

2017 Annual Report

Office of Undergraduate Research



West Virginia University®

OFFICE OF UNDERGRADUATE RESEARCH

On the cover (clockwise from top left):

(i) **Patrick Bayly** (South Charleston, WV), a B.F.A. painting major and 2017 SURE participant (Faculty Advisor: Naijun Zhang), using his supplies purchased with enrichment funding to continue his creative work on traditional history paintings. (Photo Credit: Patrick Bayly); (ii) **Attendees and undergraduate presenters** at the 1st Annual Undergraduate Spring Symposium that was coordinated with WVU Decide Day for prospective students and parents. (Photo Credit: Kevin Gooding); (iii) **Patrick Thomas** (Hurricane, WV), a biochemistry major, Honors student, 2017 SURE participant (Faculty Advisor: Laura Gibson) and president of the Undergraduate Research Association student club, presenting at the Introduction to Undergraduate Research Workshop. (Photo Credit: Hellen Nditsi); (iv) **Some of the 200+ attendees** at the Introduction to Undergraduate Research Workshop listen to speakers prior to group breakout and peer mentoring by a seasoned undergraduate researcher. (Photo Credit: Hellen Nditsi); (v) **Sydney Brooks** (Albuquerque, NM), a chemistry major and undergraduate researcher (Previous Faculty Advisor: Suzanne Bell), spent summers 2016 and 2017 at the National Institute for Standards and Technology (NIST) researching instrumentation used for forensic examination of artificially aged fibers. (Photo Credit: WVU Photographic Services)

2017 Office of Undergraduate Research Administration

Dr. Michelle Richards-Babb	Director, Office of Undergraduate Research & SURE
Dr. Kimberly Quedado	Assistant to Director, Office of Undergraduate Research & Director, RAP
Ms. Hellen Nditsi	Program Coordinator (Hellen is now a graduate student in education)

2017 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	Assistant Professor, Microbiology, Immunology & Cell Biology
Dr. Richard Thomas	Department Chair and Professor, Biology
Dr. Sam Zizzi	Professor, Sport and Exercise Psychology

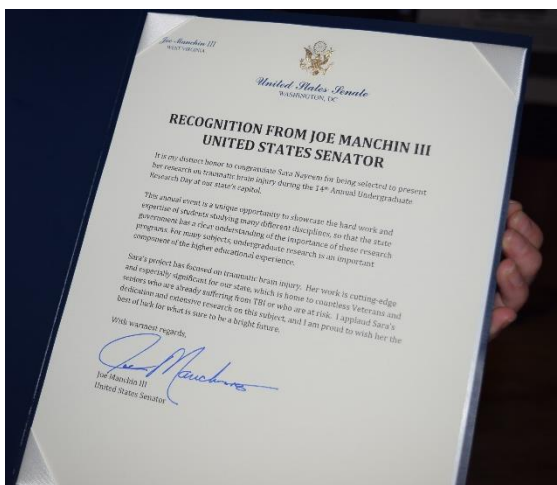
2017 WVU Undergraduate Research Programs*

- [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: WV HEPC)
- [Neuroscience Summer Undergraduate Research Internships \(SURI\)](#), Center for Neuroscience (Director: George Spirou; Funding: NIH)
- KY-WV Louis Stokes Alliance for Minority Participation (LSAMP) (Director: David Miller; Funding: NSF)
- [Research Apprenticeship Program \(RAP\)](#), Office of Undergraduate Research & Honors College (Director: Kimberly Quedado; Funding: WVU & Federal Work Study Program)
- [Community Engagement in Science Through Art \(CESTA\)](#), C. Eugene Bennett Department of Chemistry (Director: Jessica Hoover; Funding: NSF)
- [Cancer Summer Research Fellowship Program](#), WVU Cancer Institute (WVUCI) (Director: Alexey Ivanov)
- [McNair Scholars Program](#) (Director: Betty Mei; Funding: U.S. Dept of Education)
- [NASA West Virginia Space Grant Consortium \(WVSGC\) Undergraduate Research Fellowship Program](#) (Coordinator: Candy Cordwell; Funding: NASA)

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

2017 Highlights, by the Numbers

- 1** Student representing WVU at Posters on the Hill in Washington, D.C.
- 2** Students participating in NIST Summer Undergraduate Research Fellowships.
- 2** Faculty awardees for Distinction in Mentoring Undergraduates in Research.
- 4** Students representing WVU at the National Conferences on Undergraduate Research.
- 13** Non-STEM participants in summer and fall research.
- 14** Judges at the 9th annual Summer Undergraduate Research Symposium.
- 14** Winners and runner-up awards at the 9th annual Summer Undergraduate Research Symposium.
- 19** Students supported in presenting their scholarly investigations at national and regional conferences.
- 39** WVU students participating in the 14th annual Undergraduate Research Day at the Capitol.
- 53** Students engaging in research and creative endeavors in the fall pilot of the Research Apprenticeship Program (RAP).
- 64** Students engaging in research and creative endeavors via SURE.
- 95** Faculty who submitted applications to mentor undergraduates in RAP.
- 105** WVU students presenting at the 1st annual Undergraduate Spring Symposium.
- 108** Students presenting at the 9th Summer Undergraduate Research Symposium. (75 from WVU, 1 from WVUIT, and 32 visiting students)
- 134** Students involved in scholarly activity at WVU in one of nine different summer programs (36 visiting students).
- 217** Student applications to the SURE Site.



Recognition from U.S. Senator Joe Manchin III to a WVU student who presented at the 14th annual URDC event in February 2017. (Photo Credit: Kimberly Quedado)

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.

2016 Awardee: Dr. James Smith, Mechanical and Aerospace Engineering



“Dr. Smith has created an interesting and effective model of identifying the more mature engineering undergraduates and pairing them with more seasoned students. He uses specialized coaching and mentoring techniques to turn such students into highly productive researchers, even as early as sophomores and juniors.”

- Quote from Nomination Letter

2017 Awardee: Dr. Kirk Hazen, English & Linguistics



“A crucially important feature of Professor Hazen’s scholarship, and one that is particularly germane to this deliberation, is the consistent way it involves undergraduates in a major research undertaking. The WVDP is peopled every day of the week by eager and talented students who are mentored by Professor Hazen in the practice of conducting sociolinguistic interviews with native Appalachians.”

- Quote from Nomination Letter

2017 Awardee: Dr. Natalie Shook, Psychology



“Dr. Shook includes a small army of undergraduates in her research lab every year. She is highly sought-after among the undergraduates because she provides such high-quality research supervision. She often acts as a sponsor – promoting her URAs and offering a range of additional professional experiences, such as presenting at national conferences. She has supervised dozens of psychology students and is a special favorite among the McNair Scholars.”

- 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 2017 Undergraduate Research Day at the Capitol in Charleston, WV. (Photo Credit: Hellen Nditsi)

In 2017, the WVU Office of Undergraduate Research took over management and organization of the URDC event from Cate Johnson of the WVU ASPIRE Office. For the 14th Annual Undergraduate Research Day at the Capitol that took place on Friday, February 24, 2017, Cate served as an advisor to ensure the event's success. A total of 174 separate abstracts were submitted for presentation at the 2017 URDC event. Of those, 106 abstracts from undergraduate students attending 14 different West Virginia institutions, including 39 from WVU, were selected. Presenters showcased research in fields ranging from Anthropology, Architecture and Biology to Sociology, Sports Coaching, and Women's Studies.

At the 2017 URDC event, the House of Delegates of the West Virginia State Legislature recognized the importance of undergraduate research and creative endeavors to the State of West Virginia and honored the URDC presenters with a legislative citation. Select URDC presenters were invited to represent their institutions on the House floor.



Select URDC presenters being recognized on the House floor. (Photo Credit: WV Legislature Photos)



Spectators fill one of the three galleries above the House floor. (Photo Credit: WV Legislature Photos)

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 9th annual Summer Undergraduate Research Symposium was hosted by the WVU Office of Undergraduate Research on Thursday July 27, 2017. Of the 108 undergraduate presenters, 75 attended WVU, 1 attended WVU Tech and 32 were visiting students (e.g., Waynesburg University, St. Vincent College, Bethany College, St. Francis University, West Virginia Wesleyan College). Posters were divided into eight different judged categories (e.g., Agricultural and Environmental Sciences, Biological Sciences, Engineering, Health Sciences, Nanoscience, Neuroscience, Non-STEM and Physical Sciences) with a total of 14 judges, 13 judges from the WVU community and 1 judge from NIOSH. The WVU community, including the presenters' research groups, as well as the general public, including family, were invited to attend. The 2017 Symposium was so well attended that parking at the Alumni Center was scarce. Thanks to all those who attended!



Non-STEM presenters, Mykal Manswell (Sport and Exercise Psychology major) and Natalie Marquart (Marketing major) discussing their research with Symposium attendees. (Photo Credit: Hellen Nditsi)



Judges for the 2017 Summer Undergraduate Research Symposium. (Photo Credit: Hellen Nditsi)

Eight presenters were selected as winners in their categories and six presenters were selected as runner-ups. Category winners and runner-ups from the 2017 Symposium were:

Agricultural & Environmental Sciences Category (10 posters)

Winner: *Acid mine drainage coated sand as a soil amendment and phosphate removal system.* **Alex Rubenstein**, Karen Buzby and Lian-Shin Lin. (Alex, a biomedical engineering & mathematics double major and Honors student at WVU from Morgantown, WV, was a participant in the SURE program and was funded primarily via a faculty grant awarded to Lian-Shin Lin.)

Biological Sciences Category (14 posters)

Winner: *Increase in mutant Huntingtin protein aggregation leads to decrease in protein-lipid interaction.* **John Bard**, Albert W. Pilkington, IV and Justin Legleiter. (John, a biochemistry major and Honors student at WVU from Richwood, WV, was a participant in the SURE program and was funded primarily via a faculty grant awarded to Justin Legleiter.)

Runner Up: *Ergot alkaloids in bioactive Metarhizium species fungi.* **Caroline E. Leadmon** and Daniel G. Panaccione. (Caroline, a biochemistry major and Honors student at WVU from Hurricane, WV, was a participant in the SURE program.)

Engineering Category (17 posters)

Winner: *A paper-based lateral flow strip for detection of traumatic brain injury protein biomarker.* **Devan J. Shell**, Xuefei Gao and Nianquiang (Nick) Wu. (Devan, a chemistry major from Catawba College, was a participant in the NSF-funded Nano REU program.)

Runner Up: *Robust empirical modeling of stream Chlorophyll-a across time and space: scaling by a single reference observation.* **Brittany I. Brush**, Omar I. Abdul-Aziz and Mohammad A.Z. Siddik. (Brittany, a geology major at WVU from Savannah, GA, was a participant in the SURE program and was funded via the NSF LSAMP KY-WV Mid-Level Alliance Phase II grant.)

Health Sciences Category (16 posters)

Winner: *Inhibition of mitochondrial respiration in Acute Lymphoblastic Leukemia within the bone marrow microenvironment.* **Patrick M. Thomas**, Rajesh R. Nair, Debra Piktel, Werner Geldenhuys, John Hollander and Laura F. Gibson. (Patrick, a biochemistry major and Honors student at WVU from Hurricane, WV, was a participant in the SURE program.)

Runner Up: *Assessment of inflammation induced by multi-walled carbon nanotubes and carbon nanofibers from U.S. facilities.* **Sarah Foster**, Kelley E. Smith-Fraser, Vamsi K. Kodali, Tracy Eye and Aaron Erdely. (Sarah, a biochemistry major from Allegheny College, was a participant in the NSF-funded Nano REU program.)

Nanoscience Category (12 posters)

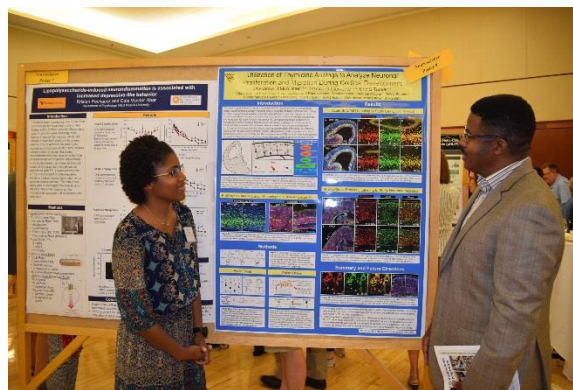
Winner: *Toxicity of inhaled welding fumes on exposed worker respiratory and reproductive cell lines.* **Karagan A. Mulhall**, Anna M. Morris, Nicole S. Olgun and Stephen S. Leonard. (Karagan, an immunology and medical microbiology major at WVU from Morgantown, WV, was a participant in the SURE program.)

Runner Up: *Harvesting waste heat for thermoelectric generation through addition of gold nanoparticles in oxide ceramics.* **James Penney**, Xueyan Song, Cullen Boyle and Cesar-Octavio Romo-De-La-Cruz. (James, a biomedical engineering major from the University of Texas at Dallas, was a participant in the NSF-funded Nano REU program.)

Neuroscience Category (14 posters)

Winner: *Utilization of thymidine analogs to analyze neuronal proliferation and migration during cortical development.* **Jawuanna H. McAllister**, Jessica G. Clemente and Eric S. Tucker. (Jawuanna, a biomedical sciences major at North Carolina Wesleyan College, was a participant in the NIH-funded Center for Neuroscience SURI program.)

Runner Up: *miR-34a targets Cytochrome C and shapes stroke outcomes.* **Edward A.P. Provencher**, Heng Hu, Stephanie Rellick, Imran Farooqi, Saumyendra N. Sarkar, Kimberly Grasmick and Xuefang



Neuroscience category winner Jawuanna McAllister and her father. (Photo Credit: Hellen Nditsi)

Ren. (Edward, a biochemistry & molecular biology double major at the University of Richmond, was a participant in the NIH-funded Center for Neuroscience SURI program.)

Non-STEM Category (10 posters)

Winner: *Machine learning in statistical arbitrage: forecasting the market to succeed during financial crisis.* **John S. Bowling**, Nathan D. Burks, Bingxin Li, Natalia A. Schmid. (John, a computer and electrical engineering major at WVU from Princeton, WV, was a participant in the SURE program.)

Physical Sciences Category (15 posters)

Winner: *Lysine location within Alzheimer's protein sequence reveals correlation to structure and membrane toxicity.* **Morgan C. Nyman**, Albert W. Pilkington, IV and Justin Legleiter. (Morgan, a biochemistry major at Gannon University, was a participant in the NSF-funded Chemistry REU program.)

Runner Up: *Mild synthesis of novel boron-based pharmaceutical candidates by copper catalysis with CO₂.* **Natalie R. Ziemer** and Brian V. Popp. (Natalie, a biochemistry major at Grove City College, was a participant in the NSF-funded Chemistry REU program.)



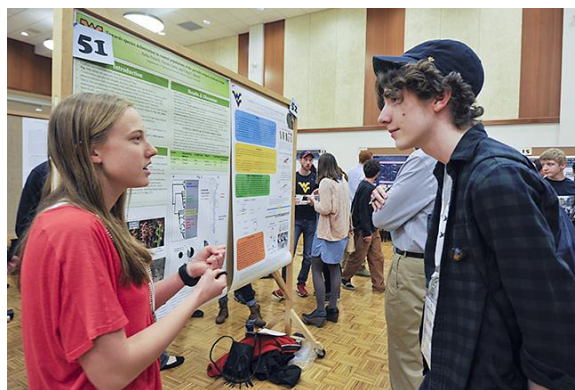
Category winners and runner-ups at the 2017 Summer Undergraduate Research Symposium.
(Photo Credit: Hellen Nditsi)

Undergraduate Spring Symposium: The 1st annual Undergraduate Spring Symposium was held on Saturday April 8, 2017. 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 the April 8 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 expect to continue this event in spring 2018.



Fine Arts-Painting major Patrick Bayly discusses his creative work entitled “Paintings of People in Places; a Renaissance Update” with a prospective student at the 2017 Spring Symposium. (Photo Credit: Kevin Gooding)



Biology major Anna French discusses her research on potential evolutionary divergence of striped coralroot orchids with a prospective student. (Photo Credit: WVU Photographic Services)

External Presentations Supported

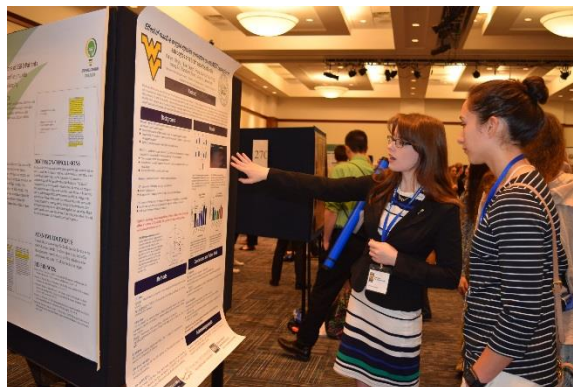
National Conferences on Undergraduate Research (NCUR): This annual Conference, offered nationwide since 1987, is the Council on Undergraduate Research’s signature undergraduate research event. It is dedicated to promoting and celebrating undergraduate research and creative endeavors in all fields and 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. This is the first year in recent memory that WVU has been represented by students at NCUR.

WVU had four undergraduate students (see below) selected to present their research at 2017 NCUR held at the University of Memphis in Memphis, TN on April 5-7. Hellen Nditsi, Program Coordinator, Office of Undergraduate Research accompanied students at NCUR.

Oral Presentation: *Targeting the metabolism of acute lymphoblastic leukemia in the bone marrow microenvironment.* **Patrick Thomas** (Patrick, a biochemistry major and Honors student at WVU from Hurricane, WV, continues to carry out research with Dr. Laura Gibson.)

Poster Presentation: *Evaluation of crown ether for extraction of inorganic gunshot residue and analysis via electrospray ionization tandem mass spectrometry (QqQ).* **Sydney Brooks** (Sydney, a chemistry major at WVU from Albuquerque, NM, carried out research with Dr. Suzanne Bell.)

Poster Presentation: *Effect of reactive oxygen species generators on mitoNEET expression in astrocytes and brain endothelial cells.* **Patricia Doyle** (Patricia, a biology major at WVU from Middlebury, VT, continues to carry out research with Dr. Werner Goldenhuys.)



WVU’s Patricia Doyle in action at 2017 NCUR. (Photo Credit: Hellen Nditsi)

Poster Presentation: *Assessment of aluminum tolerance in salix spp. For biomass production and reclamation of disturbed lands.* **Daniel Wolodkin** (Daniel, a biology and mathematics double major at WVU from Frostburg, MD, continues to carry out research with Dr. Jonathan Cumming.)

Posters on the Hill: Biochemistry major Sundus Lateef was chosen to represent WVU and the state of West Virginia at the 21st annual CUR Posters on the Hill event in Washington, D.C. held on April 25-26, 2017. Only 60 students were selected for this event out of hundreds of applicants. At this event Sundus showcased her ongoing research on the risks of drinking beverages sweetened with high fructose corn syrup to federal legislators and aides from the state of West Virginia and to representatives from federal funding agencies. In addition, Sundus learned about advocacy for undergraduate research. Hellen Nditsi accompanied Sundus to Washington, D.C. for this event.

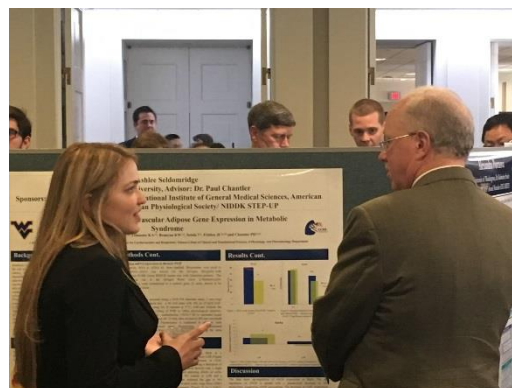


Hellen Nditsi (left) and Sundus Lateef (right) while visiting with WV legislators at the 2017 Posters on the Hill. (Photo Credit: Hellen Nditsi)

Poster Presentation: *High fructose corn syrup-55 promotes triglyceride accumulation and alters fat metabolism in the liver.* **Sundus Lateef** (Sundus, a biochemistry major and Honors student at WVU from Bridgeport, WV, carried out research with Dr. Janet Tou and Dr. Vagner Benedito. Sundus graduated in 2017 and is now in medical school at the WVU School of Medicine.)

Likewise, exercise physiology major Ashlee Seldomridge represented WVU and the state at the 20th annual Posters on the Hill event in April 19-20, 2016.

Poster Presentation: *Detrimental changes in perivascular adipose tissue gene expression in Metabolic syndrome recovered with exercise training.* **Ashlee Seldomridge** (Ashlee, an exercise physiology major and Honors student at WVU from Lewisburg, WV, carried out research with Dr. Paul Chantler. Ashlee graduated in 2016, completed a one-year fellowship in cancer research at the National Cancer Institute, and is now in medical school at the WVU School of Medicine.)



Ashlee Seldomridge (left) explaining her research at the 2016 Posters on the Hill. (Photo Credit: Paul Chantler)

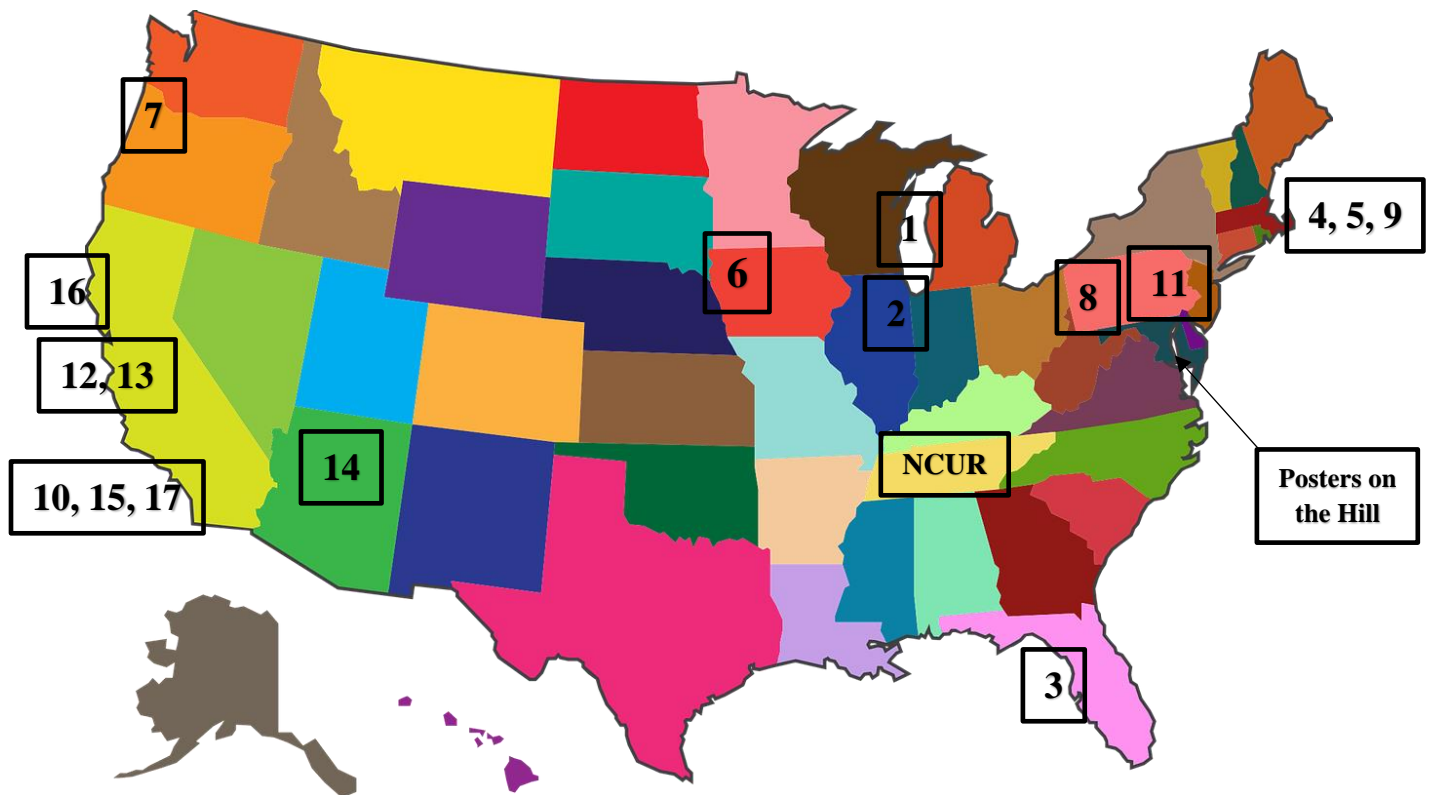
Travel Awards: The Office of Undergraduate Research offers limited travel support funding (10 per undergraduates per year) to offset the costs associated with attendance and presentation (oral or poster) of research or creative work at national or regional discipline specific conferences. The application 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 2016 and 2017, presentations by the following undergraduate students have been supported. The U.S. map, shown below the table, documents the wide geographic reach of WVU undergraduates as they traveled throughout the United States to represent West Virginia University at conferences and events.

Undergraduates supported in travel to present their scholarly activities at national or regional discipline-specific conferences. The number locators in the fourth column correlate to geographic locations on the follow up U.S. map.

Undergraduate Presenter(s) (Major)	Faculty Mentor	Presentation Title	Conference Title, Location (Number Locator)	Conference Dates
Mikal Dufor (Physics)	Earl Scime	Diagnosis of acceleration, reconnection, turbulence, and heating	59 th Annual Meeting of the American Physical Society, Division of Plasma Physics, Milwaukee, WI (1)	Oct. 23-27, 2017
Erin O’Leary (MDS), Isabella Tennant (Pre-Secondary Education & English), & Summer Krantz	Nathalie Singh-Corcoran	License to tutor: defining and communicating the Writing Center’s purpose	International Writing Centers Association Annual Conference, Chicago, IL (2)	Nov. 10-13, 2017
Tyler Plum (Wildlife and Fisheries Resources)	Amy Welsh	Temporal genetics of lake sturgeon in the Mississagii River, Ontario	147 th Annual Meeting of the American Fisheries Society, Tampa, FL (3)	Aug. 19-24, 2017
Billie Murray (Psychology)	Hawley Montgomery-Downs	Sleep validity of a non-contact bedside movement and respiration-sensing device	31 st Annual Meeting of the Associated Professional Sleep Societies (SLEEP 2017), Boston, MA (4)	June 3-7, 2017
Haley Mutz (Environmental Geoscience)	Jonathan Hall	Trashed condors: spatial dynamics of microtrash sites and California Condor movement ecology in southern California	Association of American Geographers Annual Meeting, Boston, MA (5)	April 5-8, 2017
Kassandra Colón (Women and Gender & Latin American Studies)	Cari Carpenter	La negra tiene tumbao: multimodal resistance strategies of Afro-Latinxs and other queer constructions.	“You Are Here”: An Interdisciplinary Conference on Place, Space, and Embodiment, Omaha, NE (6)	March 22-26, 2017
Hayley Harman (Biology, Psychology & Spanish)	Christina Duncan	Electronic cigarette expectancies in adolescents: differences as a function of use	Society of Pediatric Psychology Annual Conference, Portland, OR (7)	March 30-April 1, 2017
Eight students from Phi Alpha Theta Delta Nu Chapter: Elena Dugan, Nicholas Frank, Alessandra Grishina, Madison She Lamanna, Madelynn Lawrence, Elizabeth Satterfield, Anna Schles, & McKenna Williamson (History)	Katherine Aaslestad	Women and baseball: wartime inspiration and feminist precedents; Effects of urbanization on crime in West Virginia; The two faced of the Industrial Revolution; etc.	Phi Alpha Theta Regional Conference, Greenville, PA (8)	April 1, 2017
Christopher King (Environmental Geoscience)	Brenden McNeil	Leaf angle variability within an oak-hickory forest	Association of American Geographers Annual Meeting, Boston, MA (9)	April 5-8, 2017

Undergraduate Presenter(s) (Major)	Faculty Mentor	Presentation Title	Conference Title, Location (Number Locator)	Conference Dates
Emily Ernest (Exercise Physiology)	Matthew Dietz	Topical adjuvants decrease <i>staphylococcus aureus</i> biofilm on orthopaedic metals: but is it enough?	2017 American Academy of Orthopaedic Surgeons Annual Meeting, San Diego, CA (10)	March 14-18, 2017
Morgan McMinn (History)	Kate Staples	Saye no more: material culture in the Court of Chancery	11 th Annual Undergraduate Research Conference in Medieval & Early Modern Studies, Bethlehem, PA (11)	Dec. 2-4, 2016
Julianne McIlvain (Physics)	Earl Scime	Characterization of the detector for a low voltage, ultra-compact plasma spectrometer	58 th American Physical Society Division of Plasma Physics Conference, San Jose, CA (12)	Oct. 31-Nov. 4, 2016
Miguel Henriquez (Physics)	Earl Scime	Comparison of 3D ion velocity distribution measurements and models in the vicinity of an absorbing boundary oriented obliquely to a magnetic field	58 th American Physical Society Division of Plasma Physics Conference, San Jose, CA (13)	Oct. 31-Nov. 4, 2016
Nicholas Jarvis (MDS)	Nina Assimakopoulos	Videography director on an adventure documentary film project that explores connections between rock climbing, eastern breathing techniques and classical flute playing.	Creative documentary film making experience, Sedona, AZ (14)	May 18-25, 2016
Whitney Sheets (Exercise Physiology)	Jefferson Frisbee	Interventions blunting systemic inflammation and oxidant stress improve depressive symptoms and vascular function in a model metabolic syndrome	Experimental Biology 2016, San Diego, CA (15)	April 2-6, 2016
Evelin Flamenco (Environmental Geoscience)	Brendan McNeil	Leaf angle phenology of twelve Central Appalachian tree species: implications for carbon and energy fluxes in the Anthropocene	American Geographers Annual Meeting, San Francisco, CA (16)	March 30-April 2, 2016
Ashlee Seldomridge (Exercise Physiology)	Paul Chantler	Detrimental changes in perivascular adipose gene expression in metabolic syndrome	Experimental Biology 2016, San Diego, CA (17)	April 2-7, 2016



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

"I wanted to thank you all for the generous support you provided me to attend the American Academy of Orthopaedic Surgeons conference in San Diego, CA. Without your funding, I'm not sure if I would have been able to make it out there. I had never experienced anything quite like what I found at this conference, and it was a blessing to be able to attend and present research. I had an amazing experience, and I just wanted to make sure you all knew how appreciative I am of your support."

- Emily Ernest,
WVU Exercise Physiology graduate,
current M.D. student at the WVU School of Medicine



Emily Ernest (left), Dr. Matthew Dietz (right) and coauthors (Brock Karolcik and Anthony Machi) at the 2017 American Academy of Orthopaedic Surgeons Annual Meeting, San Diego, CA. Emily, Brock and Anthony are medical students at WVU's School of Medicine. (Photo Credit: Emily Ernest. Photo taken by Trey Vanek, a WVU medical student.)

Undergraduates Engage in Summer Research

Internal Programs

WVU Summer Undergraduate Research Experience (SURE): In October 2016, the Office of Undergraduate Research wrote and submitted a proposal to refund the WVU SURE Site, which has been running continuously since 2005. The SURE Site was refunded (2017-2019) 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-undergraduates.

A total of 64 undergraduates (see photo below) participated in the 2017 SURE Site. Fifty (50) undergraduates (49 WVU and 1 WVU Tech student) were funded by the SURE Site. The remaining 14 were funded through mechanisms such as faculty grants (e.g., NSF-LSAMP), faculty overhead, or Center funding (e.g., WVU Energy Institute, XTO Energy). Enrichment funding is available to undergraduates funded via the SURE Site. This funding provides SURE participants with an opportunity to participate in activities that complement, extend, and enhance their scholarly experiences during or directly subsequent to their participation in the SURE program. Thus far, 10 SURE participants have applied for enrichment funding (i) to attend conferences and present their SURE research (e.g., the American Society for Microbiology "Microbe" 2017 in New Orleans and the Pittsburgh Coal Conference) or (ii) to purchase supplies (e.g., chemicals for forensic analysis, laptop computer to run molecular dynamics simulations, and painting supplies to create a series of traditional history paintings).



2017 WVU SURE participants at the culminating poster symposium. (Photo Credit: Hellen Nditsi).

We are fortunate to have faculty members willing and excited to mentor undergraduates in research. More than 60 individual faculty members mentored SURE participants in research during 2017 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 the table below. We send a heartfelt thank you out to the entire WVU community without whom the SURE program would not be a success!

Title	Presenter
Technical Writing: Clarity and Cohesion	Dr. Nathalie Singh-Corcoran, Associate Professor & Coordinator, WVU Writing Studio
Prestigious Scholarships	Amy Cyphert, Director, and Cate Johnson, Assistant Director, WVU ASPIRE Office
Your Beautiful Question: Using Inquiry to Inspire Research	Chanelle Pickens, Instructional Librarian, Evansdale Library
Interview Simulation	Jessie Barclay, Career Services & Victoria Sanchez, Pre-Health
Ice Cream Social & Graduate Recruiters	Shelly Stump, Office of Graduate Admissions and Recruitment & Graduate Recruiters
National Science Foundation Graduate Research Fellowship	Leigh Pratt, Program Coordinator, ASPIRE Office
Career Mentoring: Academia	Dr. Maja Husar Holmes, Chair and Associate Professor, WVU Dept. of Public Administration
Career Mentoring Panel: Academia vs. Non-Academia	Dr. Ed Sabolsky (Engineering), Dr. Marjorie Darrah (Mathematics), Dr. Carrie White (LaunchLab) & Dr. Amy Welsh (Fisheries)
Intro to Statistics in Research Workshop	Dr. Casey Jelsema, Assistant Professor, WVU
Morgantown's Kids Day: Hands-on Science Activities	Arranged by Dr. Kimberly Quedado, NanoSAFE Education & Outreach Coordinator and IGERT Fellows



2017 SURE participants in action at the Speed Research Networking event (similar to speed dating). Students had 4 min. each to discuss their SURE research with a peer. (Photo Credit: Hellen Nditsi)



2017 SURE participant Samantha Isaac (physics) during her interview simulation with interview questions posed by peer SURE participants. (Photo Credit: Hellen Nditsi)



Summer undergraduate researchers attending the Ice Cream Social & Graduate Recruiter event learning about graduate opportunities in chemistry from Dr. Justin Legleiter and Dr. Brian Popp. (Photo Credit: Hellen Nditsi)

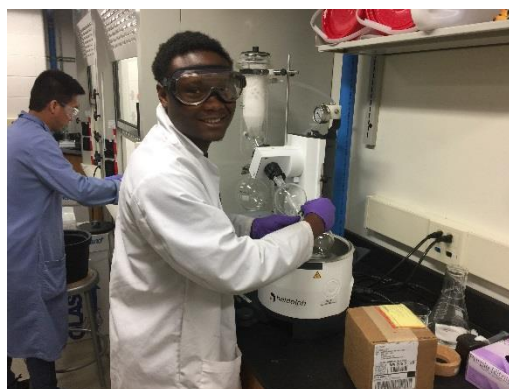


Dr. Maja Husar Holmes discussing interrelationships between the research enterprise and public policy with summer undergraduate researchers. (Photo Credit: Hellen Nditsi)

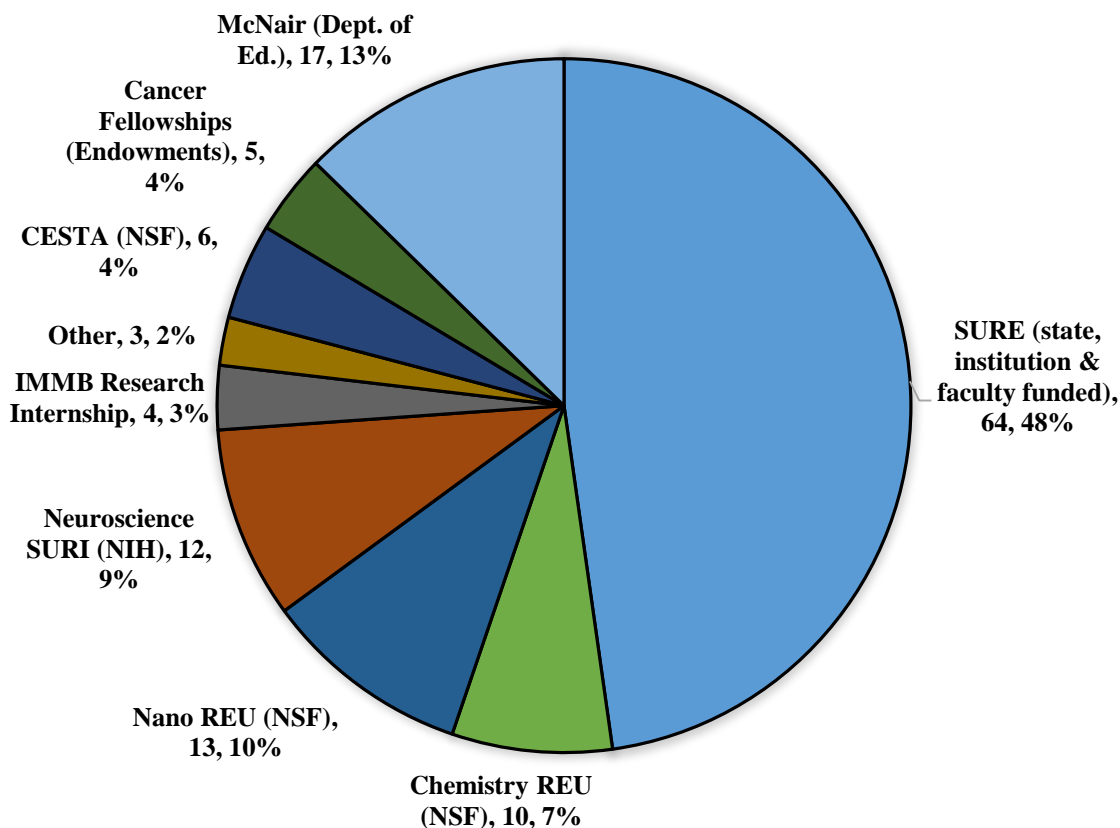
WVU-Based Summer Programs, By the Numbers: The SURE program is one of seven structured summer undergraduate research programs that take place on the WVU campus each summer. Though the SURE program mainly serves West Virginia students, many of whom attend WVU; the other six programs (e.g., Chemistry REU, NanoSAFE REU; Neuroscience SURI) 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 134 undergraduates involved in these programs, a total of 108 presented at the 2017 Symposium. A breakdown of summer undergraduate participants by funding source is given in the pie chart.



2017 Chemistry REU participant Elinore Loch, a biochemistry major from Waynesburg University, engaging in research involving analysis of plasma samples from rats exposed to TiO_2 nanoparticles (Mentor: Dr. Steve Valentine). (Photo Credit: Steve Knowlden)



2017 Chemistry REU participant Perez Youmbi, a chemistry and mathematics double major from St. Francis University, synthesizing neoprofen, a derivative of ibuprofen (Mentor: Dr. Greg Dudley). (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 provides undergraduates with an 11-week paid summer research experience at NIST. Though more than 150 students are accepted as participants, 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 11 undergraduates (10 WVU and 1 WVU Tech) in 2017. Though three of the 11 were made offers, eventually two undergraduates took part in the 2017 NIST SURF program at Gaithersburg, MD. Our 2017 NIST SURF participants and their research were:



WVU's 2017 NIST SURF participants, Sydney Brooks (left) and Tony Allen (right). (Photo Credit: WVU Photographic Services)

Chemical and physical characterization of aged fibers. **Sydney Brooks**, Amanda Forster, and Julie Bitter. (Sydney is a senior majoring in chemistry at WVU from Albuquerque, NM. She plans to pursue a graduate degree in chemistry after the undergraduate.)

The use of graph theory in forensic footwear analysis. **Tony Allen**, Martin Herman, and Hariharan Iyer. (Tony is from Hurricane, WV and graduated from WVU in spring 2017 with a mathematics degree. He is currently attending Purdue University in pursuit of a Ph.D. in Mathematics.)

In 2016, the Office of Undergraduate Research submitted SURF applications for a total of nine (9) WVU undergraduates. Four of the nine were made offers and eventually three undergraduates took part in the 2016 NIST SURF program at Gaithersburg, MD. Our 2016 NIST SURF participants and their research were:

Fiber trace evidence: quantification of sample bleaching during UV-Vis microspectrophotometry. **Sydney Brooks**, Amanda Forster, and Julie Bitter. (Sydney is a senior majoring in chemistry at WVU from Albuquerque, NM. She plans to pursue a graduate degree in chemistry after the undergraduate.)

What is the meaning of life? Terminology and measurement assurance for biotechnology standards. **Anna Gilpin**. (Anna is a senior majoring in biomedical engineering at WVU from Martinsburg, WV.)

Monte-Carlo exploration of focused neutron guide and monochromator geometries. **Samantha Isaac** and Leland Harriger. (Samantha is a senior majoring in physics and mathematics at WVU from Silver Spring, MD. She plans to attend graduate school and eventually earn a Ph.D. in physics.)

New Initiatives

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 for a 2018 Beckman Scholars Program based at WVU. If selected, this program 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.

Research Apprenticeship Program (RAP): *New in fall 2017!* The WVU Office of Undergraduate Research has introduced a program called Research Apprenticeship Program (RAP) to allow early career college students to use federal work-study funds for undergraduate research apprenticeships with WVU research faculty. The goal of this initiative is 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 on a research project is a great way for the student 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 a great 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 experiences. A coordinating 1-credit Introduction to Research course is required of all RAP undergraduates. Dr. Kimberly Quedado is developing the RAP curriculum and programmatic foundation. She is assisted in the program's administration with the help of two graduate students, Hellen Nditsi (education) and Phuong Minh Do (chemistry). Though the fall 2017 RAP program is a pilot, the program is providing mentored research experiences and training for 50+ undergraduates. We are all very appreciative of Dr. Quedado's efforts.

Undergraduate Research Association (URA) Student Organization

The Office of Undergraduate Research has partnered with student researchers to revitalize and run programming through the Undergraduate Research Association (URA). This new WVU Student Organization was founded in the fall of 2016. It works with undergraduate researchers and those seeking these positions to support and expand undergraduate scholarly activity (research and creative endeavors) at WVU. Programming like the “Introduction to Undergraduate Research Networking Event”, where freshmen students are informed of the benefits of engaging in scholarly activities by peers, and regular meetings allowed this student organization to impact more than 200 students in 2016. URA is poised to impact even more students in 2017 with their second “Introduction to Undergraduate Research Networking Event” In October 2017. URA members attended the National Conference on Undergraduate Research (NCUR) in Memphis, TN in April 2017 with support from the Office of Undergraduate Research. There, they presented their research projects and attended seminars to increase their research skills. URA has also revitalized the Mountaineer Undergraduate Research Review (MURR) under the leadership of Editor-In-Chief Cassidy Bland (a Biomedical Engineering major from Weirton, WV). URA officers for 2017-2018 include President Patrick Thomas (Biochemistry – Hurricane, WV), Vice President Sydney Brooks (Chemistry – Albuquerque, NM), Secretary Killian Coyne (Biomedical Engineering – Wheeling, WV), and Treasurer Daniel Wolodkin (Biology – Frostburg, MD).

- written by Patrick Thomas,
2017-2018 URA President

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.

The Office of Undergraduate Research is not just a resource for students. The Office is also a resource for faculty members as they seek to expand research and creative opportunities for undergraduates through supplemental funding on new proposals or existing grants or through the development of programs to enhance the undergraduate experience.

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).

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