March 24, 2016

SHOWCASING
UNDERGRADUATE SCHOLARSHIP
IN MISSISSIPPI
Posters in the Rotunda 2016

March 24, 2016

A SHOWCASE OF UNDERGRADUATE SCHOLARSHIP IN MISSISSIPPI

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@posters_ms / #MSPosters
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EVENT SCHEDULE

7:30 – 9:30 am  Posters on Display / Visits with Legislators and Public

9:30 am  Welcome Remarks *(introductions by Dr. Gordon Cannon, VP Research, University of Southern Mississippi)*
       Lt. Gov. Tate Reeves
       IHL Commissioner Glenn F. Boyce

10:00 am  Proclamation of Support – House Chamber

10:30 am  Proclamation of Support – Senate Chamber

11:00 am  Tour of Capitol

Noon   Lunch on the Capitol Grounds

1:00 pm    Close of Event
INSTITUTIONAL STATEMENTS OF SUPPORT

Dr. Alfred Rankins, Jr., President
Alcorn State University

One of the most gratifying aspects of my job as president is having the opportunity to experience some of the fruits of our students’ scholarly and creative activity. Showcasing our students’ undergraduate research at the “Posters in the Rotunda” are impressive examples of that activity. I am absolutely delighted to extend my personal congratulations to all of you showcasing the fruits of your labor.

I congratulate our students for bringing their research ideas to fulfillment, even though it may have been long, complex, sometimes frustrating, yet immensely rewarding. The kind of effort involved in producing this impressive research and creative expression requires a great deal of support, collaboration, and input from fellow scholars, as well as from faculty mentors who guide them along the way.

As Alcorn State University continues on its path toward becoming a premier research university, we will always seek opportunities to encourage, support, and develop our most important asset at ASU, our students with the best and brightest minds to tackle the most challenging problems nationally and globally.

I applaud you for the long hours which you committed and dedicated to preparing and presenting your research. I hope that you will continue to exhibit that kind of commitment which will add to the legacy of Alcorn State University. I am proud of you. The Alcorn State University family is proud of each of you. Thanks for all that you do for our beloved Alma Mater.

William N. Forge, President
Delta State University

Delta State University is a University of Champions — in the classroom with talented faculty who focus on student instruction and mentoring; through award-winning degree programs in business, arts and sciences, nursing, and education; with unique, cutting-edge programs such as commercial aviation, music/entertainment industries, and geospatial studies; and, with a full package of extracurricular activities and a college experience that help prepare our students for careers in an ever-changing, global economy. We are proud of our students, who are the livelihood of our state’s bright future, and who are making significant contributions to the cultural, scientific, and economic vitality of our great State.
Dr. James Borsig, President  
Mississippi University for Women

Congratulations to Birendra, Brianna, and Portia for having their research projects selected for the inaugural “Posters in the Rotunda.” The W values undergraduate research as a vital part of a student’s education, and the work exhibited by these outstanding students is representative of the potential contributions to knowledge by our students that can improve the lives of Mississippians.

Research at The W is by its nature an extension of our personalized learning environment. In an institution of our size, students often are directly involved in the exploration of topics they might otherwise only read about. Working closely with faculty mentors, they are able to hone analytical skills that will serve them well in advanced studies or in their careers. This is especially significant at The W, where faculty carry full teaching loads and commit the additional effort of undertaking a specialized area of research. Their commitment benefits not only our students, but the region and the state. They represent the academic rigor and regional stewardship that define The W.

Dr. Constance Bland, Vice-President for Academic Affairs  
Mississippi Valley State University

A college education requires the ability to think critically and to synthesize large quantities of information from different sources. The involvement of undergraduate students in research is one of the most effective strategies for achieving this benchmark. By allowing students to engage in research, we provide an additional opportunity for them to further understand the information they are learning in their classrooms. The “Posters in the Rotunda” activity provides a venue for our students to demonstrate and validate their understanding of the scientific process and provides our faculty with evidence of their impact on the lives of our most precious gifts. We are confident that our legislators will be impressed with our student’s knowledge and echo our sentiments and beliefs that our students are on a path to contribute to the state and ultimately the nation’s advancement.
Nothing is more important to the future success and vitality of society than higher education. It has a transformative power on people and their well-being. We see this across all the campuses of the University of Mississippi in our faculty, staff, and students. We certainly see this transformative effect in the students participating in “Posters in the Rotunda.” I congratulate University of Mississippi (UM) students Katelyn Allen, Benita Williams, and James Robinson – they are stellar representatives of the scholarly, research, and creative endeavors emanating from UM.

As we all know, it is the students who form the heartbeat of any university. For the nearly 24,000 students who attend the University of Mississippi, we are proud to assert our “student-first” mentality by inspiring and challenging our students. They will play a critical role in leading this flagship institution and our state to ever greater heights of excellence and national visibility.

Along with more than 100 programs of study offering superior academic experiences, we will build on the momentum of the Carnegie R1 designation making our great university even greater, providing each graduate with the background necessary for a lifetime of scholastic, social and professional growth, and serving as a magnet to continue drawing the best and the brightest like Katelyn, Benita, and James.
I am proud of the ways The University of Southern Mississippi has helped our undergraduate students pursue independent research to address real-world issues that affect our communities. I hope you will enjoy your time learning about current undergraduate research across the state as our students showcase their work at this inaugural “Posters in the Rotunda” event.

The continuous pursuit and creation of knowledge forms a strong foundation for robust research and creative endeavors. Discoveries in a variety of academic disciplines lead to the development of innovative products and solutions that improve the quality of life in our state, our country, and beyond. Undergraduate research also promotes a more educated workforce as participants develop career goals associated with their research and advance to specialized graduate study.

Students who generate their own research projects at the undergraduate level gain first-hand experience in identifying topics that merit investigation, designing and executing detailed research plans, applying for grant funding, and communicating their findings both in writing and via conference-style presentations. These experiences strengthen their work ethic and time management skills. Participating students are also better prepared for rigorous graduate school courses and have a higher level of confidence in their ability to succeed in master’s, specialist’s, and doctoral programs.

Thank you for your support of undergraduate research and higher education – past, present, and future. I look forward to witnessing the impact of our students’ projects in the years to come.
UNIVERSITY COORDINATORS FOR POSTERS IN THE ROTUNDA

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Director of Research Resources, Office of Research and Sponsored Programs
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The University of Southern Mississippi
Dr. Marie Danforth
Chair, Center for Undergraduate Research Steering Committee
m.danforth@usm.edu | 601-266-5629
MAP OF POSTER LOCATIONS IN THE ROTUNDA
## STUDENT PRESENTERS
### BY MISSISSIPPI LEGISLATIVE DISTRICTS AND INSTITUTION

<table>
<thead>
<tr>
<th>District</th>
<th>Senate / House</th>
<th>Student Presenter</th>
<th>Institution</th>
<th>Poster Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25</td>
<td>Katelyn Allen</td>
<td>University of Mississippi</td>
<td>19</td>
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<tr>
<td>36</td>
<td>85</td>
<td>Afua A. Antwi-Boasiako</td>
<td>Alcorn State University</td>
<td>7</td>
</tr>
<tr>
<td>27/28</td>
<td>67/68/72</td>
<td>Greg Banks</td>
<td>Jackson State University</td>
<td>12</td>
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<tr>
<td>35</td>
<td>77</td>
<td>Lashon Barnes</td>
<td>Jackson State University</td>
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<td>12/13</td>
<td>28</td>
<td>Brian Barnett</td>
<td>Delta State University</td>
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<tr>
<td>36</td>
<td>62</td>
<td>Christine Beck</td>
<td>Delta State University</td>
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<td>41</td>
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<td>Laurel Duty</td>
<td>U of Southern Mississippi</td>
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<tr>
<td>48</td>
<td>120</td>
<td>Jamie Henton</td>
<td>U of Southern Mississippi</td>
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<tr>
<td>27/28</td>
<td>67/68/72</td>
<td>Tiffanie Herron</td>
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<td>22</td>
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<td>Ricardo Jamison</td>
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<td>Joseph Jelinski</td>
<td>U of Southern Mississippi</td>
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<tr>
<td>15/16</td>
<td>37/38</td>
<td>Jenna Kilgore</td>
<td>University of Mississippi</td>
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<td>Kamberlin King</td>
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<td>Jaslyn Langford</td>
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<td>15/16</td>
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<td>Richard Y. Leonard, III</td>
<td>Mississippi State University</td>
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<td>Caroline Mensah</td>
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<tr>
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<td>Rebekah Napier-Johnson</td>
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<td>James Robinson</td>
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<td>Portia Rucker</td>
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<td>Birendra Sharma</td>
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<td>Ariel P. Walker</td>
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<td>Brianna Warner</td>
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<td>Ashanti White</td>
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<td>Benita Williams</td>
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<td>Mia Williams</td>
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<td>12/14/24</td>
<td>34/46</td>
<td>Shamiraca Williams</td>
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<td>13</td>
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<td>Angelic Willingham</td>
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<tr>
<td>13</td>
<td>28</td>
<td>Kevion Young</td>
<td>Mississippi Valley State U</td>
<td>24</td>
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</tbody>
</table>
Katelyn Allen
University of Mississippi, Oxford

Hernando, MS
Senate District 1
House District 25

Katelyn Allen is a student scholar in the Sally McDonnell Barksdale Honors College. Katelyn will appear as a co-author this year on several peer reviewed academic papers on the research she is conducting at the University of Mississippi. An aspiring dentist, Katelyn has applied to dental school at UM.

The Effects of Electron Withdrawing Groups on Halogen Bond Donors

Halogen bonding is a unique and relatively newly studied type of noncovalent interaction that has garnered considerable interest due to its potential applications in materials development.

Halogen bonding is referred to as the noncovalent interaction that can occur between a halogen atom, X, and an atom with a region of electron density on another molecule. The purpose of this research is to study the physical properties of newly-developed halogen bond donors using Raman spectroscopy and electronic structure theory. The goal is to connect the strength of the donor to structure, with a special emphasis on assigning the normal modes and determining the C-I bond strength. The most promising candidates will be used to develop self-assembled materials for use in semiconducting materials and the organic layer of solar cells.

“This work directly benefits the development of new materials and new material building blocks with potential commercial applications. These materials will be used to design self-assembled nanomaterials for solar cell and drug delivery applications, possibly leading to patents and start-up businesses based on these technologies.”

-- Katelyn Allen

Student’s Major: Chemistry (Biochemistry Track)
Faculty Mentor: Dr. Nathan Hammer
Mentor’s Department: Chemistry and Biochemistry
External Funding: National Science Foundation
Afua A. Antwi-Boasiako
Alcorn State University

Lorman, MS
Senate District 36
House District 85

Afua A. Antwi-Boasiako has received the Dean’s List Scholar and President’s Scholar Awards four consecutive times. She also has been given the Freshman of the Year Award for the Chemistry Department. After graduation in May 2017, Afua plans to attend medical school.

“Cadmium is a naturally occurring element whose presence in drinking water poses a significant threat to human health. It is vitally important to have simple to use detection technologies which are capable of selectively detecting low levels of cadmium in drinking water.”

-- Afua A. Antwi-Boasiako

Color-Indicating Sensors for Detecting Trace Levels of Cadmium in Drinks

Cadmium, a naturally occurring element in the earth’s crust, is one of the most toxic elements known. According to the Centers for Disease Control and Prevention (CDC), cadmium ranks seventh out of 275 hazardous substances in the environment. The element is present in miniscule amounts in all soil and rocks, and it is widely found in fertilizers, fuel combustion by-products, plastic toys, and many other industrial products. Because of its serious impacts to human health, it is important to have a simple means to detect the presence of cadmium and monitor its concentration in drinking water. The objective of this research is to explore the development of a color indicating sensor that can selectively detect very small concentrations of cadmium in water and use of the sensor to evaluate water sources in Mississippi. The unique optical properties of gold nanoparticles make them ideal for use in color indicating sensors. Further, immobilization of alizarin dye on the particles results in strong surface enhanced Raman scattering from the various Raman modes of the dye. In this work, alizarin was immobilized on plasmonic gold nanoparticle surfaces as a Raman reporter. Subsequently, 3-mercaptopropionic acid, and 2,6-Pyridinedicarboxylic acid at pH 8.5 were also immobilized on the surface of the nanoparticle to enable the selective coordination with the cadmium (II) ion. When the resulting sensor probe is exposed to cadmium ions in water, the alizarin functionalized gold nanoparticles undergo a color change that can be observed visually and present a similar response.

Student’s Major: Chemistry
Faculty Mentors: Dr. Aviant K. Singh and Dr. Yolanda K. Jones
Mentors’ Department: Chemistry
Developing an Android App to Control a Robot Via the RN-42 Bluetooth Module
(co-author with Mia Williams and Kirubel Tadesse)

The purpose of this project is to train undergraduate computer science and computer engineering students to integrate different technologies that enable an Android device to communicate with a Robot. This project is composed of two stages. In the first, the students learn how to use the MIT App Inventor toolboxes which include the user interface, layout, media, drawing, sensors, social, storage and the connectivity toolboxes. To assess students’ learning progress during this stage, every student is asked to develop his/her own Android app. In the second stage, the students will assemble and program the Boe-Bot Robot from Parallax Inc. and attach the RN-42 Bluetooth module to the Robot. An advanced app will be developed to connect to and control the Robot through the Bluetooth Wireless link. So far, the students were able to send data in the forward link (Android to Robot). Currently, we are working to attach some sensors and a camera to the Robot, which requires data flow in the backward link. This project is also expected to evolve to use different App development tools as well as different robot types.

Student’s Major: Computer Engineering
Faculty Mentor: Dr. Ali Abu El Humos
Mentor’s Department: Computer Science
External Funding: Federal HBCU-SAFRA Title III

"This project will help equip our computer science and computer engineering graduates with the latest technology advancements that Mississippi IT industry might be looking for such as Bluetooth and App development tools."

-- Greg Banks
Lashon Barnes
Jackson State University

Lashon Barnes is a member of the Alpha Mu Gamma Honor Society for Modern and Foreign Languages, Alpha Chi National College Honor Society, and The National Education Association. After graduation, she plans to teach Social Studies at a middle school, while returning to college to pursue her Master’s in Education. After teaching for three years, Lashon intends to earn a second Master’s in Educational Psychology to become a middle or high school guidance counselor.

“The research conducted will contribute significantly to the field of education by highlighting modes of preparation for pre-service teachers.”

-- Lashon Barnes

Passing Praxis: Fear or Procrastination
(co-author with Ashanti White)

The purpose of this study is to examine the seriousness of students in preparing for and passing the certification test. Ultimately, the objectives of this project are to (1) identify the test taking patterns of students (2) identify when and why they are taking the test (3) identify if these students are really taking advantage of the support and resources to help them pass the tests, and (4) to identify if the required core courses are providing the needed rigor for preparation.

Student’s Major: K-6 Elementary Education
Faculty Mentor: Dr. Evornia Kinkaid
Mentor’s Department: Elementary and Early Childhood Education
External Funding: Federal HBCU-SAFRA Title III
Blood Flow Occlusion Pressure at Rest and Post Low Load Exercise

The purpose of this study was to determine if arm circumference is predictive of arterial occlusion in the standing position and to determine the change in pressure before and immediately after exercise. Thirty-one participants had their arm circumference, blood pressure, and standing arterial occlusion determined before exercise. Participants then completed elbow flexions at 40% of resting arterial occlusion at 30% of their one repetition maximum (1RM). The goal repetitions for the exercise included one set of 30 repetitions followed by 3 sets of 15, with 30s rest between sets. Immediately following the last set, post exercise arterial occlusion was determined. Two different models of hierarchical linear regression were used to determine the greatest predictor of standing arterial occlusion. Our final model explained 69% of the variance in arterial occlusion with arm circumference ($\beta=0.639$, part=0.568) explaining more than brachial systolic blood pressure ($\beta=0.312$, part=0.277). Standing arterial occlusion increased from Pre [138 (15) mmHg] to Post [169 (20) mmHg] exercise ($p<0.001$). In conclusion, the cardiovascular response to blood flow restriction (BFR) in the upper arm following 4 sets of elbow flexion exercise decreases the relative arterial occlusion pressure. In addition, we confirm previous data that circumference explains the most unique variance in arterial occlusion pressure in the upper body. These findings are important as they provide additional insight into making the pressure more uniform between participants throughout exercise.

Student’s Major: Nutrition and Dietetics
Faculty Mentor: Dr. Jeremy Loenneke
Mentor’s Department: Nutrition and Dietetics

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“...This study is relevant to Mississippi as the protocol allows for the strengthening of muscles using light weights without causing damage to the muscle itself. Low levels of strength are associated with a greater risk of mortality, and this technique is a safe way to increase strength in compromised/weak populations.”

-- Brian Barnett
Christine Beck  
Delta State University

Crystal Springs, MS
Senate District 36  
House District 62

Christine Beck is a member of Phi Kappa Phi and several other honorary societies. She was named the Most Distinguished Student in the HPR Division and has received MACD Endowment Fund and Tri-Beta Research Scholarships. After graduation, Christine will eventually pursue a PhD in Mammology, specializing in the behavior and conservation of wild cat species.

“The Gulf Coast tick is present throughout the state, infesting residents with the dangerous and sometimes deadly Rickettsia parkeri bacteria. This research gives scientists a more thorough understanding of the tick-pathogen interaction, allowing for future prevention tactics of the disease.”  
-- Christine Beck

Role of Tick Antioxidants in Rickettsia parkeri Colonization in the Gulf

Amblyomma maculatum (the Gulf-Coast tick) is a proven vector for a variety of infectious pathogens, including Rickettsia parkeri (Paddock et.al. 2004) – a Gram-negative bacteria that causes spotted fever rickettsiosis. As obligate hematophages, ticks rely on blood – feeding as a necessary part of their life cycles, though it is a significant factor in the synthesis of damaging reactive oxygen species (ROS). Ticks possess a multitude of antioxidant genes to combat this oxidative stress, including those that code for selenoproteins and superoxide dismutase (SOD). The Toll pathway and the immune deficiency pathway (imd) both produce a cascade of reactions that ultimately lead to the formation of antimicrobial peptides (AMPs), which protect the tick from pathogens. Based on this information, we have formed the hypothesis that select antioxidant genes function in Amblyomma maculatum as controlling agents for R. parkeri proliferation. Utilizing real-time polymerase chain reactions (qRT – PCR) to quantify R. parkeri levels in infected A. maculatum, we discovered that R. parkeri presence tends to increase as life stages progress. Rickettsia parkeri bacteria are also typically more prolific in unfed ticks than in their blood fed counterparts. Further experiments show evidence of R. parkeri being the most abundant species of bacteria when present within a tick host. Preliminary findings of differential gene expressions show significant over-expression of the genes Sel M, O, and S as well as Cu/Zn SOD, in the presence of R. parkeri. Toll pathway genes present a similar response.

Student’s Major:  
Environmental Biology/General Biology

Faculty Mentor:  
Dr. Ellen Green

Mentor’s Department:  
Biological Sciences

External Funding:  
NIH-NIGMS/Mississippi INBRE
Roles of Osteopontin and Neutrophils in the Pathogenesis of West Nile Virus

West Nile Virus (WNV) is a single-stranded (ss)-RNA flavivirus that can cause neurological illnesses. The ability of WNV to cause these illnesses is dependent on the virus’ ability to gain access into the brain. However, the mechanism by which WNV enters the brain is still elusive. Neutrophils are the first type of immune cells that respond to chemokines and migrate to the infection sites. Previous reports demonstrated that neutrophils could also serve as reservoirs for WNV replication, and Osteopontin (Opn) is a type of chemo-attractant for neutrophils. Previous study in Dr. Bai’s lab showed that mice deficient in Opn gene (Opn-/-) are more resistant to WNV infection by reducing viral burden in the brain compared to wild type (WT) mice. Herein, we investigated if Opn plays a role in recruiting WNV-carrying neutrophils to the brain in a mouse model. After first determining a protocol for the isolation of neutrophils from mouse bone marrow, the ability of Opn to recruit neutrophils was confirmed. Neutrophils isolated from bone marrow of WT and Opn knockout (Opn-/-) mice were confirmed to carry similar WNV loads. In summary, this study has demonstrated that neutrophils can be recruited by soluble Opn, and neutrophils isolated from Opn-/- mice carry similar viral load compared to WT controls. We have concluded that reduced viral burden in the brains of Opn-/- mice was due to a lack of WNV-harboring neutrophil migration based on an absence of the chemokine Opn to recruit WNV-harboring neutrophils.

Student’s Major: Biological Sciences
Faculty Mentor: Dr. Fengwei Bai
Mentor’s Department: Biological Sciences
External Funding: National Institutes of Health and Wilson Foundation (Jackson)
Jamie Henton
University of Southern Mississippi, Gulf Park

Gulfport, MS
Senate District 48
House District 120

Jamie Henton is the president of Phi Alpha Theta History Honor Society and The History and Heritage Society on the Gulf Park campus. She is a member of Southern Connection and serves as the election commissioner for the Afro-American Student Organization. Jamie has received an Eagle SPUR grant and presented her work at the undergraduate symposium last year. After graduation, she plans to attend law school and then pursue a career as a civil rights attorney.

“My research gives a voice to those who remained or migrated to the South during the Great Migration. It also provides a new perspective on opportunity and discrimination in the North and South.”

-- Jamie Henton

To Stay in the South

“To Stay in the South,” is on the decision of African Americans to stay in the South or move to the region in the 1930s and 1940s. I began this project inspired by my grandfather, James B. Henton, who fled Mississippi to escape sharecropping, only to migrate to Louisiana. To conduct the research, I used oral histories from Duke University’s Behind the Veil Project and the University of Southern Mississippi’s Center for Oral History, as well as census records, black newspapers and periodicals to examine why African Americans would choose the oppressive South over northern states that saw an influx in African American Migration during this time period. The Great Migration was the African American movement from the oppressive South to the “land of opportunity,” namely the northern states, from World War One through the end of the Second World War. This research is significant because it fills the gap of missing knowledge on the subject of southern migration during the Great Migration. Previous work had focused on those who migrated north and their experiences. This project gives a voice to those who remained or migrated to the South due to opportunity and family. My findings showcase that historians have overstated the benefits and opportunity for African Americans who migrated to the North. Instead, oral histories have shown that African Americans found opportunity and discrimination to be equal in the North and South.

Student’s Major: History
Faculty Mentor: Dr. Douglas Bristol
Mentor’s Department: History
Tiffanie Herron
Jackson State University

Tiffanie Herron is a member of the W.E.B. Du Bois Honors College, Sigma Tau Delta Honor Society, and Who's Who Among American Colleges and Universities. Upon graduation, she plans to enroll in graduate school to pursue a master’s degree in English or Integrated Marketing Communications.

41 Shots to Fruitvale Station: Street Violence and Protest Utterances
(co-author with Ricardo Jamison and Shamiraca Williams)

In his “Radical Battle Fatigue and the MisEducation of Black Men: Racial Microaggressions, Societal Problems, and Environmental Stress”, William A. Smith asserts that microaggressions occur as a result of gendered racism. Smith goes on to assert that these conditions go on to “shape identities, motivation, dreams, activities, and the psychological and physiological welfare in people of color” (64). Drawing from Smith’s provocative explanation, our research will seek to test and implement the theory and its impact on undergraduate students at Jackson State University. Focusing on street protest and police brutality, the research will highlight the controversial relationship between Blacks and the police in the United States. Specifically, images of Travon Martin, Mike Brown, Rekia Boyd, and Tamir Rice are points of departure. We use the counterimages of Tommie Smith with his raised fist at the 1968 Olympics, Angela Davis in the courtroom, and the photo of Little Rock Nine being escorted to school. Other sources of analysis will include the song “41 Shots/American Skin” by Bruce Springsteen where Springsteen responds to the death of Amadou Diallo and the movie “Fruitvale Station” that details the death of Oscar Grant. This proposed research project aims to examine how these images, references, and other secondary sources trigger “microaggressive-like” responses in the academic and cultural climate of JSU students.

Student’s Major: English
Faculty Mentor: Dr. Ceron L. Bryant
Mentor’s Department: English
External Funding: Federal HBCU-SAFRA Title III

“By completing this project, I feel that I will be in an excellent position to transition into a society where I understand research and facts are integral for success in this society.”

-- Tiffanie Herron
Ricardo Jamison
Jackson State University

Greenville, MS
Senate District 22
House District 48/50

Ricardo Jamison is a member of Chi Alpha Epsilon National Honor Society and recently gave a presentation at the NAAAS Conference in Baton Rouge. After graduation, he plans to pursue a career as a layout editor with a national magazine.

41 Shots to Fruitvale Station: Street Violence and Protest Utterances
(co-author with Tiffanie Herron and Shamiraca Williams)

In his “Radical Battle Fatigue and the MisEducation of Black Men: Racial Microaggressions, Societal Problems, and Environmental Stress”, William A. Smith asserts that microaggressions occur as a result of gendered racism. Smith goes on to assert that these conditions go on to “shape identities, motivation, dreams, activities, and the psychological and physiological welfare in people of color” (64). Drawing from Smith’s provocative explanation, our research will seek to test and implement the theory and its impact on undergraduate students at Jackson State University. Focusing on street protest and police brutality, the research will highlight the controversial relationship between Blacks and the police in the United States. Specifically, images of Travon Martin, Mike Brown, Rekia Boyd, and Tamir Rice are points of departure. We use the counterimages of Tommie Smith with his raised fist at the 1968 Olympics, Angela Davis in the courtroom, and the photo of Little Rock Nine being escorted to school. Other sources of analysis will include the song “41 Shots/American Skin” by Bruce Springsteen where Springsteen responds to the death of Amadou Diallo and the movie “Fruitvale Station” that details the death of Oscar Grant. This proposed research project aims to examine how these images, references, and other secondary sources trigger “microaggressive-like” responses in the academic and cultural climate of JSU students.

Student’s Major: Graphic Design
Faculty Mentor: Dr. Ceron L. Bryant
Mentor’s Department: English
External Funding: Federal HBCU-SAFRA Title III

“By completing this project, the students will be in excellent positions to transition into a society where research and facts are integral for success in this society.”

-- Ricardo Jamison
Painless Hematophagy: The Role of Metalloproteases in Pain Suppression

Ticks secrete a plethora of pharmacologically active molecules in their saliva. These allow the tick to feed upon a host over prolonged periods of time in an itch free and painless attachment. The exact mechanism of pain suppression by the tick has barely been investigated. In this study, two angiotensin converting enzymes (ACEs), members of the metalloprotease family, are identified as potentially responsible for the degradation of pro-inflammatory peptides, such as bradykinin, involved in the host’s pain response. It is hypothesized that these tick ACEs block the function of bradykinin through degradation of the peptide, contributing to the tick’s ability to conduct a pain and itch-free host attachment. To elucidate the functions of the target tick molecules, the time dependent and tissue specific transcriptional gene expression has been investigated by qRT-PCR. Furthermore, an RNAi knockdown approach was used to assess the ability of saliva to degrade bradykinin in an in vitro assay. To measure degradation in ACE deficient saliva, HPLC was used to monitor bradykinin breakdown. Upon knockdown of the target genes, the ticks showed significantly reduced blood intake and the vertebrate host became highly agitated. It was observed through a HPLC of the saliva that the knockdown produced a markedly different pattern of degradation. This data, both quantitative and qualitative, shows that these genes have functional roles for bradykinin degradation and tick feeding. Therefore, these highly conserved genes are attractive targets for tick control measures, or as a novel source of analgesics for medical application.

Student’s Major: Molecular Biology
Faculty Mentor: Dr. Shahid Karim
Mentor’s Department: Biological Sciences
External Funding: NIH-NIGMS/Mississippi INBRE
Jenna Kilgore
Mississippi State University

Pelham, AL
Senate District 15/16
House District 37/38

Jenna Kilgore is a member of the Shackouls Honors College, and has been awarded a Summer Research Fellowship twice and a Travel Award three times. She has been inducted into Phi Kappa Phi and Psi Chi Honor Societies, and has received numerous scholarships. After graduation, Jenna will continue at MSU as a doctoral student in Clinical Psychology. With her degree, she plans on assisting those already incarcerated as well as those considered to be at high risk for incarceration.

“This research is relevant in the area of self-reported aggression. The reliability of the Lifetime History of Aggression measure has never been assessed in an online, longitudinal study. Our study verifies its usefulness.”

-- Jenna Kilgore

Test-Retest Reliability of Self-Reported Lifetime History of Aggression

TWe examined test-retest reliability on the 11-item self-report Life History of Aggression (LHA) scale (Coccaro et al., 1997). The LHA measures lifetime aggressive and antisocial acts using a 6-point scale (0 = “Never,” 5 = “So many times I could not give a number”). The LHA was administered online via Amazon.com’s Mechanical Turk as part of a larger longitudinal study. Participants who completed wave 1 were contacted for follow-up waves spaced 1-4 months apart and paid $1-3 per wave. Spearman correlations were computed for the full scale LHA and for each of the three subscales for waves 1 and 2 (N = 360) and waves 3 and 4 (N = 165).

All coefficients were significant at p < .05. For waves 1-2, high reliability was evidenced by scores on the full scale (r = .77) as well as scores on the other-directed aggression (r = .75), self-directed aggression (r = .76), and antisocial behavior (r = .70) subscales. For waves 3-4, moderate reliability was evidenced by scores on the full scale (r = .64) as well as scores on the other-directed aggression (r = .65), self-directed aggression (r = .64), and antisocial behavior (r = .59) subscales. Thus, LHA full scale and subscale scores yielded test-retest reliability comparable to other life history measures assessing behaviors such as tobacco use (Brigham et al., 2009), alcohol use (Friesema et al., 2004), and gambling (Sartor et al., 2007).

Student’s Major: Psychology
Faculty Mentor: Dr. E. Samuel Winer
Mentor’s Department: Psychology
Kamberlin King
Mississippi Valley State University

Validation of the Antarctic Snow Accumulation and Ice Discharge Basal Study

The largest ice shelf in Antarctica, Ross Ice Shelf, was investigated over the years of 1970-2015. Near the basal stress boundary between the ice shelf and the West Antarctic ice sheet, ice velocity ranges from a few meters per year to several hundred meters per year in ice streams. Ice velocity increases as the ice moves seaward, reaching more than 1 km yr\(^{-1}\) in the central portions of the ice front. Most of the drainage from West Antarctica into the Ross Ice Shelf flows down two major ice streams, each of which discharges more than 20 km\(^3\) of ice each year.

With changes occurring over many years a validation is needed for the Antarctic Snow Accumulation and Ice Discharge basal stress boundary created in 2003. Rapid changes occurring in regions surrounding Antarctica are causing concern in the polar science community to research changes occurring in coastal zones over time. During the research, the team completed study on the Ross Ice Shelf located on the southwestern coast of the Antarctic. The study included a validation of the ABSB vs. the natural basal stress boundary (NBSB) along the Ross Ice Shelf. The last major interest in the study included documenting the deviations or incorrect placements of the ABSB vs NBSB. ENVI 4.7 as well as ENVI 5.0 image manipulation software was used in the geo-rectifying and the geo-referencing process. Changes that occurred were documented in the form of a data table with the change that occurred along with the latitude and longitude geographic coordinates.

Student’s Major: Computer Science
Faculty Mentor: Dr. Michael Jefferson, Jr.
Mentor’s Department: Computer Science

“This study is relevant to the state of Mississippi as to preservation of historical landmarks and flood levels knowing the kilometers in which melted ice discharges down rivers’ mainstream could help economically.”

-- Kamberlin King
Jaslyn Langford
Mississippi State University

Calhoun City, MS
Senate District 8
House District 23

Jaslyn Langford is a member of the Shackouls Honors College and the Lambda Sigma Honor Society. She is president of Phi Mu Fraternity and has served on the Student Association Cabinet as well as the Student Association Class Council as the Director of Implementation. After graduation, Jaslyn plans to apply to medical school at UMMC to become a primary care physician in Mississippi.

"Mississippi has one of the highest diabetes prevalence rates in the country, so advancements through research for this disease is imperative. By committing to research of cardiovascular health in diabetic patients over the past couple of years, I feel that my work has made a difference”

-- Jaslyn Langford

RAGE Signaling is Intersected by Rap1A Crosstalk in Fibroblasts

Rap1a is a member of the Ras GTPase superfamily that acts as a molecular switch coupling extracellular events to intracellular signaling. The purpose of this study was to identify a role for Rap1a in the AGE/RAGE signaling cascade. We hypothesized that Rap1a GTPase intersects the downstream signaling modulators of the AGE/RAGE signaling cascade to promote extracellular remodeling and fibroblast function in the diabetic heart. Initial observations demonstrated significantly elevated Rap1a protein expression levels in cardiac fibroblasts isolated from diabetic hearts. Therefore, a series of studies were performed to alter Rap1a activity and protein levels to determine the influence of Rap1a in AGE/RAGE signaling cascade. Cardiac fibroblasts were isolated from diabetic (db/db) fibroblasts and non-diabetic (het) fibroblasts. A Rap1a-EPAC agonist was used to increase Rap1a activity and protein levels resulting in elevated AGE/RAGE signaling markers, such as PKC-ζ and ERK1/2 phosphorylation, α-SMA, and RAGE protein levels. Furthermore, silencing Rap1a protein expression decreased PKC-ζ and ERK1/2 phosphorylation, α-SMA, and RAGE as a result of Rap1a siRNA treatment. These studies demonstrated that Rap1a crosstalk occurred in the AGE/RAGE cascade. Rap1a involvement in the AGE/RAGE cascade identifies a new molecular mechanism, which could further potentiate fibroblast differentiation and ECM remodeling in diabetes. Deactivation of this mechanism represents a potential therapeutic approach to regulate fibroblast phenotype changes, collagen accumulation, and RAGE expression.

Student’s Major: Biological Sciences
Faculty Mentor: Dr. James Stewart
Mentor’s Department: Biological Sciences
External Funding: American Heart Association
A Mathematical Model of Inhibitory Drugs with Alzheimer’s Disease

Every sixty-seven seconds someone in the United States develops Alzheimer’s disease. According to WHO, Alzheimer’s disease is in the top ten causes of death with an upward trend. It is estimated that by 2050, 13.8 million people will have Alzheimer’s disease compared to 5 million today. The leading hypothesis for the cause of Alzheimer’s disease is the formation of Amyloid-Beta-42 (AB42) polymers that obstruct the flow of electrons through the brain causing memories to be forgotten. This process occurs when a mutated protein (Amyloid Precursor Protein or APP) begins to break down enzymes in cell membranes into a sticky AB42 monomer. These monomers then go through a polymerization process where they attach to one another and form nuclei. These then go through elongation and yield AB42 polymers. In this work, I take governing equations previously found in research published in Science magazine and add to them terms that model the presence of certain inhibitory drugs. The first proposed drug attaches to monomers and stops them from going through the polymerization process. The second proposed drug attaches to polymers and clears them from concentration completely. While some research has proposed such a monomer inhibitory drug exists, an AB42 polymer clearing drug has been found in a research lab in Japan. After obtaining these models, I analyze them with varying inputs to see how the steady state reacts.

“This research is relevant not just to the advancement of mathematical biology but to the entire world as Alzheimer’s disease is a global problem and through my research, we understand a little more about how it is that we can cure it or eradicate it completely.”

-- Richard Leonard

Student’s Major: Mathematics
Faculty Mentor: Dr. Shantia Yarahmadian
Mentor’s Department: Mathematics and Statistics
Caroline Mensah
Alcorn State University

Port Gibson, MS
Senate District 36
House District 85

Caroline Mensah has been awarded a Nuclear Regulatory Commission (NRC) scholarship and an Entergy scholarship. She is anticipating spending the summer of 2016 working with the Nuclear Technology Group of Los Alamos National Laboratory. Caroline plans to earn a master’s degree in Health Physics and pursue a professional career as a Health Physicist at a national laboratory or in a nuclear power plant.

Radiological Implications of Locally Produced Fertilizers in the State

Fertilizers play a major role in the farming industry as they tend to support plant growth and enhance crop yields. The major fertilizer ingredients of phosphate and potash based fertilizers are derived from potash and phosphate rocks originated from earth’s crust. Originated from earth’s crust, rocks contain trace amounts of naturally occurring radioactive materials (NORM). The levels of NORM in fertilizers are primarily dependent on the type of rock (potash or phosphate), amount of potash/phosphate, and their origination (geographical location). To evaluate the levels of NORM in locally produced fertilizers in the state of Mississippi, a radiological assessment study is conducted. Fertilizers of phosphate (0-46-0, P2O5) and potash (0-0-60, K2O) were analyzed via the gamma spectrometry using a 35% relative efficiency high purity germanium detector purchased from Canberra, USA for the key isotopes, Radium-226 in Phosphate and K-40 in Potash. For a comparison, the radioactivity concentration Ra-226 and K-40 were theoretically estimated. Finally, based on the obtained radio-activity levels, the radiological health parameters are computed and compared with the acceptable limits. The experimental analysis indicated mean concentrations of Ra-226, Th-232, and K-40 were 697±15, 8.9±1.0 and 47 ± 12 Bq kg⁻¹ for phosphate fertilizers, respectively. Potash fertilizers had the average levels of 1.1±0.10, 0.40 ± 0.05, and 15,162 ± 1017 Bq kg⁻¹ for Ra-226, Th-232, and K-40, respectively. The radio-activity based doses from this study indicated that the doses to workers resulted from the fertilizers are significantly higher (~4 times from phosphate and ~8 times from potash) compared to the Nuclear Regulatory Commission (NRC) recommended doses to the public (1 mSv y⁻¹).

Student’s Major: Health Physics
Faculty Mentors: Dr. Jermiah K. Billa
Dr. Girish K.S. Panicker
Dr. Steven K. Adzanu
Mentors’ Department: Advanced Technologies

“Agroiculture industry is a major contributor to the economy in Mississippi, employing approximately 29% of the state’s workforce. Fertilizers are widely used to supplement nutrients in soils. Some of the ingredients used in production of these fertilizers have significant quantities of radioactive materials.”

-- Caroline Mensah
Rebekah Napier-Jameson
Delta State University

Johannesburg, South Africa

Senate District 12/13
House District 28

Rebekah Napier-Jameson has been given the CRC Press Chemistry Award, the Martha Davis Bile’s World History Award, and is the recipient of numerous scholarships. She was on the NSISC All-Academic Team 2012-2014 and has been a member of the women’s swimming team. Rebekah already has had three publications concerning her research. After graduation, she will pursue an MPH, specializing in infectious disease and global health.

“The Gut Microbial Fauna of the Hardwood Stump Borer, Mallodon dasystomus (Coleoptera: Cerambycidae)

Fossil fuels such as oil are a major source of energy in today’s society. However, they are a limited resource. Alternative fuel sources are compounds such as ethanol. One purpose of this research project is to identify microbes that can digest cellulose and enable a more efficient and cheaper method of producing ethanol.

The hardwood boring beetle Mallodon dasystomous (the hardwood stump borer) obtains nutrients via the consumption of wood (cellulose) from trees. In order to digest the cellulose, the beetle uses microbes present within its digestive tract which produce enzymes, cellulases, which can degrade cellulose into readily absorbable compounds. The current study assesses the intestinal microbial populations of beetles isolated directly from harvested logs and beetles stressed due to being held in captivity. Larval digestive tracts were dissected into phosphate buffered saline and serially diluted. Samples were spread on a variety of different media and incubated aerobically. Microbial isolates were characterized in terms of colony morphology, cell size and shape, and cellulase activity.

To date, we have isolated over 50 microbial species, 25 of which are bacterial and four of which are yeast. Five bacterial species have been found to have cellulase activity. Current studies are being conducted to identify each.

Student’s Major: Biology/Environmental Science
Faculty Mentor: Dr. Tanya McKinney
Mentor’s Department: Biological Sciences
External Funding: USDA/US Forest Service
An Analysis of Force Loading During Heading in Women's Soccer

Women’s soccer has the highest incidence of concussion among female sports. However, there has been relatively little research investigating the immediate and cumulative effects of soccer heading on brain injury, especially among youth. To better understand concussion in women high school soccer players, we investigated force loading during heading of a soccer ball.

Data was collected from the Oxford High School Women’s Varsity Soccer Team using X2 Biosystems’ xPatch, which measures force loading magnitude and direction with six degrees of linear and rotational freedom using a 3-axis gyroscope and a high-G 3-axis accelerometer. Analysis included skill set differentiation, baseline assessment of heading skill, live-play data collection, and comparative analysis of player-by-player technique. Heading type impact data was analyzed to find if a correlation exists between the types of header (passing, shooting, clearing) and force loading. The distance, velocity, and angle of the incoming ball were varied to examine how players alter form in response to changes in these variables. In addition, form and force-loading data were con-trasted for headers performed while stationary versus headers performed while moving. Player-by-player analysis included differentiation of position (defender, midfielder, forward) to assess if correlations could be made regarding form/force loading and player position.

The overall goal is to provide prescriptive analysis and recommendation of form in relation to force loading of soccer headers with minimum training obtrusiveness and maximum player benefit. This research will raise concussion awareness and provide soccer coaching staffs with the tools to monitor and gauge the severity of head impacts.

Student’s Major: General Engineering (Pre-Med)
Faculty Mentors: Dr. Dwight Waddell
Dr. Matthew Morrison
Mentors’ Department: Electrical Engineering
External Funding: National Science Foundation
Bacterial Growth on Registered Nurses' Uniforms Vs. Student Nurses' Uniforms

The student researcher will be studying the occurrence of bacterial growth and if there is a significant difference in the amount of bacterial growth on registered nurses' uniforms as compared to student nurses' uniforms. The student researcher will swab the front exterior pockets of student nurses' and registered nurses' uniforms after a 12 hour shift with sterile swabs. Those swabs will be tested on agar plates and then incubated for 48 hours. Along with a microbiologist, the results will be analyzed to determine what bacteria and the amount of bacteria that will be found on the uniforms. These results will then be compared to determine if there is a significant difference in the amount of bacterial growth on the uniforms between registered nurses and student nurses. Although there is a high emphasis placed on proper hand hygiene among health care professionals in efforts to reduce the spread and occurrence of infections within the health care setting, little importance is placed on the cleanliness of the uniforms worn by health care providers while providing patient care. Therefore, this project is in place to determine the significance that uniforms have in the hospital setting as compared to patients and healthcare workers.

Student’s Major: Public Health
Faculty Mentor: Mrs. Laura Beth Turner
Mentor’s Department: Health and Kinesiology
The role of GenF in the asymmetric distribution of the virulence protein, IcsA in *Shigella flexneri*  
(co-author with L. D. Brandon)

*Shigella* spp. are obligate intracellular pathogens and causative agents of shigellosis. The pathogenesis of *Shigella* involves the invasion of colonic epithelial cells. Once the bacteria have entered a cell they recruit actin filaments for directional movement within these cells and for subsequent invasion of adjacent cells. The *Shigella* outer membrane protein, IcsA is the sole bacterial protein required for the recruitment of actin filaments. It is essential to *Shigella* pathogenesis in that it is targeted and restricted to the old pole of the bacterium and in that the polar distribution of IcsA is directly correlated with directional movement of *Shigella* within colonic epithelial cells and its efficient dissemination to uninfected cells. We are interested in identifying and characterizing mutations that affect the polar targeting of IcsA in *Shigella*. To this end, we have chosen to study an uncharacterized protein that is asymmetrically associated with the inner membrane of Gram negative bacteria. We have employed pcr to displace the corresponding gene (*genF*) with *natA* (nourseothricin acetyltransferase). Such mutant was subjected to surface labeling experiments using antibodies to IcsA to examine the surface distribution of IcsA on intact bacteria. We found that IcsA was associated with each bacterium in a circumferential fashion as compared to wild type strains where IcsA was located at the old pole of each bacterium. We are interested in determining whether GenF represents a putative polar target for IcsA polar targeting and subsequent polar secretion to the surface of a given bacterium.

**Student’s Major:**  Biology  
**Faculty Mentor:** Dr. Lauren D. Brandon  
**Mentor’s Department:** Biology

“*This research is aimed at uncovering a gene that may be responsible for IcsA polar targeting with the ultimate goal being to find possible cure against the disease.*”  -- Birendra Sharma
Kirubel Tadesse
Jackson State University

Kirubel Tadesse is a member of the W.E.B. Du Bois Honors College and participates in a number of professional organizations, including CodeZone, IEEE, and NSBE. He has interned at The Washington Center (TWC) where he worked for the start-up NotInMyCountry. Kirubel volunteers as a peer tutor on campus, and plans on pursuing a Ph.D. in Nuclear Engineering at Massachusetts Institute of Technology after graduation.

“This project will help equip our computer science and computer engineering graduates with the latest technology advancements that Mississippi IT industry might be looking for, such as Bluetooth and App development tools.”
-- Kirubel Tadesse

Developing an Android App to Control a Robot Via the RN-42 Bluetooth Module
(co-author with Greg Banks and Mia Williams)

The purpose of this project is to train undergraduate computer science and computer engineering students to integrate different technologies that enable an Android device to communicate with a Robot. This project is composed of two stages. In the first, the students learn how to use the MIT App Inventor toolboxes which include the user interface, layout, media, drawing, sensors, social, storage and the connectivity toolboxes. To assess students’ learning progress during this stage, every student is asked to develop his/her own Android app. In the second stage, the students will assemble and program the Boe-Bot Robot from Parallax Inc. and attach the RN-42 Bluetooth module to the Robot. An advanced app will be developed to connect to and control the Robot through the Bluetooth Wireless link. So far, the students were able to send data in the forward link (Android to Robot). Currently, we are working to attach some sensors and a camera to the Robot, which requires data flow in the backward link. This project is also expected to evolve to use different App development tools as well as different robot types.

Student’s Major: Computer Engineering
Faculty Mentor: Dr. Ali Abu El Humos
Mentor’s Department: Computer Science
External Funding: Federal HBCU-SAFRA Title III
Ariel P. Walker
Alcorn State University

Ariel P. Walker received an Academic Scholarship from ASU. She is a member of the Pre-Professional program, Honor Student Organization, and several honorary societies. She has also received a number of scholarships and has had an internship at Meharry Medical College. After graduation, Ariel hopes to study in Ecuador on a Fulbright scholarship and then attend medical school.

“Increasing ethanol tolerance in yeast strains is a first step towards engineering a microbe that specifically and efficiently uses for biofuel production agricultural products that otherwise are considered waste or of marginal value. Moreover, local facilities to convert agricultural products into biofuels can be located in the state.” -- Ariel P. Walker

Improving Biofuel Production by Enhancing Yeast Mitochondrial Activity

The need for renewable and environment-friendly sources of energy such as biofuels like ethanol is more pressing than ever. Ethanol, the fermentation product of *S. cerevisiae* becomes toxic for the microbe as its accumulation progresses, inhibiting its growth and therefore impairing ethanol synthesis. However, *S. cerevisiae* has an ethanol tolerance mechanism triggered by higher concentrations of the alcohol in which more than twenty genes related to mitochondrial function are upregulated. Because this naturally occurring mechanism of ethanol detoxification is obviously very limited, we hypothesize that genetically engineered yeast cells with enhanced mitochondrial activity will tolerate significantly higher ethanol concentrations without substantial reduction in cell growth or loss of cell viability. To test this hypothesis, we propose the following objectives: (1) To produce yeast strains that express higher levels of recombinant Ccm1p, a newly discovered multifunctional protein essential to mitochondrial function. (2) To assess mitochondrial functionality in these yeast strains. (3) To determine the degree of ethanol tolerance and ethanol production of these engineered yeast strains and study the new phenotype stability. (4) To elucidate the genetic mechanisms involved. We anticipate that the project will generate much needed knowledge in this field of study, will create an area of research that currently does not exist at our institution, and will address matters of paramount interest in terms of fuel self-sufficiency, environmental preservation, climate change, and economic development of underserved rural areas.

**Student’s Major:** Biology

**Faculty Mentors:**
Dr. Marta A. Piva
Dr. Jon I. Moreno

**Mentors’ Department:** Biological Sciences

**External Funding:** U.S. Department of Defense
Brianna Warner
Mississippi University for Women

Gulfport, MS
Senate District 48
House District 120

Brianna Warner is a 2015 Truman Scholarship finalist and was chosen to attend the Summer Public health Scholar’s Program at Columbia University. She is president of the MUW Honors Council, and has participated in the Mississippi Youth Council and Advocates for Youth Fundraising Advisory Board. After graduation, Brianna will attend law school and pursue a career in family law, particularly representing juveniles in the justice/foster systems.

“This project is important toward understanding the role that college campuses play in creating a positive environment for LGBTQ members as well as strategizing how to improve campus climate at higher education institutions in Mississippi.”

-- Brianna Warner

LGBTQ Cultural Competency Training at MUW

This study measures the current level and nature of training of Resident Advisors at Mississippi University for Women with regard to the needs of Lesbian, Gay, Bisexual, and Transgender students. This project will have strong implications for the futures of cultural competency training of staff on college campuses and improve the quality of resources for LGBT students.

Student’s Major: Political Science/Women’s Studies
Faculty Mentors: Dr. Brian Anderson
Dr. Tom Velek
Mentors’ Department: History, Political Science and Geography
Ashanti White has a passion for teaching that was ignited through several educators who she encountered from grade school through college. She has volunteered in Hinds and Hattiesburg Public School Districts since 2013, and has also observed classroom activities in the Jackson Public School District. Her motto and personal charge to keep is, “The goal of effective teaching is to reach and teach each individual!”

“Our research can be used for policy makers as an informative piece for the development of curriculum needs in order to better equip our teacher education students.”

-- Ashanti White

Passing Praxis: Fear or Procrastination
(co-author with Lashon Barnes)

The purpose of this study is to examine the seriousness of students in preparing for and passing the certification test. Ultimately, the objectives of this project are to (1) identify the test taking patterns of students (2) identify when and why they are taking the test (3) identify if these students are really taking advantage of the support and resources to help them pass the tests, and (4) to identify if the required core courses are providing the needed rigor for preparation.

Student’s Major: K-6 Elementary Education
Faculty Mentor: Dr. Evornia Kincaid
Mentor’s Department: Elementary and Early Childhood Education
External Funding: Federal HBCU-SAFRA Title III
Benita Williams
University of Mississippi, Jackson

Molecular Markers in Trauma Induced Clinical Complications as Sepsis

Severe trauma injury often leads to the development of systemic inflammatory response syndrome (SIRS), sepsis and organ failure. Most trauma patients with sepsis develop immunosuppression. This is evidenced by their inability to clear the infection. The innate immune responses mediated by Toll-like receptors (TLRs), induce early inflammatory response to the pathogen or damage associated molecular patterns (DAMPs) associated with trauma injury. Methods: A panel of molecular markers associated with TLR-signaling pathway genes was tested to evaluate trauma patients within the first week of admission. Blood was drawn at 24 hr time intervals up to one week from patients that met the inclusion criteria. Leukocytes were utilized in mRNA transcript analysis for TLR-signaling pathway genes using a gene-array. Results: TLR-1, -4, -8 and -10 were almost equally expressed day 1 in all patients. But, TLR-2 was 2.7 fold increased comparing day 1 vs. day 3 in monocytes of patients who later developed sepsis. TOLLIP, a Toll inhibitory protein also known as Cox-2 gene, was 4-fold increased in aseptic patients. The IRAK-1 (IL-1 associated kinase-1), a major mediator of the TLR-signaling pathway, was 2.5-fold increased in aseptic patients and reduced in patients with sepsis. The HMGB-1 a DAMP associated molecule was increased 5.7-fold, and CD86 an HLA-Class II receptor molecule was 15.2-fold increased in patients who later developed sepsis. Conclusion: Profiling the innate immune response signaling genes was informative and was in correlation with clinical outcomes which may help to predict the development of sepsis.

Student’s Major: Medical Laboratory Sciences
Faculty Mentor: Dr. Olga McDaniel
Mentor’s Department: General Surgery
External Funding: NIH-NIGMS/Mississippi INBRE
Mia Williams
Jackson State University

Developing an Android App to Control a Robot Via the RN-42 Bluetooth Module
(co-author with Greg Banks and Kirubel Tadesse)

The purpose of this project is to train undergraduate computer science and computer engineering students to integrate different technologies that enable an Android device to communicate with a Robot. This project is composed of two stages. In the first, the students learn how to use the MIT App Inventor toolboxes which include the user interface, layout, media, drawing, sensors, social, storage and the connectivity toolboxes. To assess students’ learning progress during this stage, every student is asked to develop his/her own Android app. In the second stage, the students will assemble and program the Boe-Bot Robot from Parallax Inc. and attach the RN-42 Bluetooth module to the Robot. An advanced app will be developed to connect to and control the Robot through the Bluetooth Wireless link. So far, the students were able to send data in the forward link (Android to Robot). Currently, we are working to attach some sensors and a camera to the Robot, which requires data flow in the backward link. This project is also expected to evolve to use different App development tools as well as different robot types.

Student’s Major: Computer Science
Faculty Mentor: Dr. Ali Abu El Humos
Mentor’s Department: Computer Science
External Funding: Federal HBCU-SAFRA Title III

“This project will help equip our computer science and computer engineering graduates with the latest technology advancements that Mississippi IT industry might be looking for such as Bluetooth and App development tools.”

-- Mia Williams
Shamiraca Williams
Jackson State University

Greenwood, MS
Senate District 14/24
House District 34/46

Shamiraca Williams is a member of the W.E.B. Dubois Honors College as well as the Tau Sigma, Golden Key, and Phi Theta Kappa Honor Societies. She was selected for Who’s Who Among American Colleges and Universities and participates in the JSU Transfer Ambassadors and Athletic Training Program. After graduation, Shamiraca plans on attending law school.

41 Shots to Fruitvale Station: Street Violence and Protest Utterances
(co-author with Ricardo Jamison and Tiffanie Henton)

In his “Radical Battle Fatigue and the MisEducation of Black Men: Racial Microaggressions, Societal Problems, and Environmental Stress”, William A. Smith asserts that microaggressions occur as a result of gendered racism. Smith goes on to assert that these conditions go on to “shape identities, motivation, dreams, activities, and the psychological and physiological welfare in people of color” (64). Drawing from Smith’s provocative explanation, our research will seek to test and implement the theory and its impact on undergraduate students at Jackson State University. Focusing on street protest and police brutality, the research will highlight the controversial relationship between Blacks and the police in the United States. Specifically, images of Travon Martin, Mike Brown, Rekia Boyd, and Tamir Rice are points of departure. We use the counterimages of Tommie Smith with his raised fist at the 1968 Olympics, Angela Davis in the courtroom, and the photo of Little Rock Nine being escorted to school. Other sources of analysis will include the song “41 Shots/American Skin” by Bruce Springsteen where Springsteen responds to the death of Amadou Diallo and the movie “Fruitvale Station” that details the death of Oscar Grant. This proposed research project aims to examine how these images, references, and other secondary sources trigger “micro-aggressive-like” responses in the academic and cultural climate of JSU students.

Student’s Major: English
Faculty Mentor: Dr. Ceron L. Bryan
Mentor’s Department: English
External Funding: Federal HBCU-SAFRA Title III

“By completing this project, the students will be in excellent positions to transition into a society research and facts are integral for success in this society.”
-- Shamiraca Williams
The Mississippi State Flag Controversy in 2001

The 2001 Mississippi state flag referendum was doomed to fail; the reasons for that is because of the overwhelming support of the inclusion of the Confederate battle emblem in the state flag by the white majority that saw the flag as a symbol of heritage and not hate, the turnout for African American Mississippi voters was low, and unlike the recent controversy in South Carolina, Mississippi did not have any violent acts happen at that time that had involved the Confederate battle flag.

The first reason was because of the overwhelming support of the inclusion of the Confederate battle emblem in the state flag by the white majority that saw the flag as a symbol of heritage and not hate. The second reason was because turnout for African American Mississippi voters was low, which would not have made a difference because they only made up a third of the state’s population. An interesting fact is that in certain counties where African Americans made up a majority of the population, the vote was more or less split. All the precincts showed that 90% of white Mississippians voted to keep the 1894 flag, and 95% of black Mississippians for the new flag design. African Americans made up only about a third of Mississippi’s electorate, so their votes alone would not have been enough to change the state flag.

The third reason was because unlike the recent controversy in South Carolina, Mississippi did not have any violent acts happen at that time that had involved the Confederate battle flag. The recent controversy surrounding the flag began when a white supremacist murdered nine African Americans while they were in worship service at a historical black church in Charleston, South Carolina. On his social media accounts, he had photos of himself with the Confederate battle flag. Mississippi did not have any racially motivated crimes that involved the Confederate battle flag at the time of the referendum.

Angelic Willingham
Mississippi Valley State University

Glendora, MS
Senate District 13
House District 33

Angelic Willingham was an honors scholar in 2014-2015 and was given the award for outstanding scholar in the History program. She is working as an intern in the MVSU archives, and has post-graduation plans to attend graduate school.

“As legislators returned to the state Capitol this 2016 session, one of the most important issues they had to address is the growing demands across Mississippi to change the state flag. My research may be conducive to the decisions concerning the state flag issue because it explores the history and causes of this issue from the 2001 state referendum to the current state flag controversy.”

-- Angelic Willingham

Student’s Major: History
Faculty Mentor: Dr. Kathryn Green
Faculty Mentor’s Department: History
Kevion Young
Mississippi Valley State University

Indianola, MS
Senate District 13
House District 28/31

Kevion Young plans to pursue a career in veterinary medicine after graduation.

“The research conducted in Kazakhstan was insightful because these blood tests are used in healthcare to determine the cause of illnesses, disease, pharmaceutical drug effectiveness, and organ function. The techniques implemented in my research are also used when working with government veterinarians in food safety, animal health, and public health.”

-- Kevion Young

Veterinary Biochemistry Technique:
Demonstrating Blood Analysis of Cattle

Hereford cattle (*Bos taurus*) are a widely-used cattle breed in temperate areas, mainly for beef production. The climate of Northwest Kazakhstan area is of sharp continental type, with hot dry summers and snowy cold winters. A routine seasonal evaluation of farm animals is required to maintain health, quality and performance. This investigation was conducted using blood analysis of thirty three physiological and biochemical indices. Ten Hereford Cattle from selection stance (Uralsk) farmlands (5:5 gender ratio) were used and each subject had two samples of blood extracted. The results from this study provided seasonal reference to the Uralsk Medical Diagnostically Centre Biochemical Laboratory for the feeding, breeding, and living conditions of the farm-raised Hereford cattle. The cattle that were used for this experimentation were in good health. Out of the ten Hereford cattle that were chosen (5 males & 5 females), the female cattle did result in higher blood count levels compared to the male cattle. Although tests revealed high levels of Creatine Kinase (CK) in 2 out of 5 female cows, and high levels of Aspartate Aminotransferase (AST) and Alkaline Phosphatase (ALP) in both sexes, these fluctuations did not have any determinable effect on the cattle’s health. Future studies should use more cattle over a longer period of time in order to determine how the seasonal variation in climate of Kazakhstan affects blood physiology.

Student’s Major: Biology
Faculty Mentor: Dr. Magauiya Gumarov
Mentor’s Department: Biology
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