



West Virginia University®

OFFICE OF UNDERGRADUATE RESEARCH

ANNUAL REPORT

2018



On the cover (left to right from top left):

(i) One of WVU's 2018 NIST SURF participants, **Samantha Isaac**, presenting to REU participants at the NIST Center for Neutron Research; (ii) University of California-San Marcos REU participant **Maria Vidaca** performing research under the supervision of professor Dr. Gregory Dudley (Photo credit: Steve Knowlden); (iii) **Kayley Morrow** presenting her SURE program research on maternal depression to Dr. Hal Gorby, judge for the Human Engagement category for the Summer Undergraduate Research Symposium (Photo credit: Kevin Walden); (iv) **Rachel Tallman** (Morgantown, WV), currently a first year student in medicine and former Honors student, discussing her research on breast cancer with Dr. Kevin Gooding at Undergraduate Research Day at the Capitol. (Photo Credit: Will Price); and (v) **Kayla Tokar** conducted research on slave drumming bans in colonial America with Dr. Travis Stimeling during her participation in the SURE program (Photo credit: WVU Photographic Services)

2018 Office of Undergraduate Research Administration

Dr. Michelle Richards-Babb	Director, Office of Undergraduate Research
Dr. Kimberly Quedado	Assistant Director, Office of Undergraduate Research
Mr. Kevin J. Walden	Program Specialist, Office of Undergraduate Research

2017-2018 Office of Undergraduate Research Advisory Council

Dr. Katherine Aaslestad	Professor, Department of History
Dr. Ken Blemings	Dean, Honors College and Professor, Biochemistry
Dr. Naomi Boyd	Department Chair and Associate Professor, Finance
Dr. Paul Chantler	Associate Professor, Human Performance/Exercise Physiology
Dr. Cerasela Zoica Dinu	Associate Professor, Chemical & Biomedical Engineering
Ms. Barbara Foster	Director of Laboratory Safety, Chemistry
Dr. Paul Hernandez	Assistant Professor, Educational Psychology
Dr. Melissa Olfert	Associate Professor, Human Nutrition and Foods
Dr. Eugenia Pena-Yewtukhiw	Associate Professor, Soil Science
Dr. Rhonda Reymond	Associate Professor, Art History
Dr. Ed Sabolsky	Associate Professor, Mechanical and Aerospace Engineering
Dr. Rosana Schafer	Associate Professor, Microbiology, Immunology & Cell Biology
Dr. Richard Thomas	Department Chair and Professor, Biology
Dr. Sam Zizzi	Professor, Sport and Exercise Psychology

2018 WVU Undergraduate Research Programs

- [Chemistry Research Experiences for Undergraduates \(REU\)](#), C. Eugene Bennett Department of Chemistry (Director: Michelle Richards-Babb; Funding: NSF)
- [NanoSAFE Research Experiences for Undergraduates \(REU\)](#), C. Eugene Bennett Department of Chemistry (Director: Lisa Holland; Funding: NSF)
- [Summer Undergraduate Research Experience \(SURE\)](#), Office of Undergraduate Research & Honors College (Director: Michelle Richards-Babb; Funding: WVU & WV HEPC)
- [KY-WV Louis Stokes Alliance for Minority Participation \(LSAMP\)](#) (Director: David Miller; Funding: NSF)
- [Immunology and Medical Microbiology Research Internships](#) (Director: John Barnett; Funding: Dept. of Microbiology, Immunology, and Cell Biology)
- [Research Apprenticeship Program \(RAP\)](#), Office of Undergraduate Research & Honors College (Director: Kimberly Quedado; Funding: WVU & Federal Work Study)
- [Community Engagement in Science Through Art \(CESTA\)](#), C. Eugene Bennett Department of Chemistry (Director: Jessica Hoover; Funding: NSF)
- [Summer Undergraduate Cancer Research Fellowship Program](#), WVU Cancer Institute (WVUCI) (Director: Alexey Ivanov; Funding: Fellowship & Research Endowment Funds)
- [NASA West Virginia Space Grant Consortium \(WVSGC\) Undergraduate Research Fellowship Program](#) (Coordinator: Candy Cordwell; Funding: NASA)
- Undergraduate Water and Energy Systems Scholars (Director: Shawn Grushecky; Funding: NSF EPSCoR)

These programs are administered and funded by the internal academic units and/or external units. This list may not be exhaustive of undergraduate research programs at WVU.

2018 Highlights, by the Numbers

- 1** Student representing WVU at the 2018 Posters on the Hill in Washington, D.C.
- 2** Faculty awardees for Distinction in Mentoring Undergraduates in Research
- 4** Presentations on undergraduate research, RAP and Office of Undergraduate Research at external events (e.g., ACS Nat. Conf., CUR Biennial, WV Science Teach. Assoc.)
- 5** Students representing WVU at the National Conferences on Undergraduate Research (NCUR)
- 6** Ambassadors for the Office of Undergraduate Research
- 11** Students who applied for competitive summer undergraduate research fellowships (SURF) at NIST national labs with 5 of 11 offers/acceptances
- 13** Judges at the 10th annual Summer Undergraduate Research Symposium
- 15** Faculty included as mentors on the 2019 Beckman Scholars Program proposal
- 29** WVU students participating in the 15th annual Undergraduate Research Day at the Capitol (URDC)
- 69** Past SURE participants listed as co-authors on peer-reviewed publications
- 70** Undergraduates engaging in research and creative endeavors via SURE in 2018
- 108** Undergraduates presenting at WVU's 2nd annual Undergraduate Spring Symposium
- 110** Students presenting at WVU's 10th Summer Undergraduate Research Symposium. (84 from WVU and 26 visiting students)
- 174** Applications to the 2018 SURE Site
- 185** Students engaging in research and creative endeavors in the Research Apprenticeship Program (RAP; 165 new RAP participants & 20 RAP graduates)
- 710** Students (min.) involved in scholarly activity during the 2017-2018 academic year

The Office of Undergraduate Research was established in August of 2015. The Office reports to the Dean of the Honors College. WVU is an Institutional Member of the Council on Undergraduate Research (cur.org).

Faculty Mentors

Faculty Award for Distinction in Mentoring Undergraduates in Research: The purpose of this award is to recognize, reward, and encourage faculty members who mentor undergraduates in research and creative endeavors. Nominations are accepted from any source and in March of each year. Outstanding nominees are invited to submit supporting documentation. Awards are made at the annual Honors College Recognition Ceremony in May.



2018 Awardee: Dr. Fernando Lima, Chemical Engineering

"[Dr. Lima] inspires confidence in me, as well as his other undergraduate students, to help us become better at what we do, and pursue big goals in our research. He has setup a terrific research group with many graduate and undergraduate students, and everyone in the group benefits from each other, thanks to the atmosphere he has created in the group."

- Quote from Nomination Letter



2018 Awardee: Dr. Edward Sabolsky, Mechanical and Aerospace Engineering

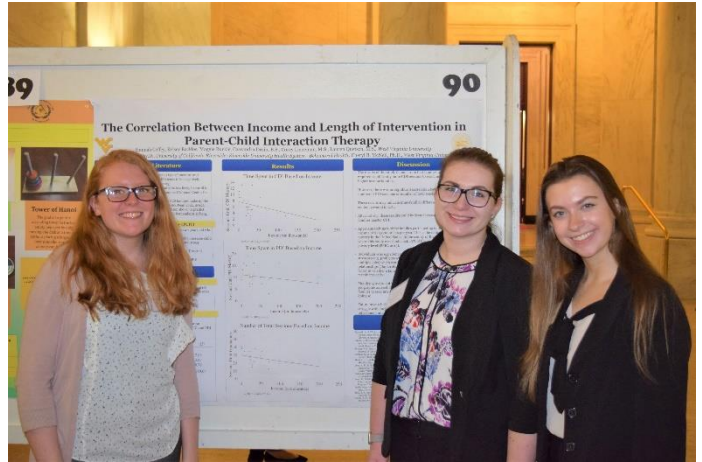
"[Dr. Sabolsky] has fostered undergraduate research experiences in his lab since 2009. He insures that every research program within his lab has at least one student working together with a graduate student. He always includes funding for these students in his proposals, and in the instance that he does not get awarded, he assists the students in drafting proposals for various undergraduate research opportunities. He currently has nine undergraduate students completing research in his lab, where three of these students he assisted in acquiring federally sponsored fellowships. These students contribute to the research projects, but they are gaining more from directly interacting with Dr. Sabolsky and their graduate mentors."

- Quote from Nomination Letter

Research and Creative Symposia

Undergraduate Research Day at the Capitol (URDC):

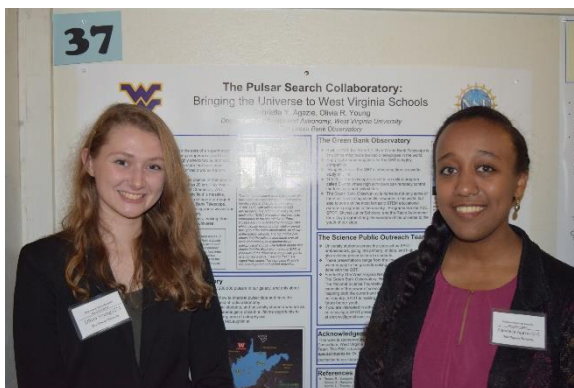
It is increasingly important that the West Virginia Higher Education community works to ensure that those in State government, who provide substantial funding for higher education, have a clear understanding of the programs they fund and why these programs are important. For many undergraduates, programming that supports research and creative endeavors is an essential part of their disciplinary educational experience. Nothing more effectively demonstrates the value of these experiences than the words and stories of students themselves. Each winter since 2004, a cadre of undergraduates from institutions throughout West Virginia have descended on the West Virginia State Capitol Building in Charleston to present their research in poster form and to speak directly with members of the WV State Legislature and Executive Branch about the importance of research to the state.



WVU students at the 2018 Undergraduate Research Day at the Capitol in Charleston, WV. (Photo Credit: Kevin Walden)

In 2018, the WVU Office of Undergraduate Research managed and organized the 15th Annual Undergraduate Research Day at the Capitol that took place on Friday, February 16, 2018. A total of 195 separate abstracts were submitted for presentation at the 2018 URDC event. Of those, 95 abstracts from undergraduate students attending 12 different West Virginia institutions, including 29 from WVU, were selected. Presenters showcased research in fields ranging from agriculture, astronomy and biology to political science, psychology and sociology.

At the 2018 URDC event, representatives from the House of Delegates and Senate of the West Virginia State Legislature visited students from their districts to learn about how research is being conducted at the undergraduate level and how congressional action supports the endeavors of the universities in the state in terms of policy and budget allocation.

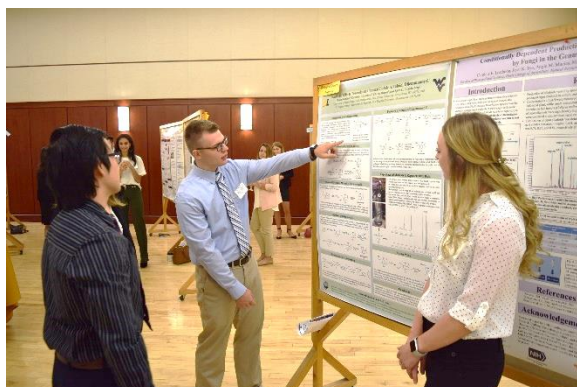


Select URDC presenters Olivia Young (left) and Gabriella Agazie (right) ready to present their work on radio astronomy. (Photo Credit: Kevin Walden)



Dean Ken Blemings visiting a poster by Taija Thomas, who is presenting her work on socio-economic risk, college adjustment, and emotional regulation as a protective factor. (Photo Credit: Kevin Walden)

Summer Undergraduate Research Symposium: Since 2009, this Symposium has been the culminating event for summer undergraduate research programs from across the WVU campus. The Symposium provides presenters with an experience akin to that of a disciplinary research conference. Presenters prepare a professional quality research poster and use it to explain their research to faculty members, students, and to members of the general public. Presenters are judged on their poster and their ability to explain and answer questions about their research to judges from the same or a related field. The 10th annual Summer Undergraduate Research Symposium was hosted by the WVU Office of Undergraduate Research on Thursday July 26, 2018. Of the 110 undergraduate presenters, 84 attended WVU and 26 were visiting students (e.g., Waynesburg University, Bethany College, West Virginia Wesleyan College, Vanderbilt University, University of Kansas, Northeastern University, and California State University-San Marcos). Posters were divided into eight different judged categories (Agricultural & Environmental Sciences, Biological Sciences, Engineering, Health Sciences, Human Engagement, Nanoscience, Neuroscience, and Physical Sciences) with a total of 13 judges, 12 judges from the WVU community and 1 judge from Edinboro College. The Human Engagement category included research and scholarship pertaining to how humans interact and engage within society in the areas of business, education, creative arts, and the humanities. The WVU community, including the presenters' research groups, as well as the general public, including family, were invited to attend, and the event was covered by the Dominion Post. High school students attending a Health Sciences & Technology Academy (HSTA) summer camp and middle school students attending a STEM camp also attend. The 2018 Symposium was so well attended that parking at the Alumni Center was scarce. Thanks to all those who attended!



Symposium participants discussing their research with attendees. (Photo Credit: Kevin Walden)



Judges for the 2018 Summer Undergraduate Research Symposium. (Photo Credit: Kevin Walden)

Eight presenters were selected as winners in their categories and five presenters were selected as runner-ups. Category winners and runner-ups (bold = undergraduate presenter; underline = faculty mentor) from the 2018 Symposium were:

Agricultural & Environmental Sciences Category (10 posters)

Winner: *Synthetic methionine use in organic meat-type chickens improves production not health.* **Katy L. Sines**, Angela E. Lamp and **Joseph S. Moritz** (Katy, an Animal and Nutritional Sciences major at WVU from Morgantown, WV, was a participant in the SURE program.)

Biological Sciences Category (17 posters)

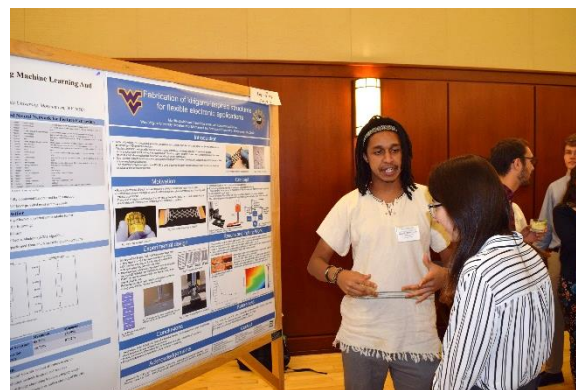
Winner: *Generating bioluminescent Gram-negative bacteria to improve visualization of bacterial pathogenesis.* **Annalisa B. Huckaby**, Emel Sen-Kilic, Kelly Weaver, Catherine Blackwood, F. Heath Damron and **Mariette Barbier** (Annalisa, a Chemistry major and Honors student at WVU from Morgantown, WV, was a participant in the SURE program and was funded via an NSF LSAMP KY-WV Mid-Level Alliance Phase II grant.)

Runner Up: *Consumption of Silver Carp (*Hypophthalmichthys molitrix*) sarcoplasmic protein on bone health.* **Kathryn Taylor**, Derek Warren, Chris Skinner, Kristen Matak and Janet C. Tou (Kathryn, a Biochemistry major at WVU from Cross Lanes, WV, was a participant in the SURE program.)

Engineering Category (18 posters)

Winner: *Fabrication of Kirigami based structures for flexible electronics applications.* **Muriithi-David Githui Kem**, Sierros Konstantinos and Derrick Banerjee (David, a Mechanical and Aerospace Engineering major at WVU from Kennesaw, GA, was a participant in the SURE program and was funded via an NSF LSAMP KY-WV Mid-Level Alliance Phase II grant.)

Runner Up: *Simulation and economic optimization of an autorefrigerated alkylation process.* **Ronald Alexander**, Rebecca Kim and Fernando V. Lima (Ronald, a Chemical Engineering major at WVU from Cumberland, RI, was a participant in the SURE program.)



Engineering category winner Muriithi-David Cihui Kem discussing his experience with Kirigami based structures in his lab. (Photo Credit: Kevin Walden)

Health Sciences Category (17 posters)

Winner: *HNSCC invasive potential in cortactin-null cells.* **Joshua L. Taylor**, River A. Hames, Benen W. Papenberg, Jessica L. Allen, Robert E. Hickey, Steven M. Markwell and Scott A. Weed (Joshua, a Biology major and Honors student at WVU from Kearnsysville, WV, was a participant in the SURE program.)

Runner Up: *Myeloid-derived suppressor cells effector gene expression in murine model of neonatal sepsis.* **Jordan Vance**, Travis Rawson and Cory Robinson (Jordan, an Immunology and Medical Microbiology major and Honors student at WVU from South Charleston, WV, was a participant in the SURE program and was funded by the Department of Microbiology, Immunology, and Cell Biology.)

Human Engagement Category (9 posters)

Winner: *The role of intergroup anxiety and intergroup contact in prejudice.* **Eva M. MacFarland** and Natalie J. Shook (Eva, a Psychology & Biology double major and Honors student at WVU from Bridgeport, WV, was a participant in the SURE program.)

Nanoscience Category (12 posters)

Winner: *Effect of additives on capillary nanogel electrophoresis.* **Courtney Kristoff**, Cassandra L. Carihfield and Lisa A. Holland (Courtney, a Chemistry major from Waynesburg College, was a participant in the NSF-Funded Nano REU program.)

Runner Up: *Characterization and exposure assessment of silver nanoparticles in sanitizer spray product.* **Sarah O'Boyle**, Alycia Knepp, Lauren Bowers and Aleksandr B. Stefaniak. (Sarah, a Chemistry major from Messiah College, was a participant in the NSF-funded Nano REU program.)

Neuroscience Category (8 posters)

Winner: *Examining dopaminergic neuron differentiation in the hypothalamus of genomic screen homeobox-1 mutant zebrafish.* **R. Madison Riffe**, Zoë A. Dobler, Regina L. Patrick, Rebecca A. Robich and Sadie A. Bergeron (Madison, a Biology major and Honors student at WVU from Charleston, WV, was a participant in the SURE program.)

Physical Sciences Category (18 posters)

Winner: *Influence of second coordination sphere boranes on rhodium(I) oxidative addition of aldehydes.* **Maxwell S. Reese**, Brian R. Nichols, Novruz G. Akhmedov, Jeffrey L Petersen and Brian V. Popp (Maxwell, a Chemistry major and Honors student at WVU from Bethel Park, PA, was a participant in the SURE program.)

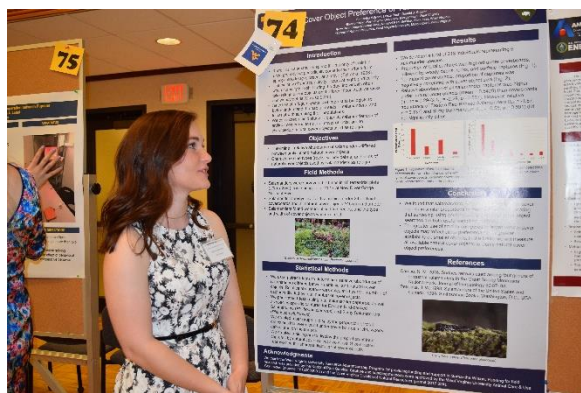
Runner Up: *Kinetic investigations of the gas phase reaction between the CH radical and cyclopentadiene.* **Zachery N. Donnellan**, Kacee L. Caster, Talitha Selby and Fabien Goulay (Zachery, a Chemistry major and Honors student at WVU from Chapmanville, WV, was a participant in the SURE program.)



Category winners and runner ups at the 2018 Summer Undergraduate Research Symposium. (Photo Credit: Kevin Walden)

[Undergraduate Spring Symposium](#): The 2nd Annual Undergraduate Spring Symposium was held on Saturday April 14, 2018. More than 100 undergraduate students from wide-ranging disciplines, from engineering to audiology and agriculture to creative arts, explained the results of their discipline-specific scholarly activity (research/creative projects) to attendees to show them what amazing work our undergraduates are doing. Our undergraduates enthusiastically represented WVU to prospective students and their parents who were attending Decide WVU Day.

The Office of Undergraduate Research and the Honors College in conjunction with Undergraduate Admissions, Eberly College's SpeakWrite initiative, the American Chemical Society Student Affiliates, the Intercollegiate Biochemistry Program, and the Biochemistry Student Club worked together to organize this campus-wide, culminating poster event whilst encouraging prospective students to decide on attending WVU. We will continue this event in spring 2019 with the 3rd Annual Undergraduate Spring Symposium.



Biochemistry major Samantha Wilson discusses her research on salamanders and their preference for taking cover under differently sized objects. (Photo Credit: Hellen Nditsi)



Speech pathology and audiology major Kenyane Simpson discusses her research on correlations between maternal depression, breast feeding, and literacy. (Photo Credit: Hellen Nditsi)

Category winners and runner-ups (bold = undergraduate presenter; underline = faculty mentor) from the 2018 Undergraduate Spring Symposium were:

Humanities/Non-STEM Category (14 posters)

1st Place: *Energy Literacy in Agricultural Education Students in West Virginia.* **Hannah Schantz**, Brieanna Hughes and Jessica Blythe (Hannah is an Agricultural and Extension Education major from Fallston, MD. Hannah was a participant in WVU's Research Apprenticeship Program.)

2nd Place: *Stick Together or Break Apart: Unplanned Alliance Dissolution in Light of Adverse Events.* **Vasant Saladi**, Gulnara Zaynutdinova, Miles Zachary, Deborah Philippe and Olga Bruyaka (Vasant is a Petroleum Engineering major from Ellicott City, MD. Vasant was a participant in WVU's Research Apprenticeship Program.)

3rd Place: *Slave Drumming Bans in Colonial America.* **Kayla Tokar** and Travis Stimeling (Kayla is a Music Therapy major from Uniontown, PA. Kayla was a participant in WVU's Research Apprenticeship Program.)

Physical Sciences Category (12 posters)

1st Place: *Synthesis of a Cyclophane Bearing Two Benz[a]anthracene and Two Naphthyl Units.* **Josef C. Heller**, Haresh Thakellapalli, Behzad Farajidizaji, Shuangjiang Li, Yu Zhang, Novruz G. Akhmedov, Carsten Milschmann, Jeffrey L. Petersen and Kung K. Wang (Josef is a biochemistry major from Daniels, WV. Josef carried out research for WVU 497-level research course credit.)

2nd Place: *Jump and Landing Detection via Accelerometry.* **Marcus Marpoe**, Krista Meder and Jean McCrory (Marcus is a Mechanical Engineering major from Carlisle, PA. Marcus was a participant in WVU's Research Apprenticeship Program.)

3rd Place: *Pulsar Searching in the 2011-2014 Driftscan Data.* **Olivia Young**, **Gabriella Agazie** and Maura McLaughlin (Olivia is a Physics major from Hurricane, WV. Gabriella is a Physics major from Morgantown, WV. Olivia's and Gabriella's research effort were mainly voluntary.)

Biological Sciences Category (15 posters)

1st Place: *Identifying Target Genes of the Homeobox Transcription Factors Gsx1 and Gsx2 in Zebrafish.* **Zoe A. Dobler**, Becca A. Robich, Emma L. Sherfinski, Regina L. Patrick and Sadie Bergeron (Zoe is a Biology major from Princeton, NJ. Zoe carried out research for Biology 486 capstone course credit.)

2nd Place: *Co-crystallization of mitoNEET with Thiazolidinediones.* **Raisa A. A. Nuñez**, Werner Geldenhuys and Aaron R. Robart (Raisa is a Biology major from Hedgesville, WV. Raisa was a participant in WVU's Research Apprenticeship Program.)

3rd Place: *Nonautonomous Requirements for JNK Signaling in Thalamocortical Development.* **Stephany Nti**, Jessica Clemente and Eric Tucker (Stephany is a Biology major from Sayreville, NJ. Stephany carried out research for Biology 386 course credit and continued her research on a voluntary basis.)

Molecular Biology & Biochemistry Category (20 posters)

1st Place: *Functional Analysis of a Gene Involved in Synthesis of Fungal Lysergic Acid Amides.* **Jessi K. Tyo** and Daniel G. Panaccione (Jessi is a Biochemistry major from Frametown, WV.)

2nd Place: *Apple Pomace Supplementation Had No Detrimental Effects on Bone Indices in a Rat Model.* **Kathryn M.E. Taylor**, R. Chris Skinner, and Derek Warren and Janet Tou (Kathryn is a Biochemistry major from Cross Lanes, WV. Kathryn carried out research for WVU 497-level research course credit.)

3rd Place: *A Role for Tumor Macrophage-Derived Microvesicles in Regulation of Epithelial-to-Mesenchymal Transition.* **Kaltume Ndayako**, Amy Gross, Joyce Obeng, Clay Marsh, Timothy D. Eubank and Duaa Dakallah (Kaltume is an Immunology and Medical Microbiology major from Abuja, Nigeria. Kaltume carried out research with an IMMB Scholarship.)

Environmental Sciences Category (13 posters)

1st Place: *Ecological and Urban Factors Impacting Wood Duck Nest Success.* **Saahirah Cua** and Christopher Lituma (Saahirah is a Wildlife and Fishery Resources major from Bristolville, OH. Saahirah was a participant in the McNair Scholar Program and continued research with a departmental capstone course.)

2nd Place: *Mapping and Morphometrics of Ancient Glacial Landforms in Central Namibia.* **Andrew T. McGrady** and Graham Andrews (Andrew is a Geology major from Branchland, WV. Andrew carried out research for WVU 497-level research course credit.)

3rd Place: *Use of LiDAR Imagery to Constrain Silicic Lava Emplacement Processes.* **Brenna Cole** and Graham Andrews (Brenna is a Geology major from Machias, NY. Brenna carried out research for WVU 495-level independent study course credit.)

Behavioral Sciences Category (32 posters)

1st Place: *The Effects of Dopaminergic Therapy on Risk-Based Decision-Making following Frontal TBI in Rats.* **Trinity K. Shaver**, Caitlyn E. Cabral, Binxing I. Zhu, Robelle B. Dalida, Anastasios D. Lake, Cory Whirtley, Christopher O'Hearn and Cole Vonder Haar (Trinity is a Psychology major from Franklin, WV. Trinity was a participant in the McNair Scholar Program.)

2nd Place: *Reducing Prejudice Against Sexual Minorities: Investigating Social Dominance Orientation.* **Hannah N. Amick**, Holly Fitzgerald and **Natalie J. Shook** (Hannah is a Psychology major from Beckley, WV. Hannah was a participant in WVU's Research Apprenticeship Program.)

3rd Place: *Effects of post-stroke infections on ischemic stroke outcomes at J.W. Ruby Memorial Hospital.* **Maria E. Mace**, Ashley B. Petrone and **Candice M. Brown** (Maria is an Immunology and Medical Microbiology major from Hurricane, WV. Maria was a participant in WVU's Research Apprenticeship Program.)

National Conferences on Undergraduate Research (NCUR): This annual Conference, offered nationwide since 1987, is the Council on Undergraduate Research's signature undergraduate research event. It is dedicated to promoting and celebrating undergraduate research and creative endeavors in all fields and from undergraduates attending all post-secondary institutions. Students submit an abstract of their research or creative work and are competitively selected to present their work in oral or poster form or as visual or performing arts. NCUR presenters also experience one of the largest graduate school information expos in the country, attend plenary lectures, and network with undergraduates and faculty from many other institutions. Since 2015, WVU has been represented by 11 students at NCUR, with an increase in representation beginning with the establishment of the Office of Undergraduate Research.

WVU had five undergraduate students (see below) selected to present their research at NCUR 2018 held at the University of Central Oklahoma (Edmond, OK) from April 4th-8th. Kevin Walden, Program Specialist for the Office of Undergraduate Research, accompanied students at NCUR.

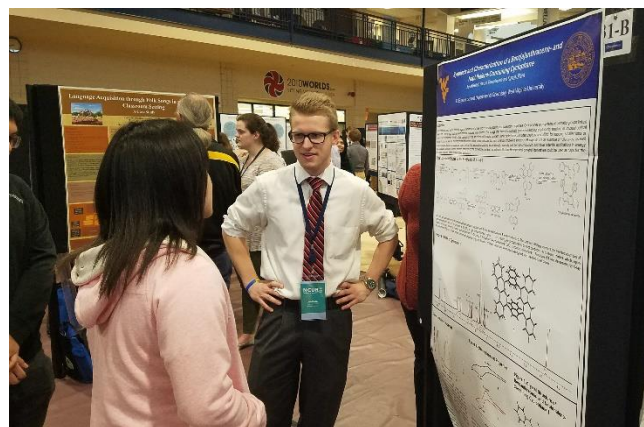
Oral Presentation: *Crystal Structure of the Outer Mitochondrial Membrane Protein MitoNEET in Complex with Furosemide.* **Raisa Nuñez** (Raisa, a biology major at WVU from Hedgesville, WV, carried out research with Dr. Aaron Robart.)

Poster Presentation: *Synthesis of a Cyclophane Bearing Two Benz[a]anthracene Units Connected at 5 and 7 Positions with Two Naphth-1,4-diyl Groups.* **Josef Heller** (Josef, a biochemistry major at WVU from Daniels, WV, carried out research with Dr. Kung Wang.)

Poster Presentation: *Emissions Analysis of Synthetic Diesel for Off Road Heavy-Duty Equipment.* **Christian Hushion** (Christian, a mechanical engineering major at WVU from Marietta, OH, carried out research with Dr. Arvind Thiruvengadam.)

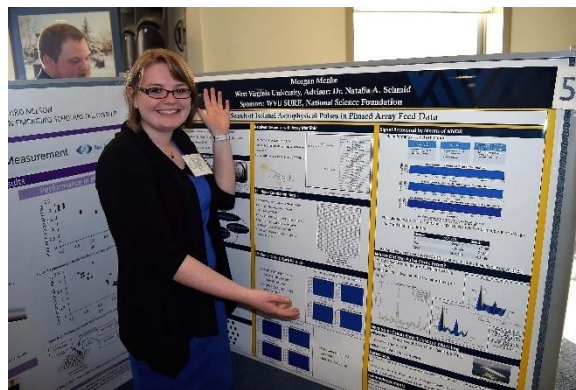
Poster Presentation: *A Changing Cultural Landscape in the Sunnyside Neighborhood of Morgantown, West Virginia.* **Elizabeth Satterfield** (Elizabeth, a history major at WVU from Independence, WV, carried out research with Dr. Jenny Boulware.)

Poster Presentation: *Mental Illness in Early 20th Century Mexico.* **McKenna Williamson** (McKenna Williamson, a history and world language, literature & linguistics double major at WVU from Daniels, WV, carried out research with Dr. Michele Stephens.)



WVU's Josef Heller in action at NCUR 2018. (Photo Credit: Kevin Walden)

Posters on the Hill: Morgan Menke, electrical engineering major and 2017 SURE participant, was chosen to represent WVU and the state of West Virginia at the 22nd annual CUR Posters on the Hill event in Washington, D.C. held on April 17-18, 2018. Only 60 students were selected for this event out of hundreds of applicants. At this event Morgan showcased her ongoing research with Dr. Natalia Schmid on detection of astrophysical radio pulses using multiple sensors that allow for larger data collections. Morgan hopes to design better and faster signal detection algorithms to help scientists and engineers detect pulses in real time from the data collect by multiple sensor telescopes. Morgan met with congressional staff members, federal government officials, and representatives from federal funding agencies before and during her poster presentation.



Morgan Menke presenting her research during the 2018 Posters on the Hill event. (Photo Credit: Kevin Walden)

In addition, Morgan learned about advocacy for undergraduate research from Mary Ditmore, Director of Federal Relations for WVU. Kevin Walden, Office of Undergraduate Research Program Specialist, accompanied Morgan to Washington, D.C. for this event.

Poster Presentation: *Blind search of isolated astrophysical pulses in phased array feed data.*
Morgan Menke (Morgan, an electrical engineering major at WVU from Ridgeley, WV, carried out research with Dr. Natalia Schmid. Morgan is completing her senior year at WVU.)

"We are very proud to have Morgan represent WVU and more generally the state of West Virginia at the 2018 Posters on the Hill event. Morgan is a product of West Virginia's educational system, from K-12 to undergraduate, and she exemplifies the curiosity and work ethic of many West Virginia students." -Quote from Michelle Richards-Babb, Director, Office of Undergraduate Research.

Travel Awards: Besides funding undergraduate student attendance at NCUR and Posters on the Hill, the Office of Undergraduate Research offers limited travel support funding (10 undergraduates per year) to offset the costs associated with attendance and presentation (oral or poster) of research or creative work at national or regional discipline specific conferences. The application process is competitive and students must (i) show proof of acceptance of their work for presentation, (ii) devise and submit a realistic travel budget, and (iii) provide a letter of support from the faculty mentor. In addition, many of our SURE participants use their \$500 of enrichment funding to aid in conference travel to present their research.

In 2017 and 2018, presentations by the undergraduate students listed in Table 1 have been partially supported by the Office of Undergraduate Research. The U.S. map, shown after the table, documents the wide geographic reach of WVU undergraduates as they traveled throughout the United States and beyond in the last year to represent West Virginia University at conferences and events.

"The Office of Undergraduate Research travel grant gave me access to many opportunities I otherwise would not have had. At the 2018 National Rural Health Association Annual Conference in New Orleans, Louisiana, I was able to meet, hear from, and present for a diverse group of rural health providers, leaders, and stakeholders from around the country. When I returned I was able to share my experience with others in the School of Public Health." – Quote from Alexa Harris (WVU Public Health major)

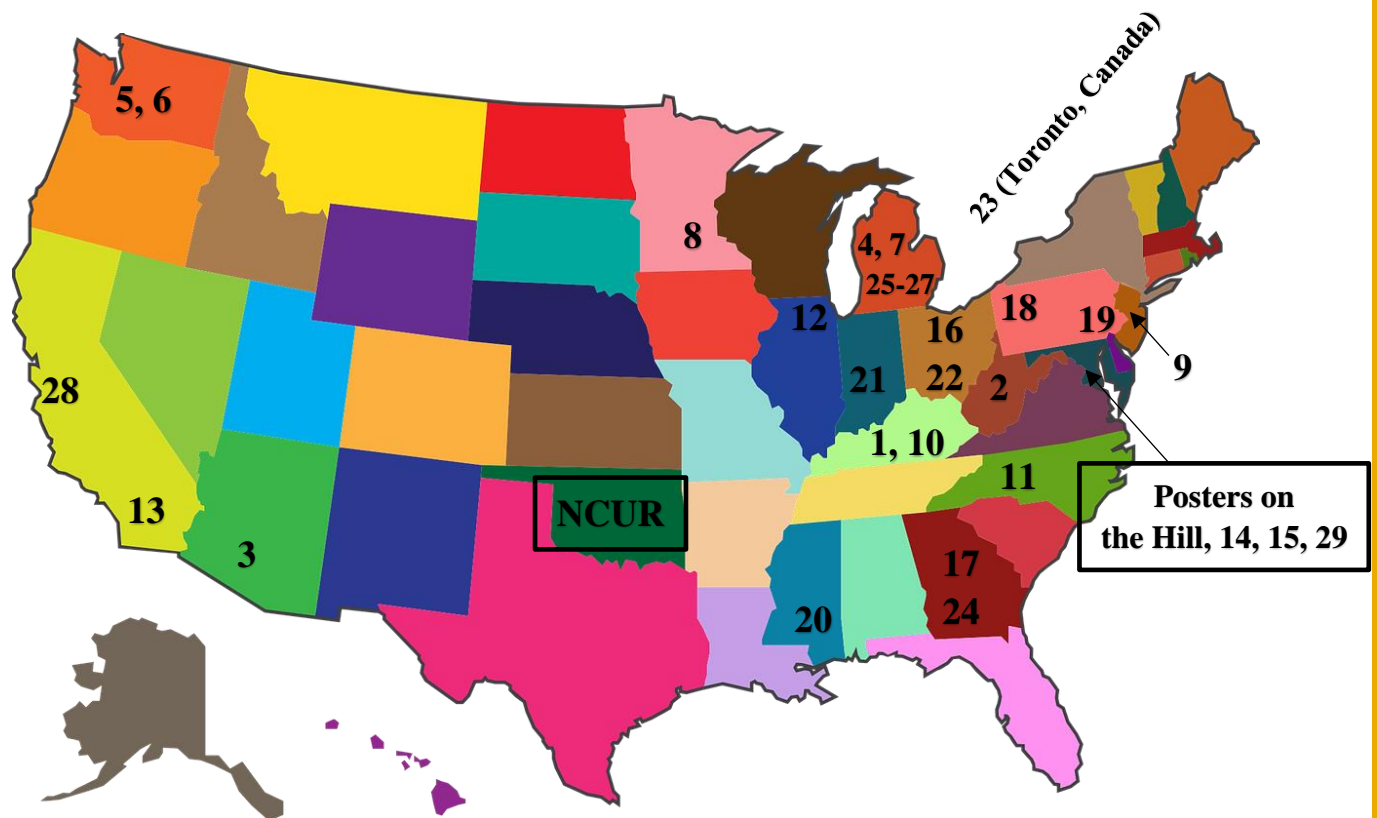
Table 1. Undergraduates supported in travel to present their scholarly activities at national or regional discipline-specific conferences. The numbers in the fourth column correlate to geographic locators on the following U.S. map. Presentations partially supported using SURE enrichment funds are designated with *.

Undergraduate Presenter(s) (Major)	Faculty Mentor	Presentation Title	Conference Title, Location (Geographic Locator)	Conference Dates
*Kayley Morrow (Psychology)	Amy Gentzler	<i>Mothers' and Children's Depressive Symptoms are Linked through Children's Attachment Security</i>	Association for Behavioral and Cognitive Therapies Conference, Washington, D.C. (29)	Nov. 15-18, 2018
London Orzolek (Anthropology & Women and Gender Studies)	Susanna Donaldson	<i>You Keep Using That word. I Don't Think It Means What You Think It Means: Defining College-Going Culture and Student Success</i>	117 th Annual Meeting of the Anthropological Association, San Jose, CA (28)	Nov. 14-18, 2018
Luke Neal (Physics & Mathematics)	Gurudas Ganguli (Naval Res. Lab., Physics Adjunct)	<i>Kinetic Equilibrium Solution to the Vlasov Equation in Cylindrical Geometry</i>	60th Annual Meeting of the APS Division of Plasma Physics, Milwaukee, WI (27)	Nov. 5-9, 2018
Andrew Jemiolo (Physics)	Earl Scime	<i>Electromagnetic Instabilities Driven by Ion Thermal Anisotropy in Helicon Plasmas</i>	60th Annual Meeting of the APS Division of Plasma Physics, Milwaukee, WI (26)	Nov. 5-9, 2018
Jacob McLaughlin (Physics)	Earl Scime	<i>Enhancement of Ion Thermal Anisotropy in Helicon Plasmas</i>	60th Annual Meeting of the APS Division of Plasma Physics, Milwaukee, WI (25)	Nov. 5-9, 2018
Phillip Carman (Criminology) and Paradise Hudson (Criminology)	Heather Washington	<i>In the Shadows of Mass Incarceration: How Prisoner Wives and Romantic Partners Build Community</i>	2018 American Society Criminology Conference, Atlanta, GA (24)	Nov. 14-17, 2018
*Trinity Shaver (Psychology & Multidisciplinary Studies)	Cole Vonder Haar	<i>Methylphenidate Treatment Impairs Risk-Based Decision Making Without Affecting Impulsivity After Controlled Cortical Impact</i>	NeuroTrauma 2018: 3 rd Joint Symposium of the International and National Neurotrauma Societies, Toronto, Canada (23)	Aug. 11-16, 2018
*Kevin Tennant (Mechanical Engineering)	Ed Sabolsky	<i>Electroactive Polymer Actuator Arrays for Soft Robotic Movement</i>	Materials Science and Technology Annual Conference, Columbus, OH (22)	Oct. 16-17, 2018
*Lauren (Risser) Dirkman (Public Health)	Danielle Davidov	<i>Intimate Partner Violence Screening in Acute Care Centers: Procedures and Patient Preferences</i>	Society for Academic Emergency Medicine Annual Conference, Indianapolis, IN (21)	May 15-18, 2018
Alexa Harris (Public Health)	A. Brianna Sheppard-Willis	<i>Low Back Pain Treatment Recommendations in Primary Care</i>	National Rural Health Association Annual Conference, New Orleans, LA (20)	May 8-10, 2018

Undergraduate Presenter(s) (Major)	Faculty Mentor	Presentation Title	Conference Title, Location (Geographic Locator)	Conference Dates
*Jacqueline Spiropoulos (Sociology)	Susanna Donaldson	<i>Cultural Perceptions of Cancer Among a College-Educated Population in North Central West Virginia</i>	Annual Meeting of the Society for Applied Anthropology, Philadelphia, PA (19)	April 3-5, 2018
Phi Alpha Theta Delta Nu Chapter: Elena Dugan, Elizabeth Satterfield, Haleigh Posey, and Jordan Riggs, and Madelynn Lawrence (History)	Kenneth Kolander	<i>The Black Hand and the Rise of Organized Crime in Northern West Virginia: 1908-1923; Swiss Settlement in Randolph County, West Virginia: A Study of Land Deals, Policies, and Immigration in Helvetia; The Role of Letters During the Napoleonic War; The Draw of Darkness: Visitor Experiences at Auschwitz an Majdanek; The Trial and Subsequent Accusations of a Confessed Salem Witch</i>	Phi Alpha Theta Regional Conference, Grove City, PA (18)	March 10, 2018
*Kiara Cogar (Psychology & Political Science)	Natalie Shook	<i>Disgust Sensitivity, Social Conservatism, and Prejudicial Attitudes Toward Arab-Americans and Muslims</i>	Society of Personal and Social Psychology Convention, Atlanta, GA (17)	March 1-3, 2018
*Mykal Manswell (Sport and Exercise Psychology)	Scott Barnicle	<i>Athletic Identity and the Transition from Division 1 Football: From Athlete to Adult</i>	Association of Applied Sport Psychology's Midwest Student Regional Conference, Oxford, OH (16)	Feb. 15-17, 2018
*John (Drew) Gatlin (Civil Engineering)	Dimitra Pyrialakou	<i>Undergraduate Transportation Engineering Student Attitudes Towards the TRB's Research Needs Statement Database</i>	2018 Transportation Research Board's Annual Meeting, Washington, DC (15)	Jan. 7-11, 2018
*Rachel Wattick (Human Nutrition & Foods)	Melissa Olfert	<i>Community Assessment and Education to Promote Behavioral Health Planning and Evaluation (CAPE): Phase II</i>	Science of Dissemination & Implementation Conference, Arlington, VA (14)	Dec. 4-6, 2017
Deja Clement (Psychology)	Daniel McNeil	<i>Pain Responsivity in Black and White Adults: Stimulus Intensity, Instructional Set, and Implications for Acutely Painful Medical/Dental Procedures</i>	Association for Cognitive and Behavioral Therapies Conference and Convention in San Diego, CA (13)	Nov. 17-19, 2017
Erin O'Leary (Multidisciplinary Studies), Isabella Tennant (Pre-Secondary Education & English), & Summer Krantz	Nathalie Singh-Corcoran	<i>License to Tutor: Defining and Communicating the Writing Center's Purpose</i>	International Writing Centers Association Annual Conference, Chicago, IL (12)	Nov. 10-13, 2017

Undergraduate Presenter(s) (Major)	Faculty Mentor	Presentation Title	Conference Title, Location (Geographic Locator)	Conference Dates
*Sierra Ciccone (Chemistry)	Jessica Hoover	<i>Nickel-Catalyzed Oxidative Decarboxylative Coupling Reactions: Exploring the Role of Silver</i>	Southeast Regional Meeting of the American Chemical Society, Charlotte, NC (11)	Nov. 8-10, 2017
*Natalie Marquart (Marketing)	M. Paula Fitzgerald	<i>Discovering the Best Consumer Complaint Strategies to Gain Compliance from Financial Institutions</i>	Society for Marketing Advances, Louisville, KY (10)	Nov. 6-11, 2017
*Samantha Isaac (Physics)	Edward Flagg	<i>Changing Dynamics of Single InGaAs Quantum Dots Under Resonant Excitation</i>	American Physical Society Mid-Atlantic Section Meeting, Newark, NJ (9)	Nov. 3-5, 2017
*Allyson Brezler (Chemical Engineering)	Fernando Lima	<i>Modeling and Optimization of Ion Transport Membranes for Oxygen Separation from Air</i>	2017 AIChE Undergraduate Student Conference, Minneapolis, MN (8)	Oct. 27-30, 2017
Mikal Dufor (Physics)	Earl Scime	<i>Diagnosis of Acceleration, Reconnection, Turbulence, and Heating</i>	59 th Annual Meeting of the American Physical Society, Division of Plasma Physics, Milwaukee, WI (7)	Oct. 23-27, 2017
Holly Pettus (Geology)	Kenneth Brown	<i>Petrography and Geochemistry of Megacrystic K-Feldspars from a Granitoid Intrusion, Northwestern NV</i>	Geological Society of America Annual Meeting in Seattle, WA (6)	Oct. 22-25, 2017
Autumn Downey (Geology)	Dorothy Vesper	<i>Sandstone Springs as Contributors to Karst Aquifers in the Valley and Ridge Province</i>	Geological Society of America Annual Meeting in Seattle, WA (5)	Oct. 22-25, 2017
*Andrew Jemiolo (Physics)	Earl Scime	<i>Optimization of Confocal Laser Induced Fluorescence for Long Focal Length Applications</i>	59th Annual Meeting of the APS Division of Plasma Physics, Milwaukee, WI (4)	Oct. 22-24, 2017
*Amanda Barbarossa (Biomedical Engineering)	Sergiy Yakovenko	<i>Towards Virtualized Transradial Prosthesis with Simulated Dynamics and Surface EMG Interface</i>	2017 Biomedical Engineering Society Annual Meeting, Phoenix, AZ (3)	Oct. 11-14, 2017
*Samuel Gary (Biochemistry)	Nik Kovich	<i>Novel Apigenin and Genkwanin Derivatives as Potential Cancer Growth Inhibitors</i>	Southeast Regional IDeA Conference, Morgantown, WV (2)	Oct. 11-13, 2017
*Steven Black (Pet. & Nat. Gas Engineering)	Kashy Aminian	<i>Measurement of the Marcellus Shale properties</i>	Society of Petroleum Engineers Eastern Regional Meeting, Lexington, KY (1)	Oct. 3-6, 2017

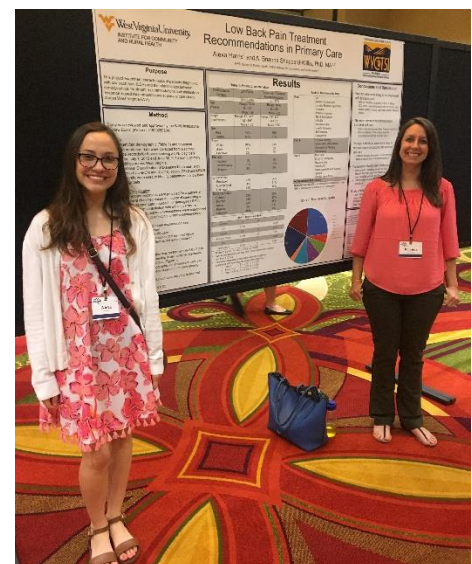
*Presentations partially supported using SURE enrichment funds. All other presentations were partially supported by competitive funding from the WVU Office of Undergraduate Research.



Geographic locators of conferences and events at which WVU undergraduates presented or carried out their scholarly activities. Numbers correlate with conference locations given in Table 1.



Attendees to NCUR 2018 in Oklahoma City. From left to right: Kevin Walden (Program Specialist), Elizabeth Satterfield, McKenna Williamson, Josef Heller, and Christian Hushion.



Alexa Harris (left) and Dr. Brianna Sheppard-Willis (right) at the 2018 National Rural Health Association Annual Conference in New Orleans, Louisiana. Alexa is a student at WVU's School of Public Health.

Undergraduates Engage in Summer Research

Internal Programs

WVU Summer Undergraduate Research Experience (SURE): The WVU SURE Site has been running continuously since 2005 and is funded through summer 2019. Current SURE funding is provided by the WV Higher Education Policy Commission's Division of Science and Research along with funding committed by the WVU Colleges of Business & Economics, Creative Arts, and Physical Activity and Sport Sciences; Davis College of Agriculture, Forestry and Consumer Sciences; Eberly College of Arts and Sciences; Statler College of Engineering and Mineral Resources; Health Sciences Center; the Departments of Biology and Chemistry; Research Corporation; and the Provost's Office.

The 2017-2019 SURE Site supports 50 undergraduates (44 STEM and 6 non-STEM) per summer in eight weeks of full-time, faculty mentored research. The goal is to move participants from research dependence to a relatively independent status. Facilitated research, trainings, career mentoring seminars, networking events and research presentations (i.e., Summer Undergraduate Research Symposium) improve participants' understanding of the research enterprise and the value of continuing their education post-undergraduate.

A total of 70 undergraduates (see photo below) participated in the 2018 SURE Site. Fifty (50) WVU undergraduates were funded by the SURE Site. The remaining 20 WVU SURE participants were funded through mechanisms such as faculty grants (e.g., NSF-LSAMP), faculty overhead, or departmental/college funding (e.g., math, chemistry, immunology and medical microbiology or education). Enrichment funding is available to undergraduates funded via the SURE Site. This funding provides SURE participants with an opportunity to engage in activities that complement, extend, and enhance their scholarly experiences during or directly subsequent to their participation in the SURE program. Thus far, 14 of the 2018 SURE participants and 29 of the 2017 SURE participants have applied for and used enrichment funding (i) to attend conferences and present their SURE research (e.g., Midwest Student Regional Conference for the Association of Applied Sport Psychology and American Academy of Forensic Sciences 71st Annual Scientific Meeting) or (ii) to purchase supplies (e.g., antibody to understand nervous system development in zebra fish, pathology reports for toxicity analysis of arthritis drug, and equipment to record voices for sociolinguistic research) to extend their SURE research.



2018 WVU SURE participants after the culminating poster symposium. (Photo Credit: Kevin Walden).

We are fortunate to have faculty members willing and excited to mentor undergraduates in research. More than 65 individual faculty members mentored SURE participants in research during the 2018 SURE program. Other WVU faculty members, staff, and graduate students offered workshops and trainings on a volunteer basis. A few examples of these offerings are shown in Table 2. We send a heartfelt thank you out to the entire WVU community without whom the SURE program would not be a success!



2018 SURE participants in action at the Speed Research Networking event (akin to speed dating). Students had 4 min. each to discuss their SURE research with a peer. (Photo Credit: Kevin Walden)



2018 SURE participants attend a workshop on how to create an effective research poster. (Photo Credit: Kevin Walden)

Table 2. Workshops, trainings and other events offered to SURE participants and the broader WVU community as part of the 2018 SURE program.

Title	Presenter
Scholarly Publishing	Dr. Ian Harmon, Scholarly Communications Librarian
First Generation Student Workshop	Dr. Sarah Farris (Biology), Dr. Lisa DeFrank-Cole (Leadership Studies), Dr. Christa Lilly (Public Health), Dr. Nicholas Turiano (Psychology), & Dr. Michelle Richards-Babb (Chemistry)
Career Mentoring Panel: Academia vs. Non-Academia	Dr. Brian Ballentine (English), Dr. Todd Hamrick (Engineering), Dr. Steve Valentine (Chemistry), Dr. Renee Nicholson (Multidisciplinary Studies), & Dr. Carrie White (AVP Entrepreneurship and Innovation)
Interviewing Skills: Ace the Interview	Jessie Barclay, Career Development Specialist, & Çağla Çelik, WVU Career Services
Graduate Student Panel: The Real Story	Current WVU Graduate Students from Various Programs Across Campus (organized by the IGERT Graduate Fellows & Dr. Kimberly Quedado, Assistant Director, Office of Undergraduate Research)
Professional Etiquette	Dr. Betty Mei, Special Assistant to The Associate Provost for Graduate Academic Affairs, WVU
Ice Cream Social & Graduate Recruiters	Shelly Quance, Director, Office of Graduate Admissions and Recruitment, WVU & College/Department Graduate Recruiters
Volunteer Scientist Service Learning Experience	Zachariah Fowler, Clinical Assistant Professor, Arboretum Director
Prestigious Scholarships	Amy Cyphert, Director, and Cate Johnson, Assistant Director, WVU ASPIRE Office
Speed Networking: Communicating Your Research	Current SURE & REU Participants (organized by IGERT Fellows & Michelle Richards-Babb)
Creating an Effective Research Poster	Dr. Michelle Richards-Babb, Associate Professor of Chemistry, WVU
National Science Foundation Graduate Research Fellowship	Leigh Pratt, Program Coordinator, ASPIRE Office

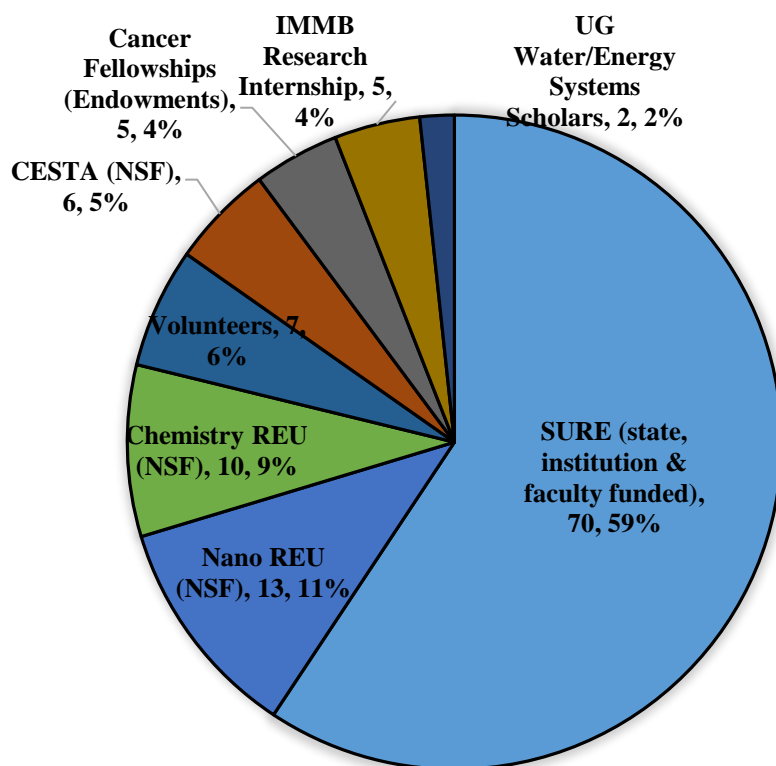


Summer undergraduate researchers attending the Ice Cream Social & Graduate Recruiter event learning about graduate opportunities in medicine. (Photo Credit: Kevin Walden)



Dr. Quedado introducing a graduate student panel about to provide tips and insight on graduate school to summer undergraduate researchers. (Photo Credit: Kevin Walden)

WVU-Based Summer Programs, By the Numbers: The SURE program is one of several structured summer undergraduate research programs that take place on the WVU campus each summer. Though the SURE program mainly serves West Virginia students, many of whom attend WVU; other programs (e.g., Chemistry REU, NanoSAFE REU; Water and Energy Systems Scholars; Cancer Institute Summer Undergraduate Research Fellowship) serve non-WVU students as well. The Office of Undergraduate Research works with program directors and faculty members to coordinate educational programming including professional development. All students participating in summer undergraduate research or creative endeavors at WVU are invited to submit an abstract for and present their research in poster form at the Summer Undergraduate Research Symposium. Of the 118 undergraduates involved in summer research (i) 111 were involved through a structured summer program and 7 were volunteering in research; (ii) 90 (76%) were WVU students and 28 (24%) were visiting students; and (iii) 110 presented at the 2018 Symposium. A breakdown of summer undergraduate participants by funding source is given in the pie chart.





2018 Chemistry and NanoSAFE REU participants, all non-WVU undergraduate students, visiting the National Institutes of Standards and Technology in Gaithersburg, MD for a scientific tour. WVU faculty member Brian Popp and WVU graduate students, Steve Knowlden and Lindsay Veltri, chaperoned. (Photo Credit: Brian Popp)



2018 Chemistry REU participant Tiffany Taylor, a chemistry major from Coker College, synthesizing boracarboxylated vinyl arenes in a glovebox. (Mentor: Dr. Brian Popp). (Photo Credit: Steve Knowlden)

External Programs

NIST Summer Undergraduate Research Fellowships (NIST SURF): Each year, the Office of Undergraduate Research submits institutional proposals containing WVU student applications for the NIST SURF programs. NIST is the National Institute of Standards and Technology (NIST) and has governmental research laboratories in Gaithersburg, MD and Boulder, CO. The SURF programs provide undergraduates with an 11-week paid summer research experience at NIST. The Gaithersburg, MD program accepts 120+ students and the Boulder, CO program accepts only 20 students each summer from a nationwide pool of applicants. Thus, the NIST SURF application process is competitive and students must be nominated by their home institution. The Office of Undergraduate Research submitted SURF applications for a total of 9 WVU undergraduates in 2018 (8 for NIST SURF-Gaithersburg and 3 for NIST SURF-Boulder). Five of our undergraduates were made offers – two for NIST SURF-Gaithersburg and three for NIST SURF-Boulder. All five accepted and carried out research at NIST for 11-weeks during summer 2018. We are very proud of their accomplishments. In fact, Katrina Rupert and William Howard were two of the three co-chairs for the NIST SURF-Boulder end-of-summer Colloquium. What a great way to represent WVU at the national level!

“Attending NIST SURF Boulder was one of the most formative experiences I’ve had. I’m happy to have been able to represent WVU. Participating in this program solidified my decision to attend grad school for Electrical Engineering.” - Quote from William Howard (WVU Electrical Engineering major)

Our 2018 NIST SURF participants and their research were:

The Effects of Chlorine Exposure on the Performance and Morphology of Polyamide Membranes. **Nicholas Strogon**, Valencia Witherspoon, and Christopher Stafford. (Nicholas is a senior majoring in Mechanical Engineering at WVU from Bridgeport, WV. He aspires to attend graduate school for a Ph.D. in Materials Science.)

Monte-Carlo Exploration of Focused Neutron Guide Geometries. **Samantha Isaac**, Leland Harriger. (Samantha, from Silver Spring, MD, has now graduated from WVU as a Physics and Mathematics double major. Currently, she is a graduate student in the Physics Ph.D. program at the University of Illinois, Urbana-Champaign.)

Development of Test Cases for 3GPP Release 14 Mission Critical Services. **William Howard** and Jason Kahn. (William is a senior majoring in Electrical Engineering at WVU from Morgantown, WV. He intends to complete a graduate degree in RF communications.)



WVU's 2018 NIST SURF participants (left to right): Katrina Rupert, Mikal Dufor, Nicholas Strogon, William Howard, and Samantha Isaac. (Photo Credit: WVU Photographic Services)

Characterization of Vapor Pods via PLOT-Cryoadsorption. **Katrina M. Rupert**, Tara Lovestead, and Megan Harries. (Katrina is a senior majoring in Forensics & Investigative Science at WVU from Stafford, VA. She plans to either attain a master's degree in Forensic Science or pursue a Forensic Law degree.)

Development of a 776-nm Extended-Cavity Diode Laser for Low-Noise Detection of Laser-Cooled Rubidium Atoms. **Mikal T. Dufor**, Elizabeth A. Donley, Kaitlin Moore, and James McGilligan. (Mikal is a senior majoring in Physics at WVU from Parkersburg, WV. He plans to earn a Ph.D. in Physics. His dream job is to work at NASA or SpaceX.)

Academic Year Programming

Research Apprenticeship Program (RAP): Undergraduate research at WVU has gone from an optional activity localized in STEM departments to an activity used in recruitment and retention (or persistence) of students from all majors. Pilot efforts to involve students in research as early as their freshmen year via the academic year Research Apprenticeship Program (RAP), modelled after the University of Michigan's Undergraduate Research Opportunity Program (UROP), began in Fall 2017. RAP goals are to expand scholarly opportunities for undergraduate students, facilitate their introduction to the concept of scholarship in their field, and improve their retention within the major and at WVU. Engaging with faculty members on research projects allows students to discover what they want to do in life while gaining valuable experience for their resume. While much of the exploration begins with fundamental skills, the student has an opportunity to make significant contributions to the research in their field. With these early career experiences, students are better positioned for prestigious scholarships, leadership positions, and more intensive research. RAP allows students to engage in research using federal work-study funds or for research credit. All RAP participants enroll in a coordinating Introduction to Research course (HONR 297) for each of two academic semesters. Over the past year, Dr. Kimberly Quedado has developed RAP, its curriculum and programmatic foundation, as informed by modules (e.g., mentor-mentee agreement,

fostering research self-efficacy, general public abstract) developed by the University of Wisconsin's National Research Mentoring Network (NRMN) and "Entering Research: A Facilitator's Manual".

In the pilot year, 52 undergraduates engaged in RAP-Part I (first semester, introductory experience) during Fall 2017. In Spring 2018, 43 continuing to RAP-Part II (second semester leveraging curriculum) and 33 additional undergraduates were recruited into RAP-Part I, ending the pilot year of RAP. In Fall 2018, 22 RAP "graduates" (completed RAP Parts I & II) continued in research endeavors, 18 continued into RAP-Part II, and 146 additional undergraduates (97 Federal Work Study eligible) were recruited into RAP-Part I. Table 3 tabulated the numbers of RAP participants engaging in research each semester. About 67 of the 85 RAP participants during the pilot 2017-18 academic year received Federal-Work Study funding to engage in research. Dr. Natalie Shook (Psychology) and Dr. Paul Hernandez (Educational Psychology) are assessing the RAP program. Preliminary outcomes from the pilot RAP program indicate that Spring 2018 to Fall 2018 persistence of RAP participants relative to a propensity score matched non-RAP cohort is higher with an odds persistence that is four times higher. In addition, RAP participants are developing stronger *Researcher Identities*, a strong predictor of intention to pursue a research career.

Table 3. Number of students engaged in research via the Research Apprenticeship Program (RAP) from the pilot year (Fall 2017) and projected (*) into the Spring 2019 semester (assuming 100% persistence in RAP or research).

RAP Course	Fall 2017	Spring 2018	Fall 2018	Spring 2019*
RAP-Part I	52	33	146	40*
RAP-Part II		43	18	146*
RAP Graduates			22	40*
Totals	52	76	186	226*

The Fall 2017 pilot cohort of RAP participants ($N = 43$) culminated their research experience with poster presentation at the Spring 2018 Undergraduate Research Symposium. Overall, 45 of the 106 symposium presenters were RAP participants who demonstrated significant progress in their research and an ability to present their work as they accumulated 7 of the symposium's 18 judged awards. The event programming also included a RAP exclusive banquet at which students completing two semesters of RAP Programming were presented with a completion certificate.



Category winners and runner ups at the Spring 2018 Undergraduate Research Symposium. Those circled in red were participants in the pilot RAP program. (Photo Credit: Kevin Walden)

Preliminary success of the pilot RAP program has resulted in its rapid expansion. RAP currently facilitates the research efforts of 186 undergraduates with 4 acting as spokesman for the Office of Undergraduate Research and role models at various WVU event. Dr. Quedado manages all aspects of the RAP program (administration and coursework) with assistance from four graduate students, Sloane Glover (Educational

Psychology), Carinna Ferguson (Educational Psychology), Jenna Wilson (Psychology), and Nathan Altman (Counseling). We are all very appreciative of Dr. Quedado's efforts.

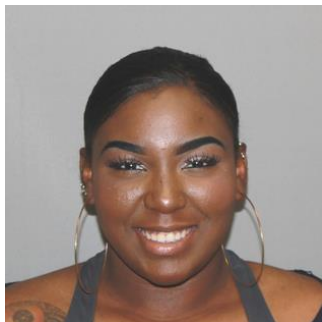
"I would totally recommend the RAP program to students as it is a great opportunity to get to know more about your major and what research is like as well as an excellent resume builder. Not only that but you meet a lot of cool people. You come to treasure all the experiences you have with the RAP program."-Quote from Pilot RAP participant (2018)

"It was helpful being able to learn with my mentor and also paralleling that experience with class."
-Quote from Pilot RAP participant (2018)

Undergraduate Research Ambassadors: In Fall 2018, the Office of Undergraduate Research launched new peer mentoring, the Undergraduate Research (UGR) Ambassadors, to bolster outreach to undergraduates and enlist the support of students with an exceptional history of conducting undergraduate research. The UGR Ambassador program also supports its participants by providing them a means to earn federal work study hours. For the program's launch, faculty and graduate teaching assistants nominated students based on their enthusiasm for undergraduate research and commitment to their fields of study. Ultimately, six students were selected to represent the office through its programming and recruitment.

Throughout the fall 2018 semester, ambassadors have represented the office and advocated for undergraduate research in classes for the RAP program, RA staff meetings in Lincoln and Honors Hall, WVU Discover Days, Intro to Undergraduate Research Networking Events hosted by the Office of Undergraduate Research, and the Humanities Colloquium hosted by the WVU Mountaineer Musicological Community on September 15th. They are also in the process of developing content for the office's website and social media platforms by interviewing undergraduate researchers and writing blogs on their interview subjects.

Students serving as ambassadors in the fall 2018 cohort include:



Kenyane Simpson, Junior, Speech Pathology and Audiology (Kenyane is a RAP graduate and participated in the 2018 SURE program.)



Kayla Tokar, Junior, Music (Kayla is a RAP graduate and participated in the 2018 SURE program.)



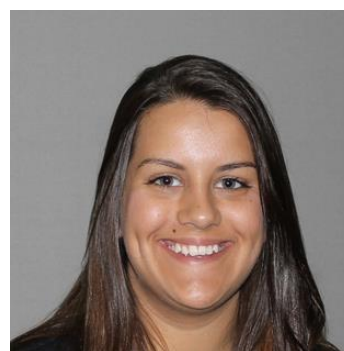
Aaron Malkowski, Sophomore, Immunology and Medical Microbiology (Aaron is a RAP graduate)



**Mya Vannoy, Junior,
Immunology and Medical
Microbiology (Mya
participated in the 2018
SURE program.)**



**Trinity Shaver, Senior,
Psychology/Multidisciplinary
Studies (Trinity completed the
McNair Scholar Program and
participated in the 2018 SURE
program.)**



**Maria Mace, Sophomore,
Immunology and Medical
Microbiology (Maria is a RAP
graduate.)**

Funding to Support Undergraduate Research and Creative Endeavors: The Office of Undergraduate Research is actively pursuing funding to support undergraduate research and creative endeavors. For instance, in June 2017 the Office of Undergraduate Research wrote and submitted a proposal to the Arnold and Mabel Beckman Foundation to fund a Beckman Scholars Program based at WVU. If selected for funding, the Foundation would provide a total of \$156,000 (for student stipends, scientific supplies/travel and mentor stipends) to fund six (6) high-achieving students with the potential to excel in research in the areas of biology, biochemistry, chemistry, and medical sciences as well as interdisciplinary combinations of these fields. Though the 2017 proposal was not funded, the proposal was re-submitted in June 2018 for the 2019 competition. We heard in late September that our submission has “successfully completed phase one of the 2019 Beckman Scholars Program selection procedure” and “is now one of 24 finalists that will be considered for final review”. Keep your fingers crossed!

In addition, UGR regularly supports faculty members who include funding for undergraduate researchers in their research proposals. UGR provides typical funding levels (e.g., stipends, housing, meals, etc.) for undergraduate researchers or sites and a list of UGR offered summer events (e.g., workshops, career mentoring speakers, networking events) and academic year activities (e.g., NSF GRF workshop) that support undergraduates in research. UGR offers advice on administering an undergraduate research site or a few undergraduates in research. For instance, we provide template offer letters and contracts, mentoring handout, advice on how to set up stipend pay, and contacts for housing, Mountaineer cards and supplemental insurance. We have provided this type of pre- or post-funding support to Shawn Grushecky (Energy Land Management), Brenden McNeil (Geography), Cerasela Zoica Dinu (Chemical and Biomedical Engineering), Yu Gu (Mechanical and Aerospace Engineering), and Brian Popp (Chemistry).

Student Opportunity Center (SOC): For 2018-2019, the Honors College has purchased limited access (500 WVU users) to the SOC, a search engine for finding relevant, nationwide experiential learning opportunities such as paid summer research, internships at national/governmental labs or agencies, conferences, and student journals.

The Office of Undergraduate Research has hosted workshops to encourage students to sign up on the SOC platform and instruct them on its use. SOC users will be surveyed about their experience with the system and its usefulness in finding and applying for research opportunities. If the SOC proves invaluable in increasing student access to external research experiences, the Office of Undergraduate Research will consider renewing the SOC license beyond the 2018-2019 pilot year and incorporate its funding in the

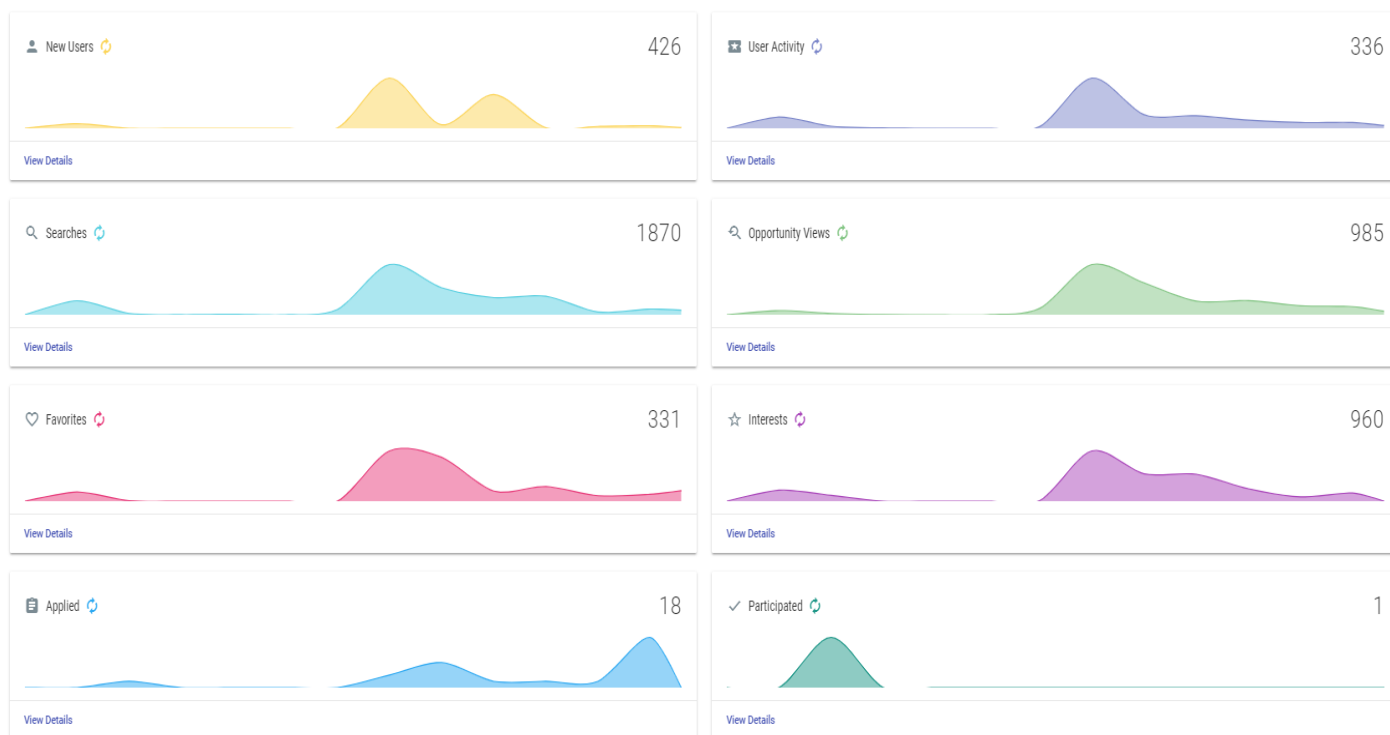
office budget, possibly with the collaboration from other WVU offices and departments that benefit from the SOC.

Social Media Outreach and Updated Website: Starting in spring 2018, the Office of Undergraduate Research expanded its reach on social media to communicate more extensively with students and faculty members about office programming, opportunities, and deadlines. Results from office surveys indicate that students have a strong preference for learning about research announcements and events through Twitter or Instagram. Over the past year, enhanced UGR online presence has facilitated more communication with students and faculty and assisted in the marketing of undergraduate research activities at WVU.





Since spring, social media accounts for Facebook and Twitter have grown by large percentages in terms of posts, followers, and audience engagement. For example, the audience for Facebook has grown by a factor of 10 and the audience for Twitter has quadrupled in terms of its followers. This year, the office also created accounts for Instagram and Snapchat to promote current events and showcase student work. Instagram proved to be the most popular account with students - gaining 213 followers over 6 months. Through Snapchat, Geofilters (location-specific digital picture frames) were customized for the spring and summer symposia and students used these frames to learn about the times and locations for the symposia, promote events, and invite friends and family to see their presentations.



In addition to social media outreach, the office has collaborated with University Relations to help advertise office activity. T-shirts, for example, were designed for 2018-2019 and have been spotted at events like new student orientation where student leaders wore their best blue and gold.



Screenshot of SOC analytics between September and October 2018. Within a month, 426 students have been registered to use the SOC, and 18 students have applied for upcoming internship and scholarship opportunities. Student users have tagged 331 opportunities and may apply to them as deadlines approach.

				
Spring 2018	1 post, 6 likes and followers	22 tweets, 34 followers	NA	NA
Fall 2018	41 posts, 65 likes and 69 followers	105 tweets, 127 followers	33 posts, 218 followers	2 geofilters produced for spring and summer symposia

Outreach to Students and Faculty in the Arts and Humanities:

In October, the Office of Undergraduate Research invited Dr. Radhica Ganapathy (Theatre History & Criticism) and Dr. Nancy Caronia (English) to attend CUR's Creative Inquiry in the Arts & Humanities Institute at the University of Montana in Bozeman, Montana as part of a team. The purpose of the Institute was to "assist campus-based teams in developing transformative opportunities for Undergraduate Research, Scholarship, and Creative Activity (URSCA) in the arts and humanities." At the Institute, the team developed an action plan with the overarching goal of establishing faculty community surrounding undergraduate research. Short-term goals included revamping UGR's Advisory Council with more purposeful inclusion of Arts and Humanities faculty members and short-term commitments (2 yr max.). Broadened faculty participation will bring more awareness to faculty members about UGR – its programs and how UGR can aid faculty members. In addition, the team determined that (i) more focused outreach on faculty, especially in the Arts and Humanities; (ii) inventory and advertisement of WVU's existing creative and scholarly structures (e.g., *Calliope* and Lab Theatre); and (iii) expansion of the annual Undergraduate Spring Symposium to better support Arts and & Humanities students (i.e., oral and performance presentations) are needed.

UGR assisted the WVU Mountaineer Musicological Community with their Symposium entitled "*Trailblazers and Hellraisers: Perspectives in the Humanities*." Six oral presentations from the arts and humanities were presented by graduate students from History, Art History, Literary and Cultural Studies, and Musicology. UGR aided in advertisement and cover page art and provided symposium day refreshments. UGR Director, Michelle Richards-Babb, attended the Symposium and learned the methods used by arts and humanities researchers when presenting scholarship.



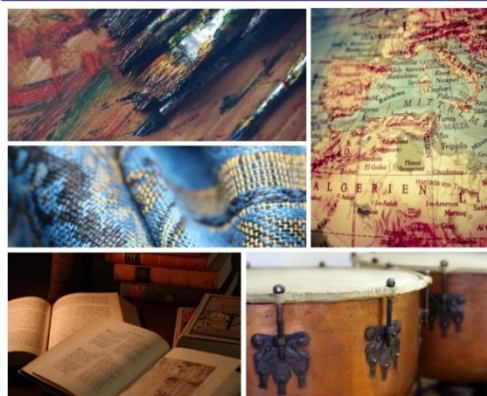
Dr. Radhica Ganapathy (Theatre), Dr. Michelle Richards-Babb (Director, UGR), Dr. Nancy Caronia (English), Dr. Kimberly Quedado (Asst. Director, UGR), and Kevin Walden (Program Specialist).

The Mountaineer Musicological Community Presents:

TRAILBLAZERS AND HELLRAISERS

Perspectives in the Humanities

Saturday • September 15th • 2018
Creative Arts Center
West Virginia University



West Virginia University
OFFICE OF UNDERGRADUATE RESEARCH

West Virginia University
SCHOOL OF MUSIC

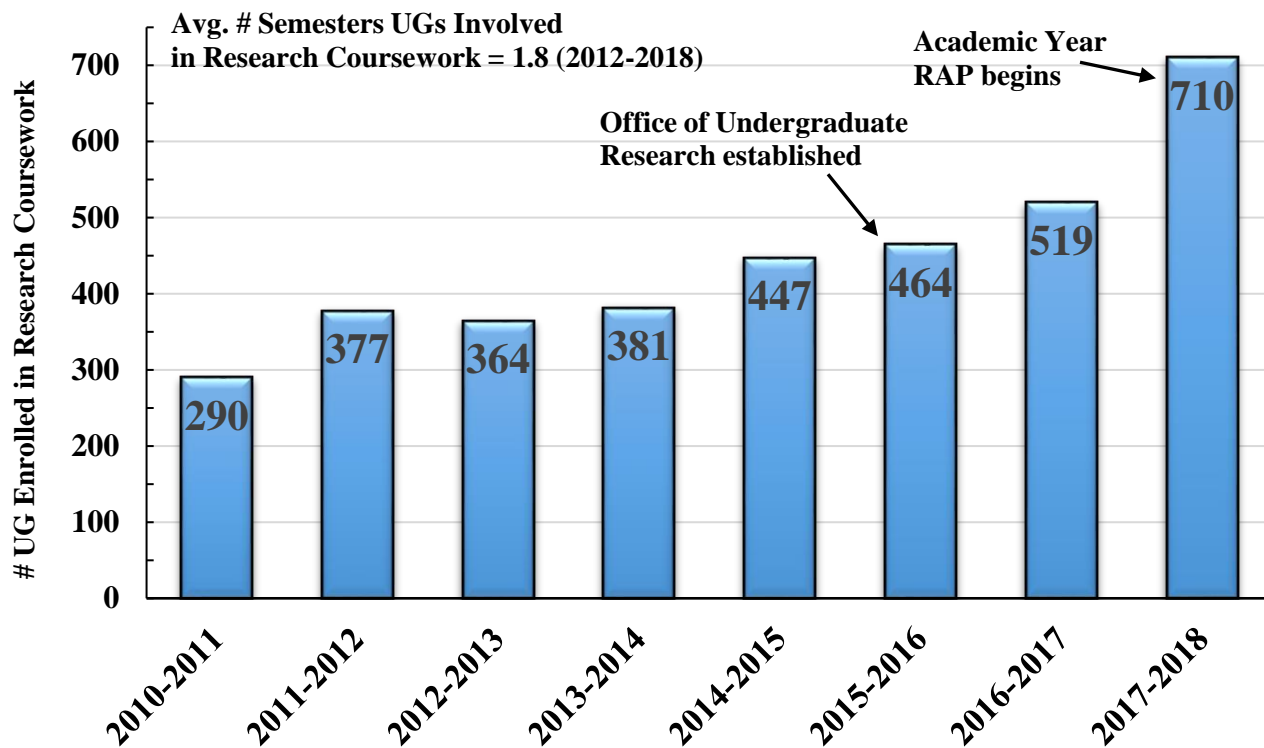
West Virginia University
HUMANITIES CENTER

In addition, to spread the word about undergraduate research and its benefits, UGR has been visiting faculty during departmental meetings. Thus far, we have visited with faculty in seven different departments (Sociology, Biology, Physics, Finance, Pharmaceutical Systems and Policy, Anatomy Division, and

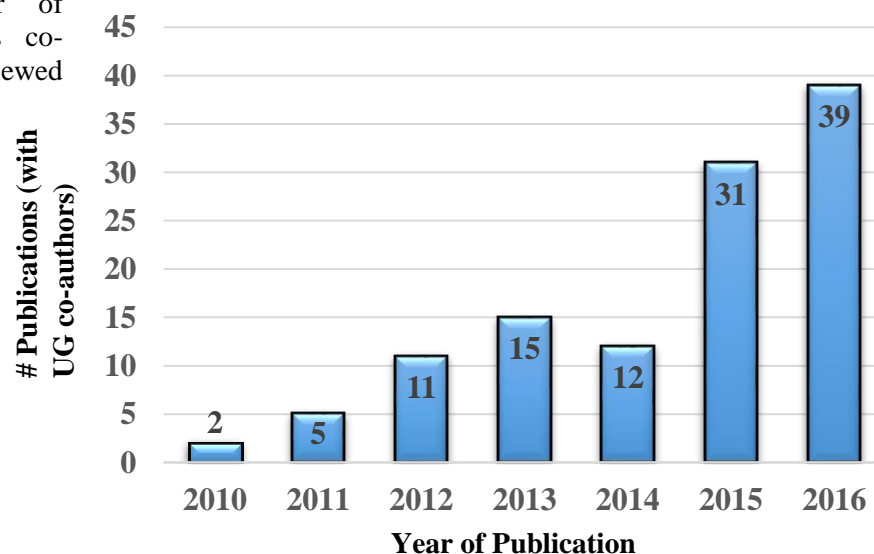
Mechanical and Aerospace Engineering). Visits with ten additional departments (e.g., Coaching & Teaching Studies, Design & Community Development, and History) are scheduled in November/December.

Preliminary Institution-Wide Outcomes

The Office of Undergraduate Research is engaged in institution-wide tracking of undergraduate research activities. The number of undergraduates involved in scholarly activities as measured by student enrollment in research (297 and 497) coursework at WVU has increased dramatically since 2010-2011.



As well, the number of undergraduates listed as co-authors on peer-reviewed publications continues to increase. UGR will continue to monitor engagement in undergraduate research using these and other metrics.



Vision and Mission

Vision: West Virginia University's Office of Undergraduate Research envisions its program as one that will contribute to world-changing discovery and innovation, academic engagement, and excellence through its focus on scholarly inquiry that prepares students to create the ideas and opportunities that shape and advance our state, nation, and world.

Mission: The Mission of the Office of Undergraduate Research at West Virginia University is to enhance academic excellence through undergraduate research and creative endeavors. We connect undergraduate students, who have strong and committed interests in research and creative endeavors, to faculty members, programs, and research-related opportunities that are aligned with their interests. As the home of the *WVU Summer Undergraduate Research Experience (SURE)* program, we foster a culture of academic engagement by providing unparalleled opportunities for student participation in research. We work to institutionalize undergraduate research and creative endeavors as a key component of the educational experience across all disciplines at West Virginia University.

For undergraduate students, the Office of Undergraduate Research:

- offers on-campus programming including symposia and summer undergraduate research opportunities;
- connects students with on-campus research opportunities;
- connects students with off-campus/external research opportunities;
- offers advice on applying for and enhancing applications to undergraduate research opportunities (on-campus and off-campus);
- offers advice on finding travel funding and preparing research for presentation;
- connects students with opportunities to present their scholarly work; and
- connects student researchers with faculty research mentors.

For faculty, the Office of Undergraduate Research:

- connects faculty members with student researchers;
- aids faculty members in supporting undergraduate research activities;
- provides budgetary templates and language for inclusion of undergraduate researchers in proposals;
- aids faculty in writing proposals to support undergraduate research sites;
- offers on-campus programming for undergraduate researchers; and
- acts as a resource for undergraduate scholarly investigations across WVU.

**Office of Undergraduate Research
305/306 Student Services Center
West Virginia University
Morgantown, WV 26506-6212
undergraduateresearch.wvu.edu**

