

# Impact Report

KY-WV LSAMP

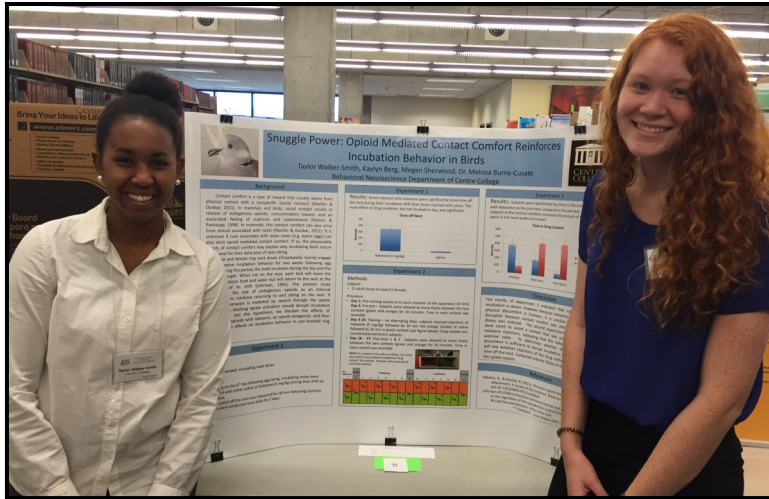
2015

**Kentucky-West Virginia**

**Louis Stokes**

**Alliance for Minority Participation**





Kentucky Academy of Science 2015

## Introduction

The Kentucky-West Virginia Louis Stokes Alliance for Minority Participation program (KY-WV LSAMP) is a nine institution alliance led by the University of Kentucky (UK). Alliance members include: Bluegrass Community and Technical College (BCTC), Centre College,

Kentucky State University (KSU), Marshall University, UK, University of Louisville (U of L), West Virginia State University (WVSU), West Virginia University (WVU), and Western Kentucky University (WKU). Alliance goals are to create, enhance, and expand programs designed to broaden participation and increase the quality and quantity of students from underrepresented populations who receive degrees in science, technology, engineering, and mathematics (STEM) disciplines. The Alliance projects the following key outcomes: increase URM STEM BS degrees by 50% for a total of 1,000 BS STEM degrees over 5 years. This will be done by achieving increases in total Alliance enrollments to 2000 average annual (a 25% increase) and similar increases in retention, transfer rate, graduation rates, and application to and attendance in URM STEM graduate degree programs.

Each institution has developed programs consistent with LSAMP goals. Institutions have also, with the help of LSAMP, built sustainable partnerships within campus programs as well as with external (outreach) programs and organizations. Program activities and partnership resources focus on outreach and recruiting, peer mentoring, undergraduate research experiences, research presentation opportunities, summer bridge and transitional programs for entering students, curriculum reforms in “gatekeeper” courses, international experiences, and workshops on professional development and STEM career options.

## Intellectual Merit

The intellectual merit of the program is the increased knowledge base related to teaching and learning practices for STEM disciplines, practices for improved recruiting and retention, and the development of improved curriculum materials and practices for STEM disciplines. As Scholars pursue their degrees and participate in program activities, they develop the skills needed to succeed not



LSAMP 25th Anniversary Symposium 2016

only in their degree programs but also in the professional community of their chosen field. They learn the skills to be the leaders and experts. Scholars give and receive mentoring on multiple levels from middle school and high school students to world renowned researchers. In addition to increasing their knowledge and research skills, this multi-level mentoring also helps the scholars to

build excellent professional networks for current and future research, presentation, and educational opportunities. Often, the connections made through the LSAMP program guide Scholars to the next opportunity.

## Broader Impacts

The broader impact is the increase in URM STEM BS degree production. This will broaden math, science, and engineering participation of underrepresented students from the two Experimental Program to Stimulate Competitive Research (EPSCoR) states and surrounding regions. Because of the skills developed and the connections made through LSAMP, scholars are uniquely qualified for graduate programs and industry. Once receiving their BS degrees, many participants continue into graduate programs. This will increase the diversification of the STEM workforce and broaden the participation of underrepresented students who seek and earn graduate degrees.

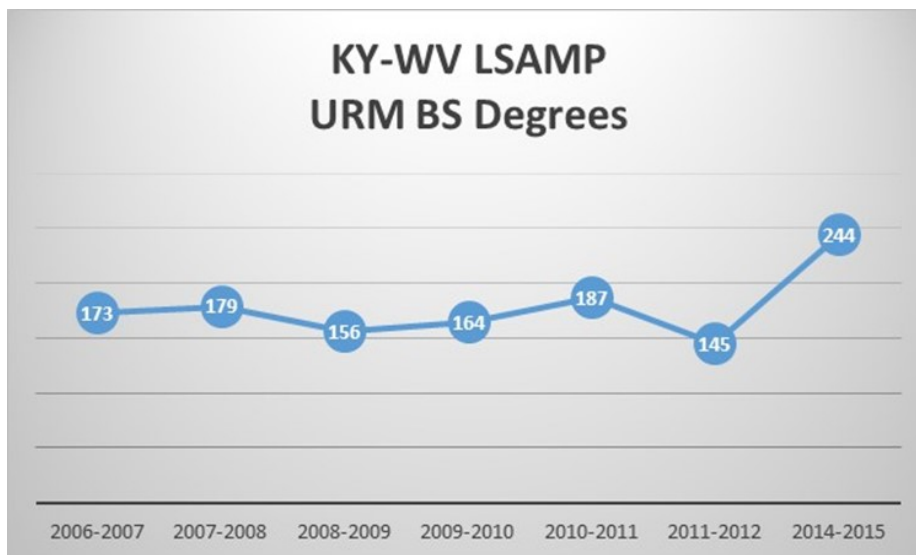
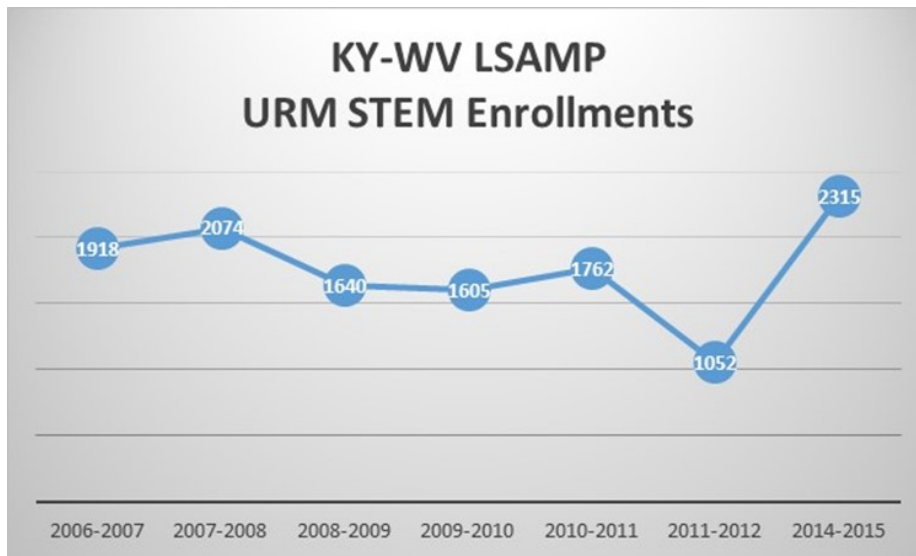
The increase in skilled workforce has the potential to significantly improve the competitive position of the two states and eventually to improve faculty diversity in STEM fields. In turn, participants will play key roles in educating their respective communities about STEM fields and encouraging younger students to pursue STEM disciplines. For example, Dr. Astrid Suarez, former WKU Scholar, recently completed her Ph.D. in meteorology from Penn State University. She and others, with support from KY-WV LSAMP, continue to broaden participation of underrepresented persons in STEM fields.

## Enrollments and Degrees

In 2014-2015, 2315 underrepresented (URM) students were enrolled in STEM BS degree programs at KY-WV LSAMP institutions. This surpasses the goal of 2000 per year and is an increase of 21% from 2006-2007 (1918 enrolled).

In 2014-2015, 244 URM STEM BS degrees were granted by KY-WV LSAMP institutions. This is a 45% increase from the 168 average used in the proposal and a 41% increase from 2006-2007 (173 degrees). Since its inception, KY-WV LSAMP has aided in the production of over 1250\* URM STEM BS degrees.

The large dip in numbers for 2011-2012 can be attributed (in large part) to incomplete data. The first funding period ended in October 2012, and there was a break in documentation and reporting before the current funding period began. \*Currently, data is not available for 2013 and 2014.



## History

The Kentucky—West Virginia Louis Stokes Alliance for Minority Participation (KY-WV LSAMP) was established in 2006 as an alliance of six institutions in Kentucky and four in West Virginia. It influences the lives and education potential of both states' traditionally underrepresented students interested in careers in science, technology, engineering, and mathematics (STEM) disciplines. The current funding period began in 2013 with one institution (Kanawha Community College) discontinuing participation.

Traditionally underrepresented populations targeted by the national LSAMP program (African-American, Hispanic, American Indians, and Pacific Islanders) represent an almost unique recruiting challenge for the KY-WV LSAMP institutions because of their unusually low percentages of the populations of the two states. Even though this population accounted for over 26% of the US population, they comprise only 16% and 6%\* of the population in Kentucky and West Virginia, respectively. \*Source Kaiser Family Foundation estimates based on the Census Bureau's March 2105 Current Population Survey (CPS: Annual Social and Economic Supplement).

The principal goal of KY-WV LSAMP is for the institutions to work together to create, enhance, and expand programs designed to broaden participation and increase the quality and quantity of students from underrepresented populations who receive degrees in STEM disciplines. Recognizing the diversity of student preference in type of higher education institution, the KY-WV LSAMP institutions vary in size, setting (rural vs urban), programmatic and mission focus, student demographics, and degree of research emphasis.

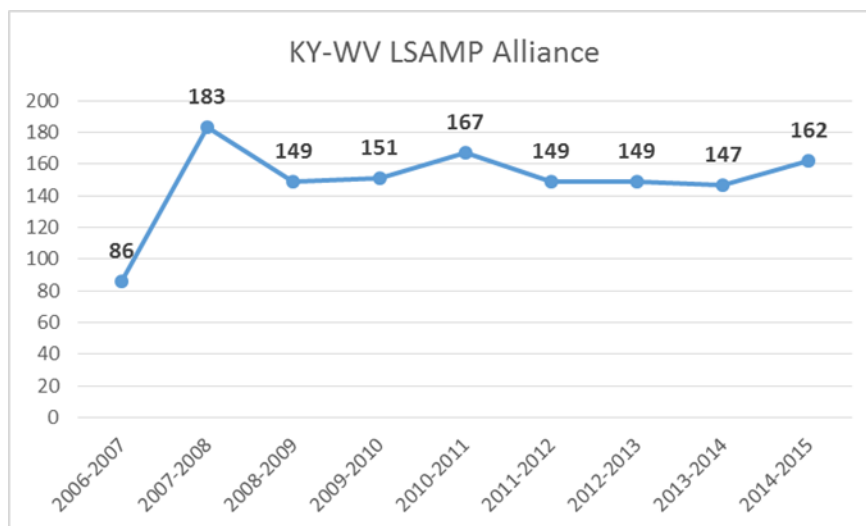
Each institution within the alliance is unique and has special characteristics that benefit the alliance as a whole. The partner institutions are: the University of Kentucky (lead institution), Bluegrass Community and Technical College, Centre College, Kentucky State University, Marshall University, University of Louisville, West Virginia State University, West Virginia University, and Western Kentucky University.

One of the most successful alliance-wide activities is the annual research symposium. KY-WV LSAMP scholars spend the academic year and/or the summer conducting research with faculty mentors. Then, they create a poster or oral presentation in order to present their research project at the symposium. They are given valuable feedback from symposium attendees and use that information to better their presentation skills for the next opportunity. For many, the KY-WV LSAMP symposium is their first professional presentation, but that presentation gives them the skills and confidence to present at other state as well as national and international conferences and symposia.

Transfer programs and centers have been created or utilized to facilitate pathways from two-year to four-year partner institutions. Curricular reforms

such as the Emerging Scholars Program (ESP) calculus classes have been instituted.

In the current funding period, the number of participants has increased by 9%. However, with renewed energy there are expectations of extraordinary impact in the year to come.



## Leveraging Resources

Each campus has partnerships with programs and organizations with like goals and objectives. Campus Coordinators collaborate with those programs and organizations in order to recruit and support a larger number of participants and better leverage the money provided by the National Science Foundation for LSAMP activities.

In addition, there are a few Alliance partnerships. There is a partnership with NASA Kentucky to provide scholarships to KY-WV LSAMP participants. The Kentucky and West Virginia Experimental Programs to Stimulate Competitive Research (EPSCoR) offer support for LSAMP scholar research during the academic year as well as summer internship opportunities. EPSCoR also supports research of the faculty mentors which, in turn, aids in the support of LSAMP scholars involved in those projects.

Some details on the strengths and partnerships of LSAMP on each campus is as follows.



**The University of Kentucky (UK)** serves as the lead institution and houses the main office. A new project director began October 2015. Fara Williams came with 8 1/2 years of working with the Oklahoma LSAMP program. In the first three months of her employment with the Kentucky-West Virginia LSAMP, Fara traveled to each of the partner institutions to learn about campus-specific LSAMP activities and participation. There is a renewed energy in the alliance and a renewed sense of purpose.

At UK, the LSAMP program has developed a partnership with the Broadening Participation in Engineering (BPE) Program. Dr. Eduardo Santillan-Jimenez, Director, is a research scientist at the UK Center for Applied Energy Research. With the partnership, both programs will share resources (such as speaker contacts and professional development workshops) and best practices in recruiting, mentoring, retaining, and preparing scholars for STEM professions. In addition, there are a number of programs (such as STEMCats - an HHMI grant and Student Support Services) and several resource offices (such as the Center for Academic Resources and Enrichment Services-CARES, and the Office of Undergraduate Research) with which the LSAMP program works closely and uses as an advising group. CARES provides a series of professional development workshops with topics such as time management, stress management, and study skills. The Office of Undergraduate Research provides training on presentation skills, has resources for printing posters, hosts the UK Undergraduate Showcase (research presentations) and provides some funding for conference travel.



**Bluegrass Community and Technical College (BCTC)** is a multi-campus institution that expands the commonwealth of Kentucky. The LSAMP program coordinator at BCTC is highly involved with many programs including extensive activities focused on diversity recruitment and college readiness programs for high school students. College Experience Camp is a week-long intensive college preparation program that allows high school students to learn and experience college processes such as application, enrollment, registration, orientation, testing, advising, and classes. CARNEGIE HALL was developed to broaden participation in STEM disciplines from high school students of LSAMP targeted populations. This program seeks to increase students' STEM knowledge prior to entering college, thereby leading to the production of more STEM undergraduates and further exploration and selection of STEM careers. BCTC is instrumental in aiding in the transfer rates of students from 2-year to 4-year institutions. Many of the LSAMP scholars successfully transfer and continue to participate in LSAMP activities. Current KSU student, Trevor Claiborn is an excellent example.



**Centre College** is a small private institution with about 1400 students and has been recognized as a top 50 liberal arts college. They have a commitment to research and study abroad experiences. About 85% of the students have at least one study abroad experience before graduation. In 2015, Centre welcomed its 10th class of Posse Scholars. The Posse Foundation is designed to offer college access to students from underrepresented populations in urban locations. Each year, recruits from the organization (in groups of 10) are provided four-year, full tuition scholarships to attend one of the partner institutions. This partnership greatly contributes to the numbers of students from underrepresented populations who are enrolled at Centre. In 2014-2015, Centre had ten URM students enrolled in STEM majors. Of these ten students, seven were supported by the LSAMP program. Several of these scholars have gone beyond their research experiences on campus and have presented their research at state and national conferences.



**Kentucky State University (KSU)** is the only Historically Black College and University (HBCU) in the commonwealth of Kentucky. It is committed to increasing undergraduate enrollment leading to BS degrees in STEM disciplines. The presence of the LSAMP program has had a positive impact on this commitment. KSU's primary LSAMP activity is a Peer Led Team Learning (PLTL). PLTL are weekly gatherings at which scholars from the LSAMP and EPSCoR programs participate in team learning activities. PLTL is designed to assist all participants with mentoring and tutoring, assisted by faculty. Participants are paired with peer leaders to ensure success. All participants are expected to take full advantage of opportunities and help each other to succeed with completing their respective BS degrees. There are also opportunities for scholars at KSU to conduct summer research at the UK main campus as well as the UK Center for Applied Energy Research.



**Marshall University** has a well-developed tutoring and advising system. Each LSAMP scholar is assigned to a graduate student who serves as a tutor, academic advisor, and mentor. These relationships provide scholars with academic and moral support needed to best succeed in their college careers and beyond. At Marshall, LSAMP is housed in the Division for Intercultural Affairs. This creates partnerships with other Division programs such as the Chancellor's Scholars Program, the Center for African American Students, and the Society of Black Scholars.



**The University of Louisville (U of L)** has developed a unique system of grouping student support programs and undergraduate research initiatives so that all are able to share resources and leverage funds appropriately. A few examples of programs and initiatives with which LSAMP has partnered include, but are not limited to: a university-wide Undergraduate Research Symposium, the Commission on Diversity and Racial



Equality (CODRE) program of the Office of the Vice President for Research, summer bridge programs for high school students, and several summer research programs including REU's and Bucks for Brains.



**West Virginia State University (WVSU)** was founded in 1891 as an Historically Black College but has evolved to serve a diverse population. At WVSU, LSAMP is housed in the Center for the Advancement of Science, Technology, Engineering, and Mathematics (CASTEM). CASTEM's mission is *to encourage West Virginia's Youth to pursue careers in STEM fields and inspire them to become future engineers, scientists, researchers, teachers, and leaders.* CASTEM also houses the NASA Science, Engineering, Mathematics, and Aerospace Academy (NASA SEMAA) and Research Rookies. NASA SEMAA was created to increase recruitment and retention of K-12 students into STEM fields through inspiration, engagement, and education activities. This program has activities for parents and family as well as the student participants. Research Rookies is a program for undergraduates to participate in yearlong research projects. Through these programs, LSAMP has access to a wide recruitment pool. WVSU has recently hired a new director for the CASTEM. This person also serves as the LSAMP coordinator.



**West Virginia University (WVU)** has a well-established alternative series of classes for calculus. The Emerging Scholars Program (ESP) focuses on student collaborative learning. After minimal time spent in a lecture format, the class participants move to an environment in which groups of students work on problems, compare, and present answers. This collaboration among students stimulates additional interactions and more thinking about course content. Workshop problems are based on the material covered in lecture but designed to challenge each student's ability. This active learning approach produces a thorough understanding of the concepts and an unusual level of creativity. ESP students more often than not perform better in their subsequent courses, gain a better understanding of calculus, and form personal, long lasting friendships with other participants. This program began with ESP Calculus I and has now expanded to ESP Calculus II, III, and even IV.



**Western Kentucky University (WKU)** has developed research experiences for participants. Participants have presented their research at national conferences and continue their education in graduate programs. WKU has a unique recruitment opportunity by way of having a charter high school located on the university campus. The Carol Martin Gatton Academy of Mathematics and Science in Kentucky is a residential program for high school students interested in pursuing STEM careers. Students are provided opportunities not found at other high schools such as research opportunities and the chance to earn 60-72 credit hours toward a college degree while completing high school requirements.

## Program Highlights

Recent accomplishments of the KY-WV LSAMP program include implementation of the 2015 and 2016 Annual Research Symposia, scholar presentations, and more communications among program personnel across the alliance.

The 2015 KY-WV LSAMP Research Symposium was attended by 50 people from across the alliance. In addition to poster presentations by the scholars, there was a panel session of graduate students. Panel members were:



Cheavar Blair received his BS in biology from Southern Illinois University, Carbondale. He is a graduate student in the department of physiology and will be the first African American male to receive a Ph.D. from the department. He was awarded the Lyman T. Johnson fellowship which is awarded to graduate students who have met academic requirements and contribute directly to UK's interest in promoting diversity. Cheavar is interested in including broadening participation and policy work in his career aspirations.



Eseosa Ighodaro is a MD/Ph.D. candidate at the University of Kentucky (UK). Her primary research interests involve studying small blood vessel diseases in the brains of elderly individuals with dementia. Her interest in scientific inquiry became evident during her AP biology course in high school. Ese' received her BS in biology with minors in chemistry and French. She conducted research in biochemistry, developmental biology, and neuroimmunology at UK, Stanford University, and University de Lille in France. One of her passions is to mentor young minority students interested in biomedical research.



Melinda Jean-Louis graduated from the University of Kentucky with a BS in civil engineering in 2012 and a MS in 2014. During her undergraduate studies, she participated in many activities including LSAMP and presented her research at a conference in Australia. Dr. L. Sebastian Bryson served as her mentor. Currently, she works as a geotechnical engineer at S&ME, Inc.



The 2016 KY-WV LSAMP Annual Research Symposium was attended by 59 people. Raymond Burse, president of Kentucky State University, provided the keynote address. Scholars presented their



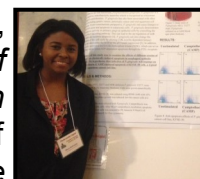
research and were provided a workshop on written communication given by Dr. Ryanette Davis.

KY-WV LSAMP Scholars were selected to represent their institutions at prestigious events.



**I. Khalil Appleton** and **Courtney McKelphin** from the University of Kentucky and **Jonathan Murphy** and **Jordan Wells** from Kentucky State University presented at the **LSAMP 25th Anniversary Research Symposium** in Washington, D. C.

Six scholars presented at **Kentucky's Posters at the Capitol**. They were: **Boniface Amankona**, Kentucky State University, *Methane Flux Measurements over a Rotational Grazed Pature in Northern Kentucky*; **Sabita Dumre**, University of Kentucky, *Screening of a Peptide Library for a Neuroprotective Binding Target*; **Maya McFrazier**, University of Louisville, *Nucleoside diphosphate Kinase-Dependent Suppression of Apoptosis in Esophageal Cancer Cells by the Oral Pathogen Porphyromonas Gingivalis*; **Courtney McKelphin**, University of Kentucky, *Optimization of Microalgae Lipid Extracts for the Production of Fuels*; **Thomas Packer**, University of Louisville, *Impact of Quercetin on miR-21, Cell Proliferation and Migration of Metastatic and Non-Metastatic Prostate Cancer Cell Lines*; and **Karen Udoh**, University of Louisville, *Inhibiting the Anaphase -Promoting Complex/Cyclosome: an Innovative Approach for Cancer Chemotherapy*.



Four scholars from West Virginia University presented at **West Virginia's Research Day at the Capitol**. They were: **Evelin Flamenco**, *Leaf Angle Phenology of Twelve Central Appalachian Tree Species: Implications for Carbon and Engergy Fluxes*; **Kristen Mastrantoni**, *Characterization of a Novel Zinc Finger Protein Using Molecular Techniques*; **Ryan North**, *The Effect of Height and Gender on the Range of Arm Motion*; and **Matthew Parsley**, *Statewide Dissemination of a Culinary Skills, Family Mealtime and Physical Activity Program through HSTA*.



Eight scholars were selected to present at the 2016 **National Conference on Undergraduate Research (NCUR)**. Those scholars were: **Danielle Chavis**, Western Kentucky University, *Small Molecular Donor-Accepted Dyads as Additives in Organic Photovoltaics*; **Trevor Claiborn**, Kentucky State University (BCTC transfer), *Farmer Brown Tha' MC and Tha' Green Team*; **Nathan Crowdus**, Western Kentucky University, *Elevation and Mesoscale Temperature Variations*; **Logan Douglas**, University of Kentucky, *The Relationship of Probiotics on the Intestinal*

*Microbiota of Children with ASD; Sabita Dumre, University of Kentucky, Screening of a Peptide Library for a Neuroprotective Binding Target; Charlie Nelson, Kentucky State University, Validation of the Antarctic Snow Accumulation and Ice Discharge Basal Stress Boundary of the Southeastern Region of the Ross Ice Shelf, Antarctica; Ashley Pittman, University of Kentucky, Use of Intraosseous Needles for Infusion of Contrast Media for Computed Tomographic Angiography; and Taylor Walker-Smith, Centre College, Snuggle Power: Opioid Mediated Contact Comfort Reinforces Incubation Behavior in Birds.*



## Scholar and Alumni Highlights

Scholars conducted research and presented their findings at professional conferences and other events. Scholars were recognized for their accomplishments through department website spotlights and program videos. Select highlights are detailed below.



Two KY-WV LSAMP scholars from Centre College received recognition for their presentations at the *Kentucky Academy of Science 2015 Annual Meeting*. **Kaylind Batey** (left) received first place for his oral presentation. **Taylor Walker-Smith** (right) received second place for her poster presentation.



Two KY-WV LSAMP Scholars from the University of Louisville (**Maya McFrazier** and **Karen Udoh**) presented at the *Atlantic Coast Conference Meeting of the Minds Symposium* at Syracuse University, April 8-10, 2016. Pictured: Karen Udoh (second from left) and Dr. Pamela Feldhoff, LSAMP Coordinator, and Maya McFrazier (holding the U of L pennant).



Summer 2015, **I. Khalil Appleton** from the University of Kentucky conducted research at Louisiana State University. Khalil continued to conduct research with Dr. John Parker (LSAMP Co-PI). He presented his research at several conferences including the UK Showcase of Undergraduate Research.



**Trevor Claiborn** became a KY-WV LSAMP Scholar while studying at Bluegrass Community and Technical College. Now, he is a senior agricultural systems major at Kentucky State University. His research, "Farmer Brown Tha' MC," is a study on the use of Hip-hop themed audio and visual



productions based around Agricultural Sciences and Natural Resources and its viability in introducing key concepts and terminology to elementary aged students in urban schools. The intent is to see whether or not educational material of this nature will attract the interest of students early if presented through a more culturally identifiable medium, i.e. hip hop instrumentation and word-play. He has several YouTube videos of his hip-hop agriculture productions. Trevor also received the 2016 MOSAIC (Multicultural Opportunities, Strategies, and Institutional Inclusiveness Conference) award. This award is given to a BCTC faculty or staff member, a student, a community member or an institution with a proven commitment to diversity.

**Lauren Dixon** received her BS in biology from Kentucky State University in 2013. She has now completed her masters in public health from Meharry Medical College.



**Evelin Flamenco** is an environmental geoscience and geography major at West Virginia University. She first got involved in research during her sophomore year. Her current research focuses on measuring tree leaf angles and how they affect things such as photosynthesis and water loss. Evelin is an author on a publication submitted in 2015, “Measuring leaf angle distribution in broadleaf canopies using UAV’s.” She was featured on her department’s website.

**Marcel Hardy** participated in a summer bridge program at Kentucky State University in 2011. He recently completed his BS in physics at the University of Alabama-Huntsville.



Cato Laurencin, MD, Ph.D. visited UK as the Dean’s Inaugural Distinguished Lecture Speaker. While at the University of Kentucky, Dr. Laurencin spent time visiting with LSAMP and other select scholars. **Sarah Hodges** (pictured), **Khalil Appleton**, **Courtney McKelphin**, **Chelsea Robinson** and others were extremely interested in Dr. Laurencin’s career path and choices as well as his research interests and experiences.

**Courtney McKelphin** is a chemical engineering junior who assembled a continuous bioreactor at the University of Kentucky Center for Applied Energy Research (CAER) during the summer. She is now conducting research on the extraction and catalytic upgrading of algae lipids to renewable fuels with Dr. Eduardo Santillan-Jimenez and Dr. Mark Crocker. She was featured in a video for Kentucky EPSCoR and serves as a peer mentor for the BPE program led by Dr. Santillan-Jimenez.



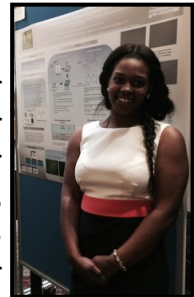
In addition to presenting at the National Conference on Undergraduate Research, **Jonathan Murphy** presented at the American Chemical Society National Meeting in San Diego, California. He is pictured here (on the left) with Dr. Kazi Javed (LSAMP Coordinator) and fellow student, Mark Holland.

**Matthew Parsley** is an exercise physiology and biology major at West Virginia University. He first got involved in research during his sophomore year. Currently, he is working on a multistate research project involving making campuses healthier including eating choices, stress management, and exercise habits. He was featured on his department's website.



**Dr. Astrid Suarez** received her BS in meteorology from Western Kentucky University in 2010. She continued her education at Pennsylvania State University where she received her MS in meteorology in 2013 and her Ph.D. in meteorology in 2015. Dr. Suarez is now in a civil service position as a meteorologist at the Air Force Technical Applications Center in Florida. Her research will include data assimilation and ensemble systems and applications for improving atmospheric transport and dispersion predictions.

**Jordan Wells** is a junior chemistry student from Indianapolis, Indiana, attending Kentucky State University. While participating in the Research Experiences for Undergraduates (REU) program for bioactive interfaces and devices at the University of Kentucky, her research advisor was Professor Dibakar Bhattacharyya. Her research involved making membranes with varying properties through phase inversion and interfacial polymerization to determine the best synthesis conditions. Primarily, cellulose acetate polymer was used for synthesis of these membranes and the properties were characterized through microscopy, elemental analysis, measurement of contact angle, and flux analysis. Jordan's poster was awarded second place in the engineering category at the Kentucky Academy of Sciences 2015 annual meeting. In addition to being a KY-WV LSAMP scholar, Jordan was also a LSAMP-NASA KY Scholar.



*Science*  
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