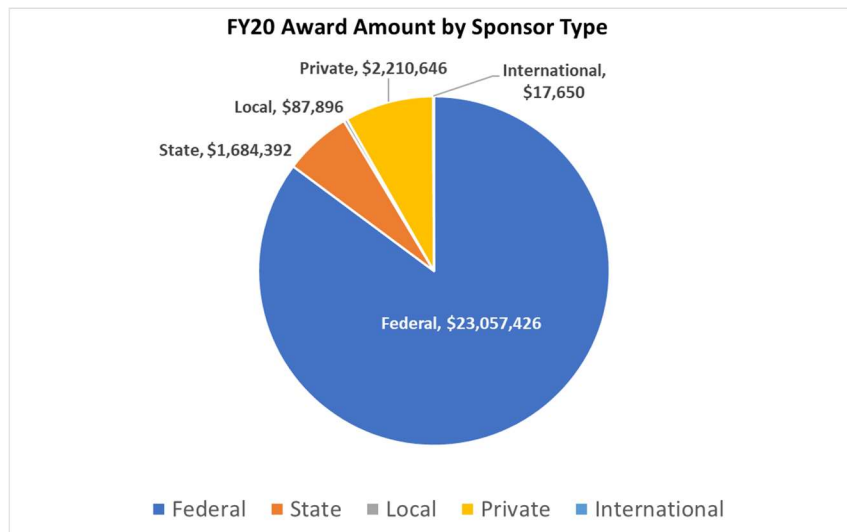

Figure 7. The total dollar amount awarded by sponsor type for FY20.

Classification of awards by project type is indicated in Figure 8. The amounts awarded to Student Service and Scholarships for FY20 are higher in comparison to Research. This is mainly due to money from the CARES Act.
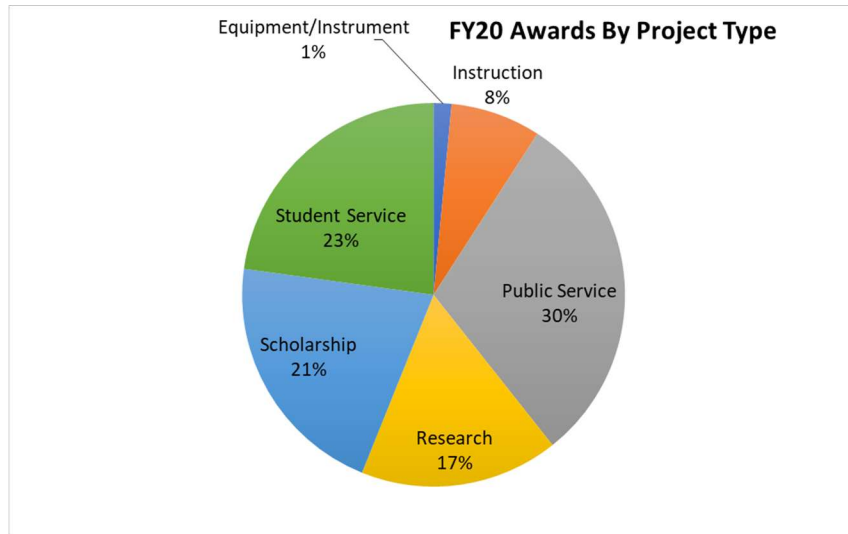

Figure 8. Representation of FY20 proposals by project type.

Figure 9 provides information regarding total dollar amounts received by Colleges.
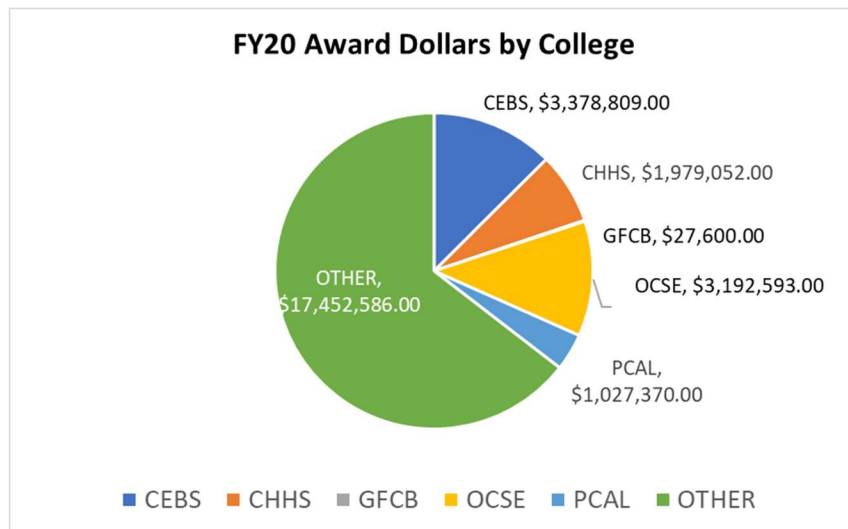
Figure 9. Total award dollars by Colleges for FY20.

Facilities and Administrative (F&A) Costs

Facilities and administrative costs (also known as overhead or indirect costs) are those costs associated with providing and maintaining the infrastructure required to support sponsored activities, but which cannot easily be attributed to a specific project. Indirect costs are requested according to WKU's federally negotiated indirect cost rate, unless specifically prohibited or limited by the sponsor. Figure 10 below shows a five-year comparison of the total amount of F&A recovered annually.

Figure 10. A five-year comparison of total F&A recovered annually.

Research and Creative Activities Program (RCAP) FY11-18 Outcome Report

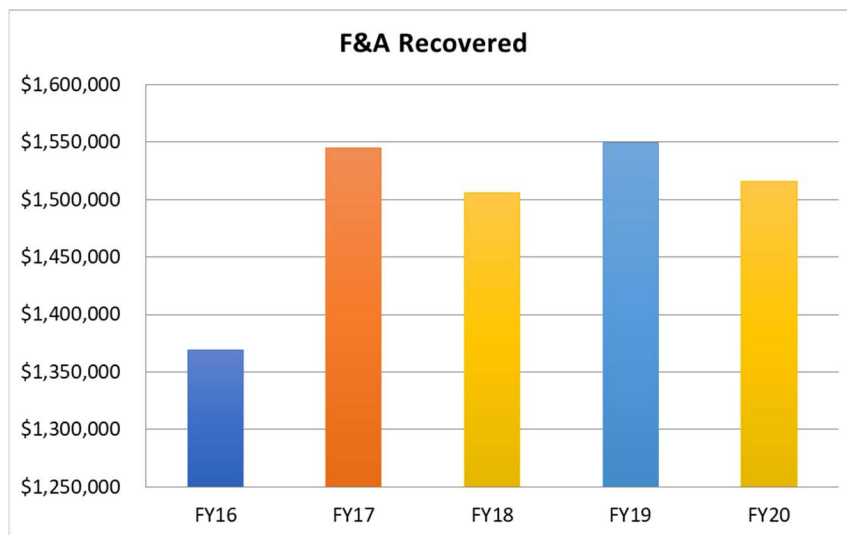RCAP funding is provided by the Office of Research and Creative Activity to encourage eligible full-time faculty and instructors at all WKU campuses to develop individual projects for research, scholarly pursuits, and creative activities, while promoting the pursuit of external funding sources.

Category I funds are considered "seed" monies to enhance the competitiveness of a subsequent proposal submission for external funding. Category I awardees are required to submit a proposal for extramural funding as an outcome of funding.

Category II funds support the general development, expansion, or enhancement of faculty research and scholarly activity, and/or the creative and performing arts.

The following report summarizes the outcomes and return on investment for RCAP Fiscal Years 2011-2018. During the reported period, 241 projects received RCAP funding totaling nearly $2.26 million dollars.

Figure 11 provides information about RCAP proposals by Colleges for FY1-18. Submission from the Ogden College of Science and Engineering (OCSE) comprises half of the proposals during the 7 year period.
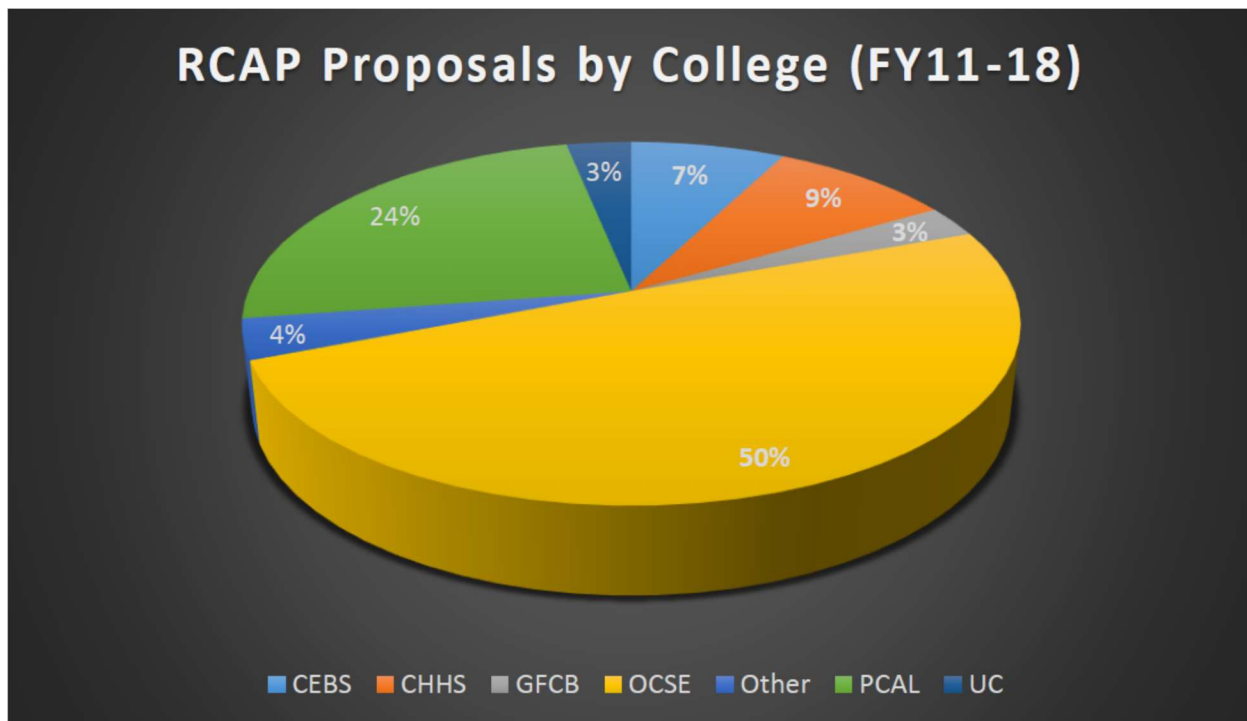

Figure 11. RCAP proposals by College for FY11-18.

Figure 12 provides information about RCAP awards by Colleges for FY11-18.
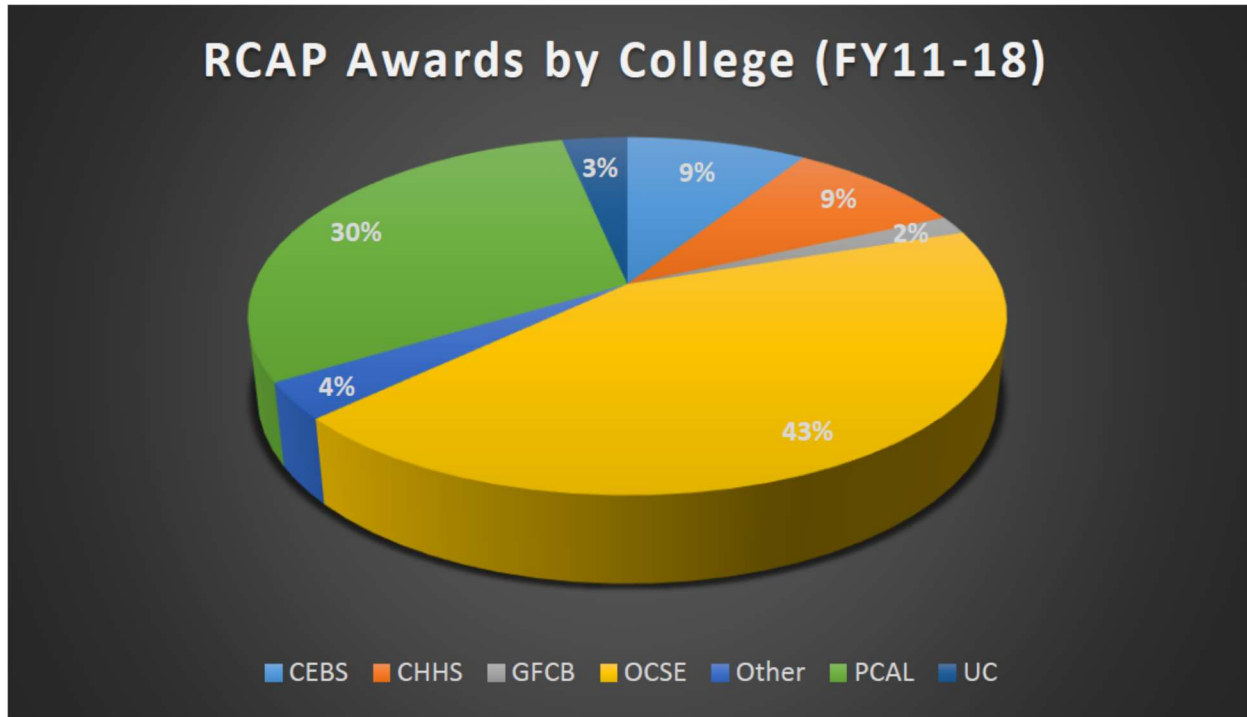
* Outcomes for RCAP cycles after FY18 have not yet been captured, since award periods are ongoing at the time of this report.

Figure 12. RCAP awards by Colleges for FY11-18.

RCAP Outcomes

Extramural Proposals & Awards – While submission of extramural proposals is a requirement of RCAP Category I awards, all awardees may choose to submit subsequent funding requests to external sponsors. Several projects during the reporting period served as seed funding for subsequent external proposal submissions. Of the 259 external proposals submitted as a result of RCAP funding, 78 received funding. The amount of external funding received by WKU as a result of RCAP FY11-18 support is $7,029,247.

Publications – *Most* RCAP awards result in a publication of some form. During the reported period, 173 journal articles and 11 manuscripts were published as a result of RCAP funding.

Student Engagement – RCAP guidelines promote that, "*all projects should aim to incorporate undergraduate and/or graduate students…*" As a result of RCAP support (both directly and

indirectly), 738 students gained valuable experience in research, creative activities, and other scholarly pursuits.

Other Outcomes – RCAP projects resulted in 480 presentations*, 267 posters*, and 144 creative works. Additionally, RCAP projects added 8 books to departmental/library resources and added 96 pieces of small and large equipment to the university's infrastructure.

RCAP Outcomes (FY11-18)
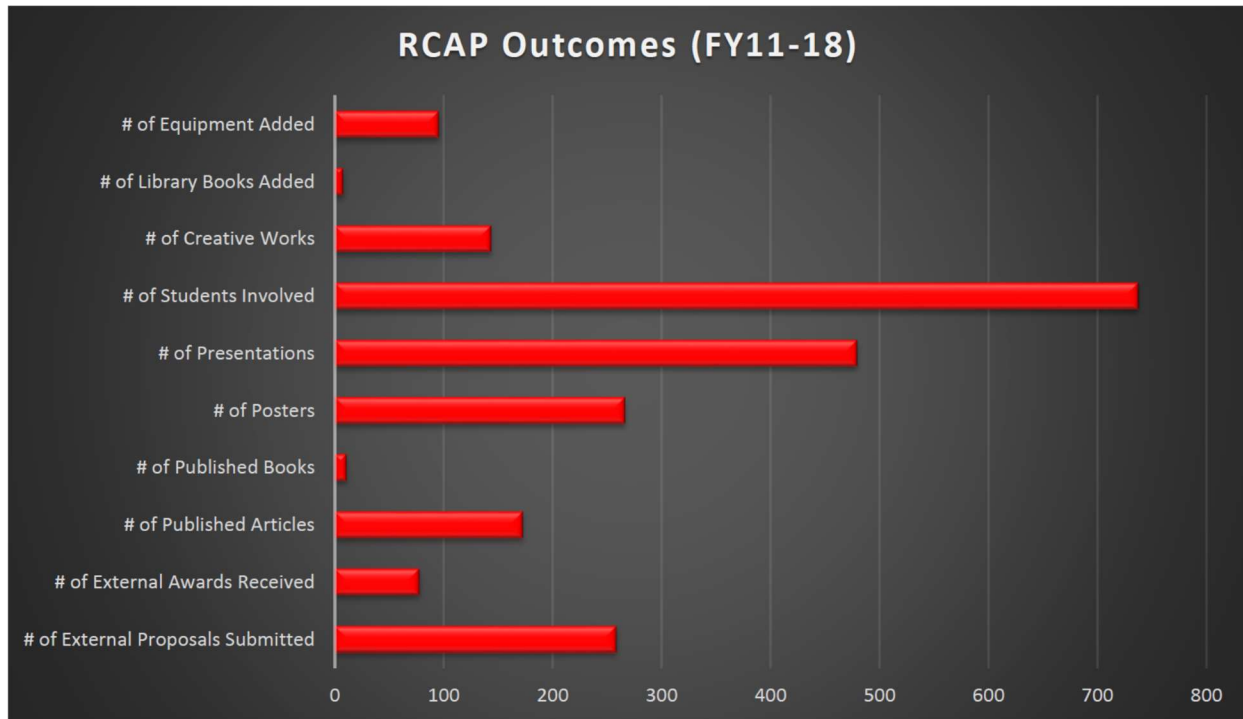
Reported presentations and posters refer to external conferences/events for both faculty and students that worked on RCAP supported projects. Presentations and posters at WKU's Student Research Conference are not included in RCAP Outcomes reporting

Figure 13. RCAP outcomes for FY11-18.

Return on Investment

The primary purpose of RCAP Category I funds are to serve as "seed" monies to enhance the competitiveness of a subsequent proposal submission for external funding. Such funding serves to provide preliminary data, proof of concept, project/fund management experience, publications, etc., all of which contribute to strengthening external proposal submissions from WKU.

During the reporting period (FY11-FY18), RCAP support totaled $2,257,666. This reflects WKU's investment in research, scholarly endeavors, and creative activities *via* the RCAP program. As a result of RCAP funding, 78 external grants were awarded totaling $7,029,247. This 311% return on investment clearly demonstrates the value of RCAP funding in stimulating competitive external proposals. This is indicated in Figure 14.
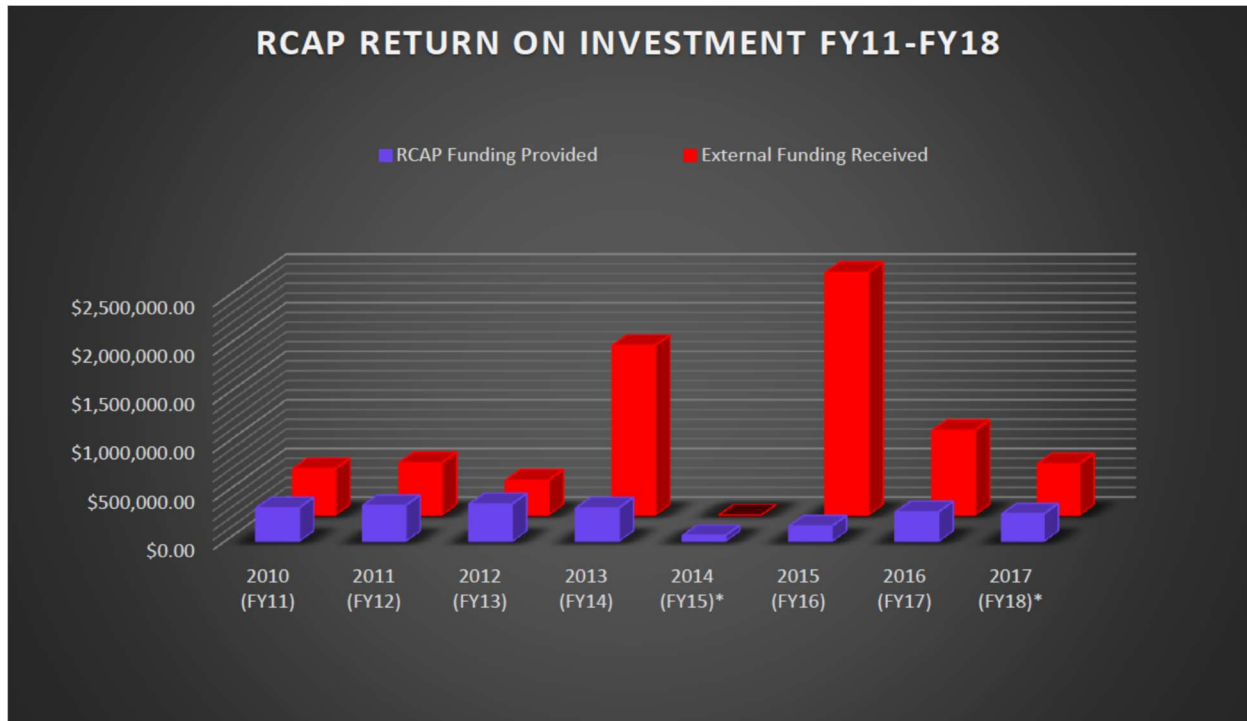

Figure 14. RCAP Return on Investment (ROI) for FY11-18.

Faculty-Undergraduate Student Engagement (FUSE) Grants

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

All undergraduate students in good academic standing who will reach at least sophomore status at the time of award may apply. FUSE is well-suited for sophomore and junior level undergraduates. The following Tables provides information about internal dollar amounts committed to FUSE since Fall 2016 and breakdown regarding awards to the Colleges.

Table 1. Information about number of awards and amounts committed since Fall 2016.

FUSE Round	Awards	International	Domestic	Committed $
Fall 2016	41	9	32	$159,000.00
Spring 2017	48	4	43	$171,000.00
Fall 2017	46	11	35	$172,000.00
Spring 2018	39	9	30	$154,000.00
Fall 2018	36	9	27	$101,500.00
Spring 2019	37	3	34	$132,500.00
Fall 2019	36	4	32	$131,000.00
Spring 2020	33	5	28	$124,500.00

Table 2. Information about number of awards by Colleges since Fall 2016.

FUSE Round	College of Education	Health & Human Sciences	Gordon Ford College	Ogden College	Potter College	University College /Honors
Fall 2016	4	1	1	20	13	2
Spring 2017	3	5	2	21	15	2
Fall 2017	3	4	1	21	15	2
Spring 2018	3	6	1	15	13	1
Fall 2018	3	2	1	15	13	2
Spring 2019	0	2	1	22	12	0
Fall 2019	2	2	1	24	7	0
Spring 2020	2	5	2	14	10	0

Office of Research Integrity (ORI)

The [Office of Research Integrity](#) (ORI) provides guidance in the protection of the rights, welfare, and security of faculty, staff, and students involved in activities throughout the WKU campus system and supporting communities to ensure compliance with federal, state, and local requirements. ORI is committed to the highest standards of quality. ORI provides guidance in the protection of the rights, welfare, and security of faculty, staff, and students involved in activities throughout the WKU campus system and supporting communities to ensure compliance with federal, state and local regulations. All research activities at WKU are governed by institutional policies and compliance committees that are imposed by federal and state laws.

- A total of 250 Financial Conflict of Interest (FCOI) submissions were reviewed by ORI Staff. These include: 1.) Conversion Project to IRBNet Database - 119; Submissions until 12/13/2019 - 44; and 3.) Submissions until 6/30/2020 – 87, for a total of 250.

- The Federal Wide Assurance (FWA) for Human Subjects was updated and completed. Regarding Human Subjects, the Institutional Review Board (IRB) reviewed 470 submissions. These include: 1.) Expedited/Exempt Reviews – 315; 2.) Full Board Reviews – 9; 3.) Other – 28; and 4.) Revisions/Renewals – 118, for a total of 470.

- The Institutional Animal Care and Use Committee (IACUC) submitted the Annual Report to Office of Laboratory Animal Welfare (OLAW) and this was approved. In addition, the OLAW four-year Federal Wide Assurance (FWA) was approved. In accordance with the compliance requirements, semi-annual meetings, inspections, and inventory was completed. The total number of IACUC approvals and addendums was 12.

- The Institutional Biosafety Committee (IBC) completed laboratory inspections. Updates were made as deemed required by IBC to meet federal, state, and local regulations where applicable. The total number of IBC approvals and addendums was 9.
    - The National Institutes of Health (NIH) Office of Science Policy (OSP) annual report was completed and accepted for WKU
    - The NIH OSP annual report was completed and accepted for WKU-United States Department of Agriculture agreement as well.

The ORI staff is grateful to the members of the FCOI, IACUC, IBC, and IRB Committees for their time and effort in ensuring that WKU is fully complaint with applicable policies.

Student Research Council (SRC)

50th Annual Student Research Conference

Saturday May 2, 2020

Western Kentucky University Bowling Green, KY

The WKU Student Research Council (SRC) is a university-wide committee charged with promoting student scholarly activity on campus and organizing the annual student conference. The Student Research Council has organized the annual Student Research Conference since 2012, with financial support provided by the WKU chapter of Sigma Xi, the Office of the Provost, the Office of Research and Creative Activity, and other university units.

The 2020 Student Research Conference was the fiftieth anniversary of the conference, and also the first instance of this conference to be conducted virtually as necessitated by the effects of the global COVID-19 pandemic.

The 50th Annual WKU Student Research Conference showcased 299 research projects and creative works. A total of 340 students were presenters and co-presenters at the conference, including undergraduate, 78 master's, and doctoral students.

The SRC members represent the following campus units: academic colleges, Honors College, Graduate School, University Libraries, University Senate, Gatton Academy, Sigma Xi, Student Government Association (SGA), and Office of Research and Creative Activity (ORCA). Members in FY20 were Scott Gordon (Chair), Simran Banga, Cheryl Davis, Ryanne Gregory, Lawrence Hill, Jean Neils-Strunjas, Enakshi Roy, Brigid Stakelum, Kandy Smith, Derick B. Strode, Leah Thompson, Tim Thornberry, and Haiwang Yuan. Sixty-eight WKU faculty, staff, and retired faculty and staff served as judges at this conference.

The SRC recognized Dr. Cheryl Davis, Associate Provost for Research and Creative Activity and Interim Dean of the Graduate School for her service and commitment to advancing research and creative activity at Western Kentucky University and dedicated the 2020 conference to her in recognition of her enduring support.

Posters At-The-Capitol

Kentucky's Undergraduate Research Day was celebrated on March 5, 2020. WKU was well represented at the 19th Annual Posters At-The-Capitol. The following seventeen posters represent the breadth and diversity of undergraduate and Gatton Academy students research and creative scholarship at WKU. Overall, twenty four students presented their research.

"*At WKU, students have an opportunity to work alongside talented faculty in cutting-edge research, creative and scholarly endeavors,*" said Dr. Cheryl Davis, Associate Provost for Research and Creative Activity. "*The Posters-at-the-Capitol event provides a unique opportunity for students to meet their state legislators, present their research in person, and explain the positive impact of their experiences to those responsible for higher education funding in Kentucky.*"

The contributions of WKU students and faculty to the success of this annual event is greatly acknowledged.

- *Fraud Detection Through the Utilization of Machine Learning*
  Ian Hamilton, *Lily Popova Zhuhadar

- *How does the exposure of Titanium dioxide nanoparticles affect the life cycle and gene expression in Caenorhabditis elegans?*
  Hannah Leibman, *Nilesh Sharma

- *Incorporating Word Boxes in Structured Literacy to Support Students With Dyslexia*
  Danielle Durbin, *Susan Keesey

- *Is the Punishment Worth It?*
  Kayla Shults, Caitlin Brock, Karlee Millay, *Susan Keesey

- *Natural Design and the Transformation of Human Industry*
  Presley Roberts, Jaron Richards, Reuben Tang, *Shahnaz Aly

- *Smarter Infrastructure: Using Technology to Create Smarter Cities*
  Brady Crawford, *Lily Popova Zhuhadar

- *Synthesis of a Novel Degradable Polymer Susceptible to Oxidation*
  Ngoc Nguyen, *Lawrence Hill

- *Twice Exceptional- Reaching Full Potential*
  Katelyn Head, Rhea Ann Jackson, *Susan Keesey

- *An Investigation of Quark Star Dynamics and the Equation of State*
  David Suarez, *Keith Andrew

- *Analysis of Circadian Rhythms of Phototaxis and Growth Patterns in a Green Alga Using Separate Media and Temperatures*
  Lorenzo M. Mahoney, *Sigrid Jacobshagen

- *Binary Classification for Network Intrusion Detection In Drones*
  Sierra Wyllie, *Ismail Abumuhfouz

- *Body Satisfaction in Men*
  Zoe Alsup, *Rick Grieve

- *Churn Prediction Application in The Business World*
  William Lawson, *Lily Popova Zhuhadar

- *Controlling Unwanted Vibrations on Smart Devices*
  Camille Wartman, Emma Moore, William Poteet, *Ahmet Ozkan Ozer

- *Effect of Skill and RIASEC Congruence on Job Satisfaction in a Survey of Supply Chain Professionals in Small Businesses*
  Michael Givens, *LeAnne Coder

- Experimentally Modeling Stochastic Resonance *in the Duffing Oscillator*
  Lars Hebenstiel, *Ivan Novikov

- *Exploration of the Relationship Between Critical Thinking, Moral Development, and Attitudes Toward Human Rights*
  Anna T. Simpson, *W. Pitt Derryberry

* indicates faculty mentor

National Science Foundation Higher Education Research & Development (HERD) Survey Results

The NSF Higher Education Research & Development (HERD) survey collects data from universities and colleges in the U.S. on annual research expenditures. Surveys are submitted each January. The NSF publishes the HERD survey data each year typically in November, and also publishes the rankings of colleges and universities in various categories of research expenditures: Total R&D Expenditures (from both external sources and internal sources); Expenditures from federal sources; and Expenditures from all external sources, etc.

At WKU, data required for completion of the survey are provided by budget managers from all colleges, staff in Grants and Contracts Accounting, and staff in the Office of Sponsored Programs. Ms. Paula Mattison, Assistant Director, Grants and Contracts Accounting, collects the relevant data from across the campus, assembles the data, and performs the necessary calculations, and completes and submits the survey to NSF.

The NSF HERD survey pertains **only** to research expenditures. Our profile of external grants and contracts includes awards in several categories of Equipment/Instrument, Instruction, Public Service, Research, Scholarships, and Student Services. In FY20, WKU received $27,058,010 in external grants and contracts, and approximately 17% of external awards and contracts ($4,538,934) received were categorized as "research". Below you can see WKU's nationwide ranking (as compared to other Kentucky public universities) in the category of Total R&D Expenditures (external + internal) for FY15-19. In the HERD ranking, a lower score is associated with a higher ranking in the survey.

Table 3. NSF HERD Rankings of Public Institutions in KY.

UNIVERSITY	FY19	FY18	FY17	FY16	FY15
EASTERN KENTUCKY	619	609	599	570	541
KENTUCKY STATE	357	343	357	367	375
MOREHEAD STATE	535	510	475	487	524
MURRAY STATE	446	487	486	508	490
NORTHERN KENTUCKY	507	558	554	527	512
UNIVERSITY OF KENTUCKY	63	63	62	64	69
UNIVERSITY OF LOUISVILLE	130	125	122	112	107
WESTERN KENTUCKY	346	339	324	337	347

WKU's R&D expenditure per NSF data since FY 2010 is indicated in Table 4 below.

Table 4. WKU Research and Development expenditures since FY10.

Fiscal Year	R&D Expenditure ($ Million)
2010	9.943
2011	8.344
2012	10.639
2013	9.322
2014	8.280
2015	7.854
2016	8.926
2017	10.814
2018	9.617
2019	9.281

Research and Creative Activity Council

The Research and Creative Activity Council (RCAC) serves as an advisory committee to the Associate Provost for Research and Graduate Education. The RCAC provides counsel on a wide variety of matters relating to the research and creative enterprises of WKU faculty, staff, and students. The group is composed of the following members:

Dr. Jeffrey Budziak is an Associate Professor of Political Science and currently serves as the Assistant Dean in the Potter College of Arts and Letters. Dr. Budziak's scholarly interests focus on American government, law and courts, and statistical methodology. His research primarily investigates the behavior and decision-making patterns of the United States Supreme Court and the United States Courts of Appeals. This research has been published in scholarly journals such as The Journal of Law and Courts, Political Behavior, and Political Science Research and Methods,

Dr. Austin Griffiths is an Assistant Professor in the Department of Social Work at Western Kentucky University and the Director of the Center for Child Welfare Education and Research (CCWEAR). He previously worked for the Kentucky Department for Community Based Services in adult and child protective services. He is currently the Principal Investigator on a Medicaid funded project entitled the *Kentucky Child Welfare Workforce Wellness Initiative* and the majority of his research is focused on child welfare practice, training, and workforce development.

Dr. Anthony Paganelli is the business and law librarian instructor for WKU Libraries' Department of Public Library Services. He has been with the WKU Libraries since 2012. Research interests includes the academic library role in blockchain technology, social entrepreneurship, and makerspaces. Further research in academic libraries involve innovative library services in embedded librarianship, personal librarianship, online and distance librarianship, and library learning modules. Dr. Paganelli writes the column Legally Speaking for the *Against the Grain* journal and is a reviewer for the Journal of Academic Librarianship.

Yvonne Petkus, artist and Professor of Art in the WKU Department of Art & Design, was recently awarded the distinction of University Distinguished Professor. Petkus has presented her work in exhibition venues and conferences across the U.S. and internationally, and honors include artist grants and awards from the Kentucky Arts Council, the Kentucky Foundation for Women, and the Great Meadows Foundation. Competitive artist residencies and fellowships include an artist residencies in New York at the School of Visual Arts, and Iceland, and the 2017 Zuheir Sofia Endowed International Faculty Seminar Fellowship Program in Bosnia-Herzegovina.

Dr. Jenni Redifer is an Associate Professor in the Department of Psychology and also is the Assistant to the Dean for Research in the College of Education and Behavioral Sciences. Her research examines cognitive factors related to student learning and achievement. She is also the Lab Director of the Attention and Memory Lab which examines cognitive factors related to student learning and achievement. The lab investigates how working memory capacity (the limited attentional resources we have available during effortful tasks) influences problem-solving and retrieval of information from long-term memory.

Dr. Bruce A. Schulte is the Associate Vice President for Strategy, Performance and Accountability and a University Distinguished Professor noted for his studies on elephant behavior and conservation. He was co-chair of the WKU Strategic Plan *Climbing to Greater Heights* development process, and he chairs the Strategic Plan Implementation Committee. The WKU Strategic Plan set as a goal for Our Community & Beyond for WKU to serve as a Regional Lighthouse "*to provide resources, attract talent, and nurture intellectual capital in the communities we serve*."

Dr. Cathleen Webb is presently serving as the Associate Dean of Research of the Ogden College of Science and Engineering. Dr. Webb recently completed twelve years as Department Head of Chemistry. Dr. Webb has had continuous and diverse external research funding (federal – NSF, NPS, USGS, BLM, EPA, and USFS, state and private) since 1991, with over 40 grants totaling over $3M, including an SBIR Phase I and Phase II grant from the EPA. She has published over 40 articles, chapters, conference proceedings, and technical reports. Her research area of specialty is environmental and geochemistry and impacts on water quality.

Dr. Lily Popova Zhuhadar received her Ph.D. degree in *Computer Science and Computer Engineering* from the University of Louisville. Dr. Zhuhadar's applied research is directed toward collaborating with colleagues from various disciplines in the USA and Europe to solve today's Big Data problems by using Data Mining methodologies. The impact of her research has been witnessed by its contribution to more than 50 publications in peer-reviewed journal articles, book chapters, and national/international conference proceedings. Dr. Zhuhadar is a fellow of several associations such as AAAI, AACSB International, ACM, IEEE to name a few.

ORCA is grateful to Mr. William (Jeff) Hook, Director of the WKU Center for Research and Development (CRD) for his years of service to RCAC.

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We are pleased to extend our sincere thanks and congratulations to the many dedicated faculty and staff members who participated in sponsored projects activities in FY20.

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