KY-WV LSAMP
9th Annual Research Symposium

LOUIS STOKES ALLIANCE FOR MINORITY PARTICIPATION
KY * WV

NSF

MARSHALL INTERCULTURAL AFFAIRS

Saturday, March 4, 2017
Hosted by: Marshall University LSAMP
Located: Memorial Student Center,
Huntington, West Virginia
## Agenda

### Friday, March 3, 2017  
**For KY-WV LSAMP Scholars Only**

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<tr>
<th>Time</th>
<th>Activity</th>
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<tr>
<td>03:00-04:00 PM</td>
<td>Registration and Refreshments</td>
<td>1st Floor Lobby</td>
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<tr>
<td>03:15-04:00 PM</td>
<td>Welcome and Introductions</td>
<td>BE5</td>
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<tr>
<td>04:00-04:30 PM</td>
<td>What is LSAMP?</td>
<td>BE5</td>
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<tr>
<td>04:30-05:00 PM</td>
<td>Why the focus on Grad School &amp; Research?</td>
<td>BE5</td>
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<tr>
<td>05:00-06:00 PM</td>
<td>Graduate School Application Process</td>
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<tr>
<td>06:00-06:30 PM</td>
<td>Dinner</td>
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<td>06:30-07:30 PM</td>
<td>Graduate Student Q&amp;A</td>
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<tr>
<td>07:30-09:00 PM</td>
<td>Networking Mixer / Graduate Application Clinic</td>
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### Saturday, March 4, 2017  
**For the General Public and KY-WV LSAMP**

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<tr>
<td>08:00-10:00 AM</td>
<td>Symposium Registration and Refreshments</td>
<td>BE5 Foyer</td>
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<tr>
<td>09:00-09:30 AM</td>
<td>Welcome and Introductions</td>
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<tr>
<td>09:30-10:30 AM</td>
<td>Keynote Presentation</td>
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<td>10:30-11:00 AM</td>
<td>Brief Introduction of Recruitment Tables</td>
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<tr>
<td>11:00-11:15 AM</td>
<td>Break</td>
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<tr>
<td>11:15-12:15 AM</td>
<td>Poster Session</td>
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<tr>
<td>11:15-12:45 AM</td>
<td>Recruitment Tables</td>
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<tr>
<td>12:15-1:30 PM</td>
<td>Networking Lunch</td>
<td>John Marshall Dining Room</td>
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<td>12:15-01:30 PM</td>
<td>Alliance Meeting Lunch</td>
<td>Shawkey Dining Room</td>
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<td>01:30-01:45 PM</td>
<td>Break</td>
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<tr>
<td>01:45-02:30 PM</td>
<td>Oral Presentations</td>
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<tr>
<td>02:30-03:00 PM</td>
<td>Closing / Recognition Presentations</td>
<td>BE5</td>
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</table>
Welcome to the Kentucky-West Virginia Louis Stokes Alliance for Minority Participation (KY-WV LSAMP) Annual Research Symposium. As you gather, present research, and exchange ideas, we collectively improve our capacity to engage and teach students in Science, Technology, Engineering, and Math (STEM) fields and expand the effect of our shared work. This symposium is always a display of the critical assets that every individual brings to the STEM community, no matter who they are or where they call home.

The KY-WV LSAMP produces remarkable work, and cultivates success among an extraordinary group of people. In 2015-16 alone, the Alliance supported 228 scholars, granted 274 STEM degrees to students, and emboldened many students to present their work at conferences nationwide.

To be sure, our collective ability to engage in and expand the boundaries of STEM ensures a robust and healthy economy. More so, the success that undergirds LSAMP, when we engage different people in this work, broadens our understanding of how our education, research, and engagement affects people and communities.

We must continue to encourage students, faculty, and staff from our region to pursue their passion and interest in STEM education. The research presented each year at the Annual Research Symposium is a true testimony of the influence we can make as a collaborative STEM community through the joint efforts of institutions across our regions.

Eli Capilouto, Ph.D.
President, University of Kentucky
Principal Investigator, KY-WV LSAMP
Marshall University is pleased to host this year’s Kentucky-West Virginia LSAMP Annual Research Symposium. We welcome you to our beautiful campus and trust you will enjoy your visit.

Expanding opportunities that encourage diversity and inclusiveness is among Marshall University’s strategic priorities and the KY-WV LSAMP program complements that goal perfectly. In today’s complex world, being able to tap into the talents of all people is becoming increasingly important.

National studies show that underrepresented minority students enroll as STEM majors at the same rate as their counterparts, but graduate at significantly lower rates. We know that the key to retention will be providing timely and effective individual support.

LSAMP provides rich opportunities that we hope will excite more underrepresented students to explore, delve into, and thrive in academic and research programs in STEM fields. Their increased participation will stimulate and improve the alliance institutions' outcomes in disciplines critical to the future of our state, our region and the nation.

We are pleased to be a member of this alliance and look forward to working with our partners to attract, retain and graduate more underrepresented students in high-tech fields.

I’m looking forward to seeing all the research presented at this year’s symposium.

We Are… Marshall!

Jerome A. Gilbert, Ph.D.
President, Marshall University
Louis Stokes

In 1991, the National Science Foundation created six multi-institutional Alliance for Minority Participation (AMP) programs. In 1998, Congressman Louis Stokes’ name was added to the program.

Louis Stokes and his brother, Carl, grew up in an impoverished part of Cleveland. After serving in the US Army during World War II, he worked for the US Department of the Treasury during the day while attending Case Western Reserve University at night. He earned a law degree from Cleveland-Marshall College of Law.

Congressman Stokes represented his Ohio District in the US House of Representatives for 30 years. Elected on November 6, 1968, he was the first African American member of Congress from the state of Ohio. The thrust of his career focused on advocacy for the poor and disadvantaged, especially those in urban America. He sponsored legislation to help people of color enter the intelligence community, fought for adequate housing for the poor, and oversaw the passage of the Disadvantaged Minority Health Improvement Act of 1989. Other legislative efforts included the sponsorship of programs for minority professionals in health and science and engineering at the National Institutes of Health and the National Science Foundation, respectively. He served under six presidents during his 30 years in Congress. Congressman Stokes passed away in 2015.

Dr. A. James Hicks was named LSAMP program director in 1997. He received a Ph.D. in biology from the University of Illinois at Urbana and additional training at Harvard University, the National Institutes of Health, and the Missouri Botanical Gardens. When Dr. Hicks took over LSAMP, there were 25 alliances in the nation. Today, there are over 40 active LSAMP alliances with over 600 colleges and universities involved in increasing the quality and quantity of students from underrepresented populations who receive degrees in science, technology, engineering, and mathematics (STEM) disciplines.

Dr. Tasha R. Innis is a tenured Associate Professor of Mathematics and former Vice-Chair of the Department of Mathematics at Spelman College. Until recently, Dr. Innis was Co-Lead Program Director for the Louis Stokes Alliance for Minority Participation. She is currently serving as Acting Deputy Division Director at the National Science Foundation in the Human Resources Development. She received her BS in mathematics from Xavier University, an MS in applied mathematics from the Georgia Institute of Technology, and a Ph.D. in applied mathematics from the University of Maryland, College Park. Dr. Innis was one of the first three African American women to receive a doctorate in mathematics from UMD.
Speaker Biographies

**Brittani Grant** is a New Jersey native with a strong construction and project management background. Brittani has both a Bachelor's and Master's degree in Civil Engineering from Carnegie Mellon University. During her time at Carnegie Mellon, Brittani was a leader in several organizations including Alpha Chi Omega Fraternity, student life community advisors, and an engineering student peer-mentorship program. Between her junior and senior year, Brittani interned with Turner Construction on the University of Princeton Plainsboro Hospital, which was her first introduction into the construction industry. Following the completion of her studies, Brittani gained valuable contracting and project management experience working with Clark Construction for 3.5 years on the National Museum of African American History and Culture. During that time, she primarily focused on the structure and skin trades for the building construction – in particular the building’s curtainwall enclosure. In addition, she also focused heavily on the project’s finances. Brittani is a LEED AP BD+C and Army QAQC certified. She now leverages those skills in her Assistant Project Manager position at The Tower Companies. There, Brittani is currently working on a 284-unit class-A apartment building in Silver Spring, MD.

**Michael Heppler** is co-founder of a company called Creation’s Best. This is an Educational Advancement, Life Improvement, and Relationship Development consulting company. This includes presentations about the graduate and professional school application process, available financial support, and the importance of professional relationship development and academic performance.

He has 30 years of experience in public education. This includes fifteen years in the graduate education administration and another 15 years of experiences in public school and community college environments. He has traveled throughout the United States carrying a message about the abundance of opportunities for scholars to experience the Best of Life through academic excellence and scholarly research. He has presented workshops to over 2,000 scholars across the United States and Costa Rica.

A few of his prior appearances are the 2011 Oklahoma EPSCoR NSF Grants Workshop, the Inaugural Oklahoma PHD (Pursuing Higher Degrees) Camp held in 2010, National Society of Black Engineers Region V Conference, North Carolina A&T University McNair Scholars Research Conference in Greensboro, North Carolina, Heartland McNair Scholars Research Conference in Kansas City, Missouri, Ronald E. McNair Research & Leadership Conference in Albuquerque, New Mexico, and the Oklahoma Louis Stokes Alliances for Minority Participation (OK-LSAMP) state conference.

**Graduate Student Panel**

**Austin Gibbs** is currently a biochemistry Ph.D. student studying enzyme kinetics under the tutelage of Eugene Mueller. Mr. Gibbs is originally from Fayetteville, North Carolina. He received his BS in chemistry from the University of North Carolina at Charlotte. Prior to graduate school, he spent a brief period working in a lab for Duke Energy. Following completion of his doctoral degree at the University of Louisville, Mr. Gibbs plans to teach at the collegiate level.
Tonnie Mike graduated from Clayton State University on December 12, 2015, with a Bachelor's of Science in Health Care Management. In August 2016, she matriculated to Marshall University located in Huntington, West Virginia, and is pursuing a Master of Science Degree in Health Informatics. While pursuing her Master's degree, she also serves as a graduate assistant in Career Services at the university. While pursuing her undergraduate degree, Ms. Mike completed research papers in the areas of electronic health records, The Patient Protection and Affordable Care Act, health information technology, and Le Dossier Médical Personnel.

Kayla Titialii is originally from Seattle, Washington, and received her BS in zoology from Washington State University. Currently, she is a first year Ph.D. student at the University of Kentucky in the Department of Biology. Throughout her undergraduate career, Ms. Titialii conducted research and attended multiple conferences through the support of programs such as LSAMP and the Ronald E. McNair Post-baccalaureate Achievement Program. Her research focuses on the relationship between metabolism and retina development as well as regeneration. Ms. Titialii’s career goal is to continue conducting metabolism/development research in her own lab while working with programs that cater to under-represented students in STEM in the Seattle area.

Cordell Wells is a native of Little Rock, Arkansas. He earned a BS in mathematics from Philander Smith College and is currently pursuing a MS degree in mathematics at West Virginia University. Mr. Wells serves as a teaching assistant for applied modern algebra. His research interests include the study of diseases of the brain. Mr. Wells’ career goals include attaining a Ph.D. in mathematics.

Isiah Woodson was born and raised in Richmond, Virginia, and finished grade school in a town called Mechanicsville. Through his academics, he gained a love for math, chemistry, and physics. Mr. Woodson was offered the chance to study at the LA-STEM Research Program at Louisiana State University (LSU). At LSU, he pursued chemical engineering and received his bachelors degree in May of 2014. Mr. Woodson’s endeavors for graduate school eventually led him to the University of Louisville, where he began studying for his Ph.D. in chemical engineering in August 2015.

Thank You!

KY-WV LSAMP would like to offer a huge thank you to those who have helped to make this year’s Annual Research Symposium such a wonderful success.

The UK Office of the President provides continuing support for the KY-WV LSAMP program, administrative assistance, and has provided gifts for the speakers.

The UK Office of Institutional Diversity provides the KY-WV LSAMP program with administrative assistance including printing of symposium materials such as the program book.

KY-WV LSAMP would like to give a large thank you to the Marshall University LSAMP staff and associates for their priceless assistance in planning and implementing this event. Those individuals are: Maurice Cooley, Assoc. VP, Office of Intercultural Affairs and LSAMP Campus PI; Dr. Girmay Berhie, Professor, Health Informatics and LSAMP Campus Director; Lisa Wilcox, Health Informatics graduate student; Shaunte Polk, Sponsored Programs Administrator; Lisa Allen, Office of Multicultural Affairs Program Manager; and Matthew Arnold, undergraduate intern.
KY-WV LSAMP would like to thank William Carter, Student Center Operating Business Manager, and Casey Hall, Facilities Scheduling Manager, for their help in selecting and reserving space.

KY-WV LSAMP would like to thank Cara Hedrick, Director of Sales for the Hampton Inn and Fairfield Inn and Suites. Her assistance in reserving lodging for the scholars and coordinators was invaluable.

KY-WV LSAMP would like to thank Sodexo Catering especially Eric Barker, Catering Manager.

KY-WV LSAMP would like to thank Danna Barnett in the UK Office of Undergraduate Research for printing the program posters for the symposium.

KY-WV LSAMP would like to thank all the Volunteers including those who provided transportation for the scholars and those who assisted with the registration table.

KY-WV LSAMP would like to thank all the Graduate Schools and program recruiters for supplying information on graduate programs, internship programs, and other opportunities for our scholars.

Most of all, KY-WV LSAMP would like to give special thanks to the research Mentors. This program would not be the success it is without expert support and guidance mentors provide to the scholars as they explore and enhance their research and scientific skills. We cannot say “Thank you” enough.

KY-WV LSAMP would especially like to thank the National Science Foundation and the LSAMP program director, A. James Hicks, Ph.D., for their continued support of the program.

KY-WV LSAMP is eternally grateful for the hard work and dedication of the KY-WV LSAMP Staff on each campus. Their mentoring and guidance keeps scholars on track academically and professionally, so they are ready for the rigors of graduate school, academia, and/or industry careers.

Marshall University LSAMP would like to thank:
Dr. Jerome Gilbert, President, Marshall University
Dr. Gayle Ormiston, Senior Vice President, Academic Affairs and Provost
Dr. Charles Somerfield, Dean, College of Science
Dr. Wael Zatar, Dean, College of Information Technology & Engineering
Dr. David Mallory, Chair, Department of Biological Science
Dr. Habiba Chirchir, Department of Biological Sciences
Dr. Frank O'Keefe, Department of Biological Sciences
Dr. Michael Castellani, Chair, Department of Chemistry
Dr. Rosalyn Quinones, Department of Chemistry
Dr. Michael Norton, Department of Chemistry
Dr. Huong Nguyen, Chair, Department of Physics
Dr. Alfred Akinsete, Chair, Department of Mathematics
Dr. Asad Salem, Chair, Department of Engineering
Brian Morgan, Chair, Department of Computer and Information Technology
Dr. Kumika Toma, Department of Exercise Science
Diane Maue, Graduate Recruitment and Communication Coordinator Biomedical Sciences & Clinical and Translational Science
KY-WV LSAMP Program Administration

Eli Capilouto, Ph.D., KY-WV LSAMP PI, pres@uky.edu, 859-257-1701
Dr. Eli Capilouto (Principal Investigator for KY-WV LSAMP) became the 12th President of the University of Kentucky on July 1, 2011. Under his leadership, the $3.5 billion flagship and land grant research university has gained significant momentum in fulfilling its multi-faceted mission of teaching, research, service and health care. Dr. Capilouto has led a process to enrich UK’s academic experience by investing in priorities that maintain affordability and access; support the institution’s talented faculty and staff; and revitalize the living, learning and research facilities across campus. Under Dr. Capilouto’s leadership, the University of Kentucky is undergoing a significant physical transformation of its academic, research, residential, health care and community spaces. Through partnership, increased philanthropy and effective financial management, UK is self-financing the vast majority of its more than $2.1 billion infrastructure development. Dr. Capilouto is committed to enhancing UK’s research enterprise and graduate education programs through high-quality partnerships, both domestic and international, and by recruiting and rewarding top scholars across the world. Recently, UK's Markey Cancer Center earned National Cancer Institute-designation (NCI); making it one of 22 universities with the trifecta of federal research awards: NCI, Clinical Translational Science Award (CTSA) and an Alzheimer's Disease Center. A native of Alabama, Dr. Capilouto previously served as Provost of the University of Alabama-Birmingham (UAB) and Dean of the UAB School of Public Health. He holds several undergraduate and graduate degrees from schools within the University of Alabama system, and a Doctorate in Health Policy and Management from Harvard University. He and his wife, Dr. Mary Lynne Capilouto (D.M.D.) a former Dean of the UAB School of Dentistry, have one daughter.

Johné Parker, Ph.D., Co-PI, johne.parker@uky.edu, 859-218-0647
Dr. Johné Parker serves as the lead Co-PI of KY-WV LSAMP. She received a BS, MS, and Ph.D. in mechanical engineering from the Georgia Institute of Technology and worked in industry for six years before completing her graduate degrees. Dr. Parker is currently an Associate Professor at the University of Kentucky. Her research interests include systems and controls, automation, radio frequency identification and science/technology policy.

Fara Williams, Program Director fara.williams@uky.edu, 859-218-6326
Fara Williams received a BS in elementary education / middle level science from Oklahoma State University. She taught for seven years in public and private schools where she received a wide range of experience working with students from 3 years old through high school. Ms. Williams taught all subjects including math, science, language, art, music, and physical education. For 8 1/2 years, Ms. Williams worked with the Oklahoma LSAMP alliance. During those years, OK-LSAMP saw a significant increase in the number of program participants and in annual symposium attendees. In October 2015, Ms. Williams became director of the KY-WV LSAMP and is working to increase the quality and quantity of LSAMP programming and participants in the region.

Willie Pearson, Jr., Ph.D., Program Evaluator, kingvassie@comcast.net, 404-385-2265

Ed Marshall, Program Evaluator, edmarshall06@gmail.com, 215-746-0575
KY-WV LSAMP Campus Coordinators

**Bluegrass Community and Technical College**

*Charlene Walker,* charlene.walker@kctcs.edu, 859-246-6438  
Charlene Walker received a bachelor’s degree in social work and a master’s degree in counseling from Eastern Kentucky University. Currently, she is the Vice President of Multiculturalism and Inclusion and Professor in student development and counseling. Ms. Walker has received recognition by the Urban League and has conducted numerous presentations on issues related to sexism, racism, and classism.

**Centre College**

*John Wilson, Ph.D.*, john.wilson@centre.edu, 859-238-5409  
Dr. John Wilson received his BS in mathematics from the University of the South and his MS and Ph.D. from the University of North Carolina. Currently, Dr. Wilson is the H.W. Stodghill, Jr. and Adele H. Stodghill Professor of Mathematics at Centre College and serves as the chair of the Division of Science and Mathematics. Dr. Wilson’s research interests include using math to develop efficient and reliable methods of transmitting and sorting information.

**Kentucky State University**

*Kazi Javed, Ph.D., Co-PI*, kazi.javed@kysu.edu, 502-597-6722  
Dr. Kazi Javed received a BS in physics and chemistry from Dickinson College and a MS and Ph.D. in chemical engineering from Clarkson University. Currently, Dr. Javed is an Associate Professor of Chemistry at Kentucky State University. His research interests include hazardous and radioactive waste treatment technology, carbon nanotechnology and membrane platforms for environmental and energy applications.

**Marshall University**

*Maurice Cooley*, cooley@marshall.edu, 304-696-5430  
Maurice Cooley earned a BS in sociology and a Master of Arts in counseling from Marshall University. Mr. Cooley joined the Marshall University staff in 2003 as the Director of the Center for African American students. Currently, he is the Associate Vice President for Intercultural Affairs.

*Girmay Berhie, Ph.D.*, berhie@marshall.edu, 304-696-2718  
Dr. Girmay Berhie received a MS of social work from Saint Louis University, an MS in information systems from Marshall University, and his Ph.D. in public policy and administration with a concentration in research methodology. Additionally, Dr. Berhie has taken courses from the John Hopkins University School of Hygiene and Public Health. Dr. Berhie specializes and lectures in global health, program planning and evaluation, biostatics, public health research, health service research, hospital information systems, health informatics and electronic health records. Currently, Dr. Berhie is a Professor and Program Director of Health Informatics at Marshall University.

**University of Kentucky**

*Jeffrey Osborn, Ph.D.*, jlosbo3@uky.edu, 859-257-3988  
Dr. Jeffrey Osborn received a BA from Amherst College and an MS and Ph.D. from Michigan State University. He received a postdoctoral fellowship from the Cardiovascular Research Institute Department of Medicine at the University of Iowa. Dr. Osborn is currently a Professor at the University of Kentucky. His research interests include neural control of renal sodium and water balance and the role of renal sympathetic nerves in the control of blood pressure.
University of Louisville

Pamela Feldhoff, Ph.D., pamela.feldhoff@louisville.edu, 502-852-3791
Dr. Pamela Feldhoff received her Ph.D. from Florida State University. Currently, she is an Associate Professor in the Department of Biochemistry and Molecular Biology and Associate VP for Research and Innovation. Her research interests include the effects of courtship pheromones on reproductive behavior in Plethodontid salamanders. Lab efforts are focused on the purification and characterization of PMF isoforms, including the determination of the complex disulfide bonding pattern.

West Virginia State University

Tanya Mishra
Tanya Mishra received a bachelor’s degree in information technology from AD Patel Institute of Technology and master’s degrees in computer science and art history from Texas Tech University. For the last year, Ms. Mishra was the director of the Center for the Advancement of Science, Technology, Engineering, and Mathematics (CASTEM) at West Virginia State University.

Ami Smith, Ph.D., smitham@wvstateu.edu, 304-204-4305
Dr. Ami Smith received a BS in biology from West Virginia State University and a Ph.D. in biosciences from the University of Exeter. Currently, Dr. Smith serves as the Associate Vice President for Public Service at WVSU. In her position, she assists in developing, maintaining and showcasing WVSU’s outreach, public service and extension activities.

West Virginia University

David Miller, Ph.D., Co-PI, millerd@math.wvu.edu, 304-293-2011 ext. 2323
Dr. David Miller received his BS in mathematics and engineering physics from Missouri State University and a MS in applied mathematics and a Ph.D. in mathematics with specialization in undergraduate math education from Oklahoma State University. Currently, Dr. Miller is an Associate Professor at West Virginia University and Undergraduate Program Director in Mathematics. Dr. Miller’s research interests include undergraduate math education, cognitive science, and STEM education.

Western Kentucky University

Charles McGruder, Ph.D., mcgruder@wku.edu, 270-745-5277
Dr. Charles McGruder received his BS from the California Institute of Technology and his Ph.D. from the University of Heidelberg. He is a past president of the National Society of Black Physicists and was appointed to the National Research Council’s Committee on Astronomy and Astrophysics in 2005. Currently, Dr. McGruder is the William McCormack Professor at Western Kentucky University. His research interests include construction of a wide-wide network of fully robotic imaging telescopes, extrasolar planets, and gamma-ray bursts.
KY-WV LSAMP 9th Annual Research Symposium

Presentations At A Glance

Oral Presentations
1:45-2:00 PM  Grayce Behnke  Marshall  Forensic Chemistry
2:00-2:15 PM  Noah Ichite  Marshall  Health Informatics
2:15-2:30 PM  Trevor Claborn  KSU  Agriculture

Poster Presentations
1  Kaylind Batey  Centre  Biochemistry
2  Sarah Hodges  UK  Biochemistry
3  KY-WV LSAMP 2016
4  Edwina Barnett  WVSU  Biology
5  Zachary Kilwein  WVU  Chemical Engineering
6  Opportunities
7  Danielle Chavis  WKU  Chemistry
8  Ana Mira  Centre  Chemistry
9  Abel Belachew  Marshall  Health Informatics
10 Tonnie Mike  Marshall  Health Informatics
10 Firehiwot Kebede  Marshall  Health Informatics
11 Bezawit Wodajo  Marshall  Health Informatics
12 Bezawit Wodajo  Marshall  Health Informatics
13 Catherine O’Hearn  WVU  Electrical Engineering
14 Keenan Kocan  WVU  Mechanical and Aerospace Engineering
15 Khalil Appleton  UK  Mechanical Engineering
15 Alijah Travasico-Green  UK  Computer Science
16 Torli Bush  WVU  Mechanical Engineering
17 Nathan Crowdus  WKU  Meteorology
18 Miguel Heneriquez  WVU  Physics
Oral Presentations

1:45-2:00 PM

MODIFICATION OF THE SURFACE OF ZINC OXIDE NANOPARTICLES IN ORDER TO INCREASE EFFICIENCY OF SOLAR CELLS

Authors: Grayce Behnke and Dr. Rosalynn Quinoñes

University of Scholar: Marshall University, Huntington, WV, USA
Location of Research: Huntington, WV, USA
Funding: KY-WV LSAMP, NASA WV Space Grant Consortium, SURE
Mentor: Dr. Rosalynn Quinoñes, Marshall University

Self-assembled monolayers (SAMs) are molecules that bind to solids through adsorption. SAMs can be used as sensors for lethal bacterial enzymes, pH and conductivity indicators, and can inhibit corrosion. SAMs are incredibly useful due to the ability for chemical binding of molecules to the surface of a metal, like zinc oxide (ZnO), and can greatly change chemical and physical properties. ZnO specifically has a large variety of properties that are useful for surface modification, including a wide band gap (3.37 eV), high exciton binding energy (~60 meV), and stable wurtzite structure. Through the process of SAMs, the surfaces of ZnO nanoparticles are modified with 16-phosphonohexadecanoic acid, 11-phosphonoundecanoic acid and 11-undecynylphosphonic acid. After binding an organic compound to a ZnO surface 5-aminofluorescein is attached to the organic molecule in order to serve as a fluorescent marker. By changing the properties of the ZnO surface layer, solar cell efficiency can be altered by decreasing corrosion and increasing energy efficiency conversion for a solar cell. The sample concentration and use of “linker” molecules will be altered in order to determine the optimum conditions for the modifications to the ZnO surface and the success of modification will be determined using infrared spectroscopy, dynamic light scattering, zeta potential, ultraviolet-visible spectroscopy, scanning electron microscopy, and electrochemistry. UV-Vis spectroscopy was used to determine the band gap of the surface modified nanoparticles. Band gap is the minimum energy required to excite an electron that is in its bound state into a free state in order to participate in conduction. By lowering the band gap, conductivity can occur more easily making ZnO ideal for solar cells. Initial testing has indicated that the band gap of our surface modified molecules is lower than that of the ZnO bulk material.

2:00-2:15 PM

AGE DIFFERENCES IN SKELETAL MUSCLE CAPILLARY RESPONSES TO UNWEIGHTING AND RECOVERY

Author: Noah Ichite

University of Scholar: Marshall University, Huntington, WV, USA
Location of Research: Huntington, WV, USA
Funding: NASA WV Space Grant Consortium
Mentor: Dr. Kumika Toma, Marshall University

Skeletal muscle is a highly adaptable tissue. Their contraction causes movement. Depending on how strong contraction occurs, skeletal muscle mass and function can be increased by overload or decreased by disuse. Decreased skeletal muscle size (atrophy) and function due to space flight is well-known. Previous research shows that not only skeletal muscle size decreases, blood supply to muscle fiber (capillary) also decreases due to disuse caused by the space-flight simulation unweighting in rats. Since NASA estimates about 9 months of space flight to reach at Mars, significant muscle fiber atrophy and loss of capillary, which could lead to adverse health effects, are a major concern. It is also anticipated that crew members may be diverse in age, sex, and race to accomplish the various required tasks for Mars Mission. However, there is no systematic study investigating physiological function changes due to unweighting among the diverse subjects. Because aging occurs both sex and any race, this study focuses on the age differences of capillary changes in skeletal muscle due to disuse and recovery. Using multiple-tiered hypotheses, this proposal will address the age differences associated with skeletal capillary changes in response to unweighting and recovery. The application of the anticipated finding is not limited in space flight. Because disuse during space flight represents the example of disuse during extreme sedentary lifestyle. Therefore, the fining from this study will also give the new slight to importance of exercise in aging population.
This study investigates elementary aged students in urban schools on their perspectives and understanding concerning Agriculture and Natural Sciences. Using a practical qualitative research methodology, I will present material in-class and at other community venues to gather opinionative data via a series of surveys on survey monkey as well as written surveys distributed to 300 3\textsuperscript{rd} - 5\textsuperscript{th} grade students in 3 elementary schools. Parents, and Teachers will give feedback as to the viability of the material. We will determine if a hip-hop themed video and audio educational series “Farmer Brown Tha’ MC”, based around Agriculture and Natural Sciences, will make a difference in the children’s engagement. Low participation rates in College Agriculture programs and declining demographic representation in the Agriculture sector are indicators of lack of interest on the part of the students in the targeted communities early in their academic careers. Hip-hop’s influence on cultural identification for students in these areas is indelible across the ethnic spectrum. If the students’ interest can be caught early through desired mediums; entertainment platforms, Agriculture and Natural Sciences will not seem abstract to them when presented in class. The preliminary observations show that the pilot program has generated measurable interest in targeted communities via, partnerships, and presentation inquiries, and noticeable attitudinal change in subject content.

**Posters**

**P01**

**LOSS OF NOTCH LIGAND JAGGED1 IN THE OSTEOLINEAGE ACCELERATES OSTEOBLAST DIFFERENTIATION AND INFLUENCES TRABECULAR BONE LOCALIZATION**

Authors: Kaylind G. Batey, Rialnat A. Lawal, Mary A. Georger, Benjamin J. Frisch, PhD and Laura M. Calvi, MD

University of Scholar: Centre College, Danville, KY, USA

Location of Research: University of Rochester, Rochester, NY, USA

Funding: National Institutes of Health, UR-MSTP; National Science Foundation, KY-WV LSAMP

Mammalian bones undergo a life-long homeostatic process of remodeling that is accomplished by the coupled actions of matrix-depositing osteoblasts and matrix-resorbing osteoclasts. Continuous regulation of this homeostatic process is critical for maintaining bone mass and preventing skeletal disease. Notch signaling is required for osteoblast differentiation; however, the specific contribution of individual Notch ligands is unknown. To determine if Notch ligand Jagged1 contributes to bone homeostasis, selective deletion of Jagged1 in osteolineage cells was carried out, targeting mesenchymal stem cells (MSCs) and their progeny (PJag1). Previously, we reported an increase in trabecular bone mass in the femur of PJag1 in comparison to wild-type (WT) littermates. However, we determined that the increased trabecular bone mass in PJag1 mice was subtle in the proximal 2mm region of the femur, and sizable in the distal 3mm region. In PJag1 mice, we found an increase in global bone formation and mature osteoblasts. These past findings suggest that loss of Jagged1 plays an important role in regulating osteoblastic populations farther away from the growth plate and near the diaphysis. Despite previously finding an overall increase in bone resorption, we sought to determine if PJag1 mice have regional differences in their osteoclast populations to also account for the regional increase in trabecular bone. Here, static-histomorphometry was performed to conduct regional counts of osteoclasts. Osteoclast number and surface were quantified on enzymatic TRAP stained paraffin sections of mice hind limbs in PJag1 mice and littermates using a Visiopharm platform. In PJag1 mice, we found a decrease in osteoclast number and surface area within the distal region, but not in the proximal region when compared to wild-type controls. Therefore, our results here demonstrate that Jagged1 may modulate bone mass localization through osteoclastic effects in addition to osteoblastic effects.
**P02**

**THE CORRELATION BETWEEN THE PH OF SOLUTION AND THE FORMATION OF ETTRINGITE IN THE CREATION OF PIEZOELECTRIC CSA CEMENTS.**

Author: **Sarah Hodges**

University of Scholar: University of Kentucky, Lexington, KY, USA

Location of Research: University of Kentucky Center for Applied Energy Research, Lexington, KY, USA

Funding: National Science Foundation, University of Kentucky Office of Undergraduate Research, KY-WV LSAMP

Mentors: Tom Robl, Ph.D., University of Kentucky Center for Applied Energy Research; Robert Jewell, Ph.D., University of Kentucky Center for Applied Energy Research; Tristana Duvallet, Ph.D., University of Kentucky Center for Applied Energy Research

There are two main types of cement used in modern construction, calcium sulfoaluminate (CSA) cement and Portland cement. Both types of cement contain ettringite after hydration, however CSA cement contains a greater amount of ettringite. To determine ettringite’s functionality as a piezoelectric mineral in cement, research was conducted on the effect of the pH of solution on the formation of ettringite fibers in cement. Five sample batches of nine mortar cubes were created from solutions of varying pH values: pH 7, pH 10, pH 12, pH 13, and pH 14. The cement samples were then run through a series of tests including: tensile strength, voltage drop, resistance, and cyclic loading, to determine the effects of ettringite on the integrity of the cement and whether the piezoelectric properties correlated with a change in pH. Samples were also crushed, and then analyzed using scanning electron microscopy (SEM) and X-ray diffraction machines (XRD) to provide information on the presence of the ettringite in the cement.

**P03**

**INFORMATION POSTER: KY-WV LSAMP ACTIVITIES IN 2016**

In 2016, Kentucky-West Virginia Louis Stokes Alliance for Minority Participation Scholars attended regional and national conferences and symposia. Scholars also presented at many of those events and gained recognition for their research and scholarly work.

**P04**

**OPTIMIZATION OF DNA EXTRACTION PROTOCOL FOR HERBARIUM PRESERVED RUBUS TISSUE**

Authors: **Edwina Barnett**, Doug Bright and Barbara E. Liedl

University of Scholar: West Virginia State University, Institute, WV, USA

Location of Research: West Virginia, USA

Funding: National Science Foundation, KY-WV LSAMP

Mentor: Dr. Barbara E. Liedl, West Virginia State University

*Rubus* is the taxonomic name for a genus of fruiting plants including the blackberry, raspberry, and thimbleberry. This genus is ecologically important in early forest succession and economically important as fruiting crops and ornamentals. There is a lack of genetic and morphological diversity due to the domestication of *Rubus*. However, wild species of *Rubus* offer many desirable traits for breeders to access. Although this may be true, the taxonomy of the genus is complex. Interspecific hybridization, polyploidy, various growth habits, along with the lack of a universal species concept complicate breeder attempts to obtain these desirable traits. Therefore, a solid understanding of the evolutionary relationship within the genus is needed for breeders to take advantage of these traits. Herbarium *Rubus* specimens hold much of the necessary genetic material needed to conduct a molecular based study. These specific specimens are key because they have been named by authorities based on morphology, but a genetic study is still necessary to help identify synonyms amongst the species. In order to achieve this molecular based study of herbarium *Rubus* a DNA extraction protocol was optimized. PCR and sequencing success of the herbarium samples extracted from the optimized extraction protocol showed minimal improvement in comparison to the original protocol. Furthermore, success rates of PCR and sequencing of the fresh tissue was less successful than the original protocol.
P05 MATHEMATICAL MODELING AND ANALYSIS OF A MODULAR NATURAL GAS COMBINED CYCLE POWER PLANT

Authors: Zachary A. Kilwein, Juan C. Carrasco, and Fernando V. Lima
University of Scholar: West Virginia University, Morgantown, WV, USA
Location of Research: WVU Department of Chemical and Biomedical Engineering, Morgantown, WV, USA
Funding: WVU SURE; National Science Foundation, KY-WV LSAMP
Mentor: Dr. Fernando Lima, West Virginia University

The increasing focus on environmental safety and decreasing reserves of fossil fuels have forced the power industry to look for creative approaches to tackle the high energy demand while minimizing carbon footprint. Natural gas’ portion of US energy production has increased from 15% in 2006 to 33% in 2016. Natural Gas Combined Cycle (NGCC) power plants represent a cleaner, more efficient alternative to traditional coal plants. Availability of customizable NGCC modular designs could solve issues such as remote drilling areas, or provide unique industrial applications. However, comprehensive studies of these modular systems are scarce. This research contributes with energy and mass balanced models in MATLAB of a simulated modular micro-cogeneration system, providing a basis of comparison to larger existing combined cycle models. Existing NGCC data of traditional plants are obtained from DOE reports, while consumer modules were selected as baselines for modular performance and limitations. Preliminary results suggest that power generation in the modular setup is possible, however the big challenge is to find the adequate size with respect to the electricity demand.

P06 INFORMATION POSTER: RESEARCH, PRESENTATION, AND FUNDING OPPORTUNITIES

There are many opportunities for KY-WV LSAMP Scholars to participate in research experiences; present at local, regional, and national conferences; and receive funding for summer experiences and graduate study. These are just a few of those opportunities.

P07 NOVEL BINARY REACTIVE GROUP FUNCTIONALIZED SILSESQUIOXANE MICRO-PARTICLES AND THEIR COLLOIDAL SELF-ASSEMBLIES

Authors: Danielle Chavis, Niharika Neerudu Sreeramulu, Hemali Rathnayake
University of Scholar: Western Kentucky University, Bowling Green, KY, USA
Location of Research: Kentucky and Ohio, USA
Mentors: Dr. Hemali Rathnayake, University North Carolina Greensboro; Dr. Charles McGruder, Western Kentucky University

Through direct hydrolysis and co-condensation of their appropriate silane precursors, benzyl chloride and amine functionalized group silsesquioxane particles were assembled. By adjusting the molar ratio and the base concentration, the size and distribution of the particles were controlled. The colloidal self-assemblies of the particles were determined by TEM spectroscopy. Through the TEM images, the particles arrangement, average size and shape were examined. On average, the Benzyl Chloride SSQ particles ranged approximately 1–2 µm. The TEOS Amine-SSQ resulted in nanoparticles approximately 200–300 nm. In the future, these particles will be further functionalized with anthracene and rhodamine B for dual fluorescents.

P08 ION MOBILITY SPECTROMETRY AS A TECHNIQUE FOR SCREENING PESTICIDES

Authors: Ana Gabriela Mira and Leonard Demoranville
University of Scholar: Centre College, Danville, KY, USA
Location of Research: Kentucky and West Virginia, USA
Funding: KY-WV LSAMP
Mentor: Dr. Leonard Demoranville, Centre College

Ion mobility spectrometry (IMS) is an instrument known for its rapid response time and ability to detect nanogram quantities of analyte. Thermal desorption IMS is widely used for screening for explosives and illicit drugs by agencies such as the Transportation Security Administration, Customs and Border Patrol, and the Bureau of Prisons. This research group uses thermal desorption IMS with the goal of creating a preliminary screening technique to quickly determine the presence of pesticides on imported produce. The analyzed pesticides are selected from the most common pesticides found on imported produce according to the U.S. Environmental Protection Agency’s Top 10 list, along with certain pesticides previously analyzed by IMS. Through desorber temperature and response curve studies, the limit of detection, limit of linearity, and reduced mobility values are reported for several pesticides of interest. Pesticides previously analyzed by laser desorption IMS to have indeterminate responses demonstrated clear peaks using TD-IMS, suggesting interferences caused by the laser desorption process.

P09
DISPARITIES IN MEDICATION ADHERENCE PERSIST AFTER CONTROLLING FOR SOCIODEMOGRAPHICS AND LITERACY/NUMERACY SKILLS
Authors: Abel B. Belachew, Andrea E. Lagotte, Lyndsay A. Nelson, PhD, Mariya P. Kristeva, and Arathi S. Nandyala
University of Scholar: Marshall University, Huntington, WV, USA
Location of Research: Vanderbilt University Medical Center, Nashville, TN, USA
Funding: University of Central Florida College of Medicine; University of South Florida College of Medicine
Mentor: Chandra Y. Osborn, PhD, Vanderbilt University Medical Center

Adherence to antihyperglycemic agents and/or insulin is associated with better glycemic control and reduced diabetes complications. Factors facilitating medication adherence include adequate health literacy and numeracy skills, motivation and self-efficacy, financial/practical support, and resources. We examined the relationship between race and medication adherence among adults with type 2 diabetes (T2DM). We assessed medication adherence using the adherence to refills and medications scale for diabetes (ARMS-D). Participants were English-speaking adults (N=151) with T2DM prescribed at least one glucose lowering medication recruited for a medication adherence trial at Vanderbilt University Medical Center in Nashville, TN. Participants completed a REDCap (Research Electronic Data Capture) survey where they self-reported sociodemographic information and responses to validated instruments. A research assistant reviewed electronic medical records to obtain additional diabetes information. (e.g. insulin use). The analysis shows a series of multiple hierarchical regression models examined the association between race and medication adherence. Model 1 regressed ARMS-D scores on race. In the second model, we adjusted for sociodemographic (age, gender, education, income) and diabetes characteristics (diabetes duration, insulin use). In the third model, we adjusted for sociodemographic, diabetes characteristics, health literacy and numeracy. Results were being non-white was significantly associated with less medication adherence, explaining 9.4% of the variance in adherence. Conclusions were Non-white were less adherent to diabetes medication than whites after controlling for sociodemographic, diabetes characteristics and health literacy and numeracy skills. Disparities in adherence may contribute to persistent disparities in glycemic control and other diabetes complications.

P10
SMARTPHONE USAGE IN HOSPITALS: HIPPA
Authors: Tonnie Mike, Firehiwot Kebede, Morgan Belpher, and Douglas Melton
University of Scholar: Marshall University, Huntington, WV, USA
Location of Research: Cabell Huntington Hospital, WV, USA
Funding: KY-WV LSAMP, Dr. Alberto-Coustasse-Henck
Mentor: Dr. Girmay Berhie, Marshall University

The purpose of the study was to determine whether patient information have been safeguarded while utilizing smartphones in hospitals versus other mobile devices. To a limited degree, smartphones are used by clinicians through secure channels such as DocHalo which communicate through an encrypted app. Smart phones have become second nature in the modern world. Smartphones enter pharmacy orders, chart
patient information, and provide bedside real time documentation. An extension in healthcare replacing the need to use multiple devices (cellphone, pager, professional development and appraisal systems (PDAs) while providing care. An anonymous online survey, with no identifiers, will be given to 50-100 clinicians to determine if using a smartphone for managing patient care is secure, appropriate, and HIPPA compliant. It will also measure if a policy needs to be established ensuring social media does not distract from patient safety as well as safeguarding patient health information. Potential benefits include: providing real time documentation, medication reconciliations, patient planning, patient chart review through a smartphone versus limited laptop/desktop sites on a floor. In addition, smartphones would improve time management by improving logging in/logging out of terminals between patient care.

P11

MOBILE APPS USED IN REDUCING MEDICATION ERRORS: THE CASE OF ETHIOPIA

Authors: Bezawit Wodajo and Girmay Berhie
University of Scholar: Marshall University, Huntington, WV, USA
Location of Research: Kentucky and West Virginia, USA
Funding: National Science Foundation, KY-WV LSAMP
Mentor: Dr. Girmay Berhie, Marshall University

Introduction: Medication error is a preventable yet major cause of morbidity and mortality. Different technologies including medical mobile apps are now widely used in clinical practice to support clinical decisions system and prevent medication errors. The widespread adoption of mobile phones in developing countries like Ethiopia, can leads to the utilization of various mobile apps in reducing medication related errors. However, not all mobile apps are readily available to use in resource-limited countries. Therefore, this study focuses on identifying mobile apps that are suitable for

Purpose: identify, describe, and pilot mobile apps that can be used towards preventing medication errors in Ethiopia.

Methodology: The methodology of the study was a review of articles and different mobile apps. Five electronic databases and six reputable websites were utilized. A total of 34 articles were referenced for this study from the years 2004 -2016 and written in the English language.

Results: Two mobile apps namely mHIV- Dr and SapoMed were selected from six other mobile apps that were included in the study. They were selected because they were found to be suitable for developing countries setting in regard to cost and ease of use. mHIV-DrApp is designed to provide dosing recommendations for front-line providers while SapoMed keeps users aware of their medication schedule and provide patients with full information about their medication.

Discussion/ conclusion: in an effort that is made to reduce medication error, mobile technology is now playing a key role. The development of mobile apps that are specifically targeting the under developed countries like Ethiopia could have an important part in reducing medication error and promote safe and effective medication management process.

P12

THE IMPLEMENTATION OF EHR IN DEVELOPING COUNTRIES

Authors: Bezawit Wodajo and Girmay Berhie
University of Scholar: Marshall University, Huntington, WV, USA
Location of Research: Kentucky and West Virginia, USA
Funding: National Science Foundation, KY-WV LSAMP
Mentor: Dr. Girmay Berhie, Marshall University

Background: The functioning of health information systems relies on adoption of electronic health records (EHRs). Therefore, promoting EHRs adoption among medical institutions is not only a global trend but also an imperative healthcare policy in all countries. Researchers reported above 95% EHR system implementation throughout developed countries like United Kingdom, New Zealand and Netherlands. However, there is very limited evidence in the research literature that discusses the utilization, benefits and challenge of using EHRs in developing countries.

Purpose: This meta-analysis explores EHR use in sub-Saharan Africa (SSA), focusing on implementation status, potential benefits, and barriers.

Methodology: The methodology of the study was meta-analysis in which articles were analyzed for their commonalities and variances. A total of 27 articles were referenced for this study from the years 2000 -2016 and written in the English language.
Results: Twenty-two research articles spanning 17 Sub-Saharan Africa SSA countries were included in this review. The use of open source healthcare software was documented in 95.5% of the studies. Most implementations (50%) are in HIV care for data collection. Common EHR associated benefits that were mentioned in most publication include; improved in the quality & continuity of healthcare through reduced medication error & improved data accuracy as well as decreased patient visit time. Barriers include, infrastructure, and financial resource limitations, lack of trained man power and resistance from end-users and technicians.

Discussion/Conclusion: There is a scarcity of literature describing EHR implementation in SSA. Despite existing barriers, successful implementations have been reported in some countries, indicating the feasibility of EHR implementation when necessary resources are available. EHRs address common challenges of healthcare delivery in SSA. Expansion to non-HIV settings and additional implementations are needed to optimize EHR benefits in SSA. Other solutions include early involvement of end-users, technical and infrastructure support, and application of user-centered design principles.

P13 ELECTROLUMINESCENT CHARACTERIZATION OF ON-ORBIT III-V NITRIDE-BASED LEDS
Authors: Catherine O’Hearn, Matthew Pachol, and Jeremy Dawson
University of Scholar: West Virginia University, Morgantown, WV, USA
Location of Research: Morgantown, WV, USA
Funding: KY-WV LSAMP, NASA WV Space Grant Consortium
Mentor: Dr. Jeremy Dawson

NASA’s Independent Verification and Validation (IV&V) Facility and West Virginia University have partnered for the deployment of the Simulation-to-Flight 1 (STF-1) CubeSat Mission. STF-1 is a 3U CubeSat that houses both NASA and WVU experiments, including an in-house designed optoelectronic characterization tool for verification of the performance and durability of on-orbit III-V nitride-based LEDs, for which a poster was accepted for the 30th Annual Small Satellite Conference. III-V nitride-based LEDs are more radiation resistant than their silicon counterparts, therefore potentially requiring less shielding and producing lighter, more efficient satellites. This experiment consists of two circuits; one for forward voltage measurements, the other containing photodiode arrays to collect the spectral response of each LED. Because the operation of LEDs can be monitored by observing shifts in the emission wavelength, the goal of this work is to design a low-power electroluminescent spectrometer to measure LEDs emitting at a wavelength of 465nm while on orbit. The system has dimensions of 3.5in x 3.75in and adheres to the .77W power budget.

P14 DEMONSTRATION OF A METHODOLOGY FOR AUTOMATED MODEL BUILDING WITH PHYSICAL CO2 SORBENTS
Authors: Keenan X. Kocan and Dr. David Mebane
University of Scholar: West Virginia University, Morgantown, WV, USA
Location of Research: West Virginia University, Morgantown, WV, USA
Funding: National Science Foundation, KY-WV LSAMP
Mentor: Dr. David Mebane, West Virginia University

This research demonstrated a method for automatically building and calibrating models given a provided dataset with the application being adsorption of CO2 on the physical adsorbent zeolite 13X. Starting with a Langmuir isotherm for modeling of the CO2 adsorption, the method equips the model with Gaussian process stochastic functions. The stochastic functions consist of a series of spectral, nonparametric, orthogonal and ordered basis functions. Due to the functions being ordered, they may be added to the model in a rational fashion. Each additional term provides the model a better fitting, though each added term requires an additional parameter to be estimated in the calibration and the model could be over-fitted with the inclusion of too many terms. The method of Bayes factors was deployed to find a balance between model fidelity and model simplicity. Bayesian calibration determines a distribution of model parameters that is consistent with the data; an adaptive sampling routine was implemented to carry out the calibration.
P15
EFFECT OF KEY FACTORS CONTRIBUTING TO CROSS-PROGRAMMING IN RFID MULTI-TAG APPLICATIONS

Authors: Khalil Appleton, Alijah Travascio-Green
University of Scholar: University of Kentucky, Lexington, KY, USA
Location of Research: University of Kentucky, Lexington, KY, USA
Funding: National Science Foundation, KY-WV-LSAMP
Mentors: Dr. Johné Parker and Mr. Zi Qin Phua, University of Kentucky; Donnie Proffit, Jason Hale, John Fessler, Robby Whitesell, Brandon Reynolds, Lexmark

Radio Frequency Identification (RFID) is a method of transferring data wirelessly over short distances using electromagnetic fields. These tags have been implemented in applications such as security mechanisms, object location, and electronic payment methods such as Apple pay. However, this technology is vulnerable to several key factors. For example, the ability to successfully read or program a tag is dependent on factors such as the air gap (distance between tag and radio antennae), tag orientation with respect to the radio antenna, etc. In addition, it is difficult to specify which tag will be read or programmed, if there are multiple tags in close proximity. This leads to the problem of cross programming, which occurs when a nearby tag is detected and programmed instead of the targeted tag. Thus, the goal of this project is to develop a more optimized design configuration and more reliable methods for reading and writing to RFID tags that would maximize readability while minimizing cross-programming. Current results are based upon prior studies conducted by our team to determine the key factors which affect performance for a single tag. Key accomplishments from prior work include the design of a GUI to efficiently control parameters for testing conducted using the ThingMagic M6e RFID radio. Using the GUI, we found that the probability of cross-programming is generally proportional to tag readability. We also observed that the probability of cross programming increases as tags grow closer to each other. This data is now being used in our development of better antennas for targeted reader-to-tag communication in the presence of multiple proximal tags. We are now using the previously gathered statistical data from the M6E and the GUI to produce prototypes with different layouts and antenna designs. This prototype testing will provide us with more data which can be used to further optimize and even replace certain RFID reading methods in semi-controlled environments.

P16
NUMERICAL SIMULATIONS OF FLAME PROPAGATION IN A DUSTY-GASEOUS ENVIRONMENT

Authors: Torli Bush, Sinan Demir, and V’yacheslav Akkerman
University of Scholar: West Virginia University, Morgantown, WV, USA
Location of Research: WVU Center for Alternative Fuels, Energy, and Emissions, Morgantown, WV, USA
Funding: WVU-SURE, KY-WV LSAMP, NSF, Alpha Foundation for the improvement of Mine Safety and Health
Mentor: V’yacheslav Akkerman, West Virginia University

While combustion of gaseous fuels and that of dust have been studied, separately, reasonably well, ignition and flame propagation in a combined dusty-gaseous environment still remain almost an enigma that commands both the fundamental and practical interests. In particular, accidental methane-air explosions and fires in the presence of combustible dust frequently occur in coalmines and claim hundreds of lives annually. To reduce the risk of such disasters, a fundamental understanding of the combustion process is critically needed. This project is a step in this direction undertaken by means of comprehensive computational simulations of fully-compressible hydrodynamic, combustion and dust equations. Two categories of dust are considered and implemented into the simulations, namely: (i) combustible (say, coal particles), and (ii) inert dust (say, sand). For each category, four dust distributions are studied, specifically, (a) homogenous, (b) linear, (c) parabolic and (d) cubic, with three different pipe radii employed. As a result, flame parameters such as the flame shape and velocity as well as the flame acceleration rate are calculated.
P17

ELEVATION AND MESOSCALE TEMPERATURE VARIATIONS

Authors: Nathan Crowdus and Dr. Rezaul Mahmood
University of Scholar: Western Kentucky University, Bowling Green, WV, USA
Location of Research: Kentucky, USA
Funding: National Science Foundation, KY-WV LSAMP
Mentor: Dr. Rezaul Mahmood, Western Kentucky University

The Kentucky Mesonet is a research-grade world class weather and climate observing network of 66 stations that provides quality assured 5 minute temperature, precipitation, solar radiation, relative humidity, dew point temperature, wind speed and direction data. However, with 66 of these stations distributed throughout the Commonwealth, Mesonet enables one to take note of localized variations in weather and climate as well. This research observes the mesoscale temperature variations between the mesonet sites in Mason and Lewis counties in Kentucky. It is found that the Lewis county site consistently had much cooler minimum temperatures despite being roughly 400 feet lower, elevation-wise, than Mason county. It is suggested that topography of the landscape is responsible for this mesoscale temperature differences. High spatio-temporal density of Kentucky Mesonet stations allowed us to identify and quantify impacts of small elevation variations on temperature.

P18

COMPARISON OF 3D ION VELOCITY DISTRIBUTION MEASUREMENTS AND MODELS IN THE VICINITY OF AN ABSORBING BOUNDARY ORIENTED OBLIQUELY TO A MAGNETIC FIELD

Authors: Miguel F. Henriquez, Derek S. Thompson, Dr. Earl Scime, Shane Keniley, Rinat Khaziev, Dr. Davide Curreli, Dr. Timothy Good, Dr. M. Umair Siddiqui
University of Scholar: West Virginia University, Morgantown, WV, USA
Location of Research: West Virginia, USA
Funding: U.S. National Science Foundation Grant No. PHY-1360278
KY-WV LSAMP Mentor: Dr. Earl Scime, West Virginia University

Understanding particle distributions in plasma boundary regions is critical to predicting plasma-surface interactions. Ions in the presheath exhibit complex behavior because of collisions and due to the presence of boundary-localized electric fields. Complete understanding of particle dynamics is necessary for understanding the critical problems of tokamak wall loading and Hall thruster channel wall erosion. We report measurements of 3D argon ion velocity distribution functions (IVDFs) near an absorbing boundary oriented obliquely to a background magnetic field. Measurements were obtained via argon ion laser induced fluorescence throughout a spatial volume upstream of the boundary. These distribution functions reveal kinetic details that provide a point-to-point check on particle-in-cell and 1D3V Boltzmann simulations. We present the results of this comparison and discuss some implications for plasma boundary interaction physics.
Registered Attendees

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<td>Kilewein WVU</td>
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<td>Awero (Faye)</td>
<td>Osseni Marshall</td>
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Information Tables

- Marshall University College of Science
- Marshall University Dept. of Biological Sciences
- Marshall University Dept. of Biomedical Sciences
- Marshall University Dept. of Chemistry
- Marshall University Dept. of Engineering
- Marshall University Dept. of Exercise Sciences
- Marshall University Dept. of Mathematics
- Marshall University Dept. of Physics
- National Cancer Institute Continuing Umbrella of Research Experiences
- Nerd Squad
- University of Kentucky College of Dentistry
- University of Kentucky Dept. of Physics and Astronomy
- University of Kentucky Graduate School
- West Virginia University Office of Graduate Admissions and Recruitment
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**West Virginia Academy of Science**

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**Women of Color STEM Conference**

October 5-7, 2017

Marriott at the Renaissance Center
Detroit, Michigan

http://intouch.ccgmag.com/page/woc_Conference2

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**Kentucky Academy of Science**

November 3-4, 2017

Murray State University
Murray, Kentucky

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**NCUR**

National Conference on Undergraduate Research

April 5-7, 2018

University of Central Oklahoma
Edmond, Oklahoma

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2018

West Virginia Wesleyan College
Buckhannon, West Virginia

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