



21st Annual Fisk Research Symposium



April 3, 2019



Kevin D. Rome, Sr., PhD

President



Vann R. Newkirk, PhD

Provost and Vice President for Academic Affairs



Katharine Burnett, PhD

Associate Professor, English

Co-chair Fisk Research Symposium



Sajid Hussain, PhD

Associate Vice Provost for Innovation and Information Technology

Co-chair Fisk Research Symposium



FISK

UNIVERSITY

April 3, 2019

Dear Fisk Family and Friends:

Welcome to the 21st Annual Fisk Research Symposium:

It is with great pleasure that we welcome you to Fisk's 21st Annual Fisk Research Symposium. Fisk is renowned for engaging students in research and scholarly activities. Empirical research and scholarship are grounded in its academic curriculum, campus services, and community activities. Our students, faculty and administrators emphasize the discovery and advancement of knowledge through research in the natural and social sciences, business and the humanities.

The research symposium is a time for celebrating our research, scholarship and creative work accomplishments; it is a venue to showcase, disseminate, and share scholarly contributions with other researchers and scholars. The poster presentations and dialogue with the researchers shows Fisk's commitment for critical thinking and inquiry-based learning. This year's symposium reinforces our trust that the students at Fisk receive the tools, techniques and skills essential to their intellectual growth. We have one hundred and one (101) presentations, where fifty-one (51) presentations are Oral Presentations, and the remaining fifty are Poster presentations. These are the highest ever number of presentations in the symposium history.

We highly appreciate the dedication and commitment of students, faculty, and staff. This is an event for the entire Fisk family, and we hope to continue celebrating our scholarly achievements many years in the future.

Join us in "Cultivating Scholars and Leaders One by One."

Yours sincerely,
FRS-2019 Co-chairs:



Katharine Burnett & Sajid Hussain

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21st ANNUAL FISK RESEARCH SYMPOSIUM

Wednesday, April 3, 2019

SCHEDULE

8:00am—9:15am

HBCU Wellness Panel

PJ 122

Jaelynn Bailey, Biology
Terry Blackburn, Sociology
MyKaila Jones, Psychology
Brooklyn Sims, Biology

9:30am – 12:00pm

Poster presentations— Life Sciences only Franklin Library

Theme-based Oral Presentations (Concurrent) Park-Johnson Hall

1:00 pm - 3:00 pm

Poster Presentations — Franklin Library

Lifting the Veil: Fisk and the Harlem Renaissance Library Special Collections

Theme-based Oral Presentations (Concurrent) Park-Johnson Hall

3:00 pm - 4:00 pm

Plenary Presentation: A Celebration of St. Elmo Brady & Reception Franklin Library, 2nd Floor

4:00 pm - 5:30 pm

CORE 120 presentations PJ 203

PRESENTERS

9:30am – 10:45am

Machine Learning (PJ 103)

Eirene Francis, Business Administration
Oumar Kuranga, Computer Science
Zahra Rasuli, Computer Science

Digital Humanities (PJ 322)

Jordan Thompson, English
Traveria Evans, English
Chandler Claiborne, Political Science
Colin Williams, Biology
Kiara Brewer-Carroll, Psychology
Richard Wallace, Business Administration
Mikaila Robinson, & Shelby Bullock—
Psychology
Kadeer Wellington, Art

Colonialism and UN Policies (PJ 301)

Politics and Humanism in a Digital World (PJ 107)

Nataliah Whetsone, Psychology
Dartisha Mosley, English & Music
Micah McDuff, Computer Science
Sydney Patton, Computer Science
Alliyah Robertson, Psychology
Maurisha Johnson, Political Science

10:40am-12:05pm

Business and Economics in the Global Marketplace (PJ 122)

Mekka Abdullah
Jasmin Johnson
Robert Gibson & Victor Alston
Imani Carnes
—Business Administration

Key Issues in the Contemporary Business World (PJ 305)

John Hamilton
Maya Walters; Jillian Allen; & Chelsee Harris
Angelica Kollie & Angel Hale
Ariana Young
—Business Administration

11:00am-12:15pm

Literary Spheres: Circulating Cultural Tropes through Arts and Media (PJ 205)

Caitlin Tucker, English
Anna Flood, English & Gender Studies
Traveria Evans, English & Gender Studies

Critically Examining Chimamanda Ngozi Adichie's *Half Of A Yellow Sun*: Diasporan Perspectives of Se- lect Discourses Within the African Novel (PJ 107)

Socialization and Human Develop- ment (PJ 208)

Donae McPherson, Psychology
Mikaila Robinson, Psychology
Alaya Williams, Sociology

1:00 pm - 3:00 pm

Machine Learning (PJ 322)

Denisa Buliga, Computer Science
Tykeena Watson, Mathematics
Jamaal Wells, Computer Science

Campus and University Culture (PJ 208)

Cassandra Hanna, History
Lea Weatherall, English
Kourtney Tate, Biology
Kiara Brewer-Carroll, Psychology

Computer Applications (PJ 112)

Bikki Nagarkoti
Caleb Anyaeche
Matthew Clark
Basanta Dhakal
Jagdish Ghimire
—Computer Science

4:00 pm - 5:30 pm

CORE 120

Kamari Bell; Brian Townshend; Joi
Brown; Kourtney Tate; Menelik
Demeke; Kira Currie; Camryn Brew-
er; Jaiho Masam; Genesis Lawrence;
Timberley Brown; Mikel Houston;
Nat Jossell; Kamea Massey; Terry
Gullatte

Organization

Program Co-Chairs:

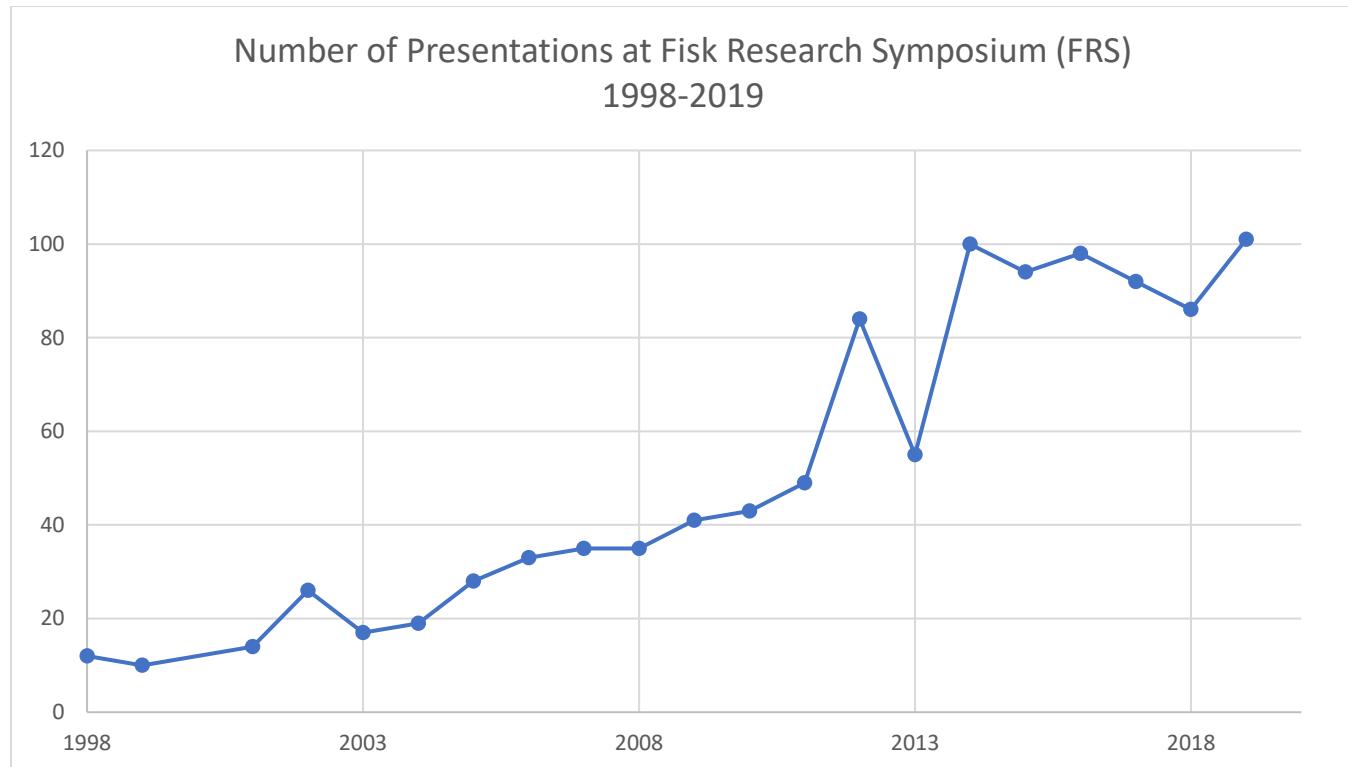
- Katharine Burnett, Associate Professor English
- Sajid Hussain, Associate Vice Provost for Innovation and Information & Technology

Organizing Committee

- Jennifer Adebanjo, Professor of Political Science
- Natalie Arnett, Chair of Dept. of Life Sciences
- Lean'tin Bracks, Professor of English
- Arnold Burger, Senior Vice Provost
- Constantine Coca, Program Coordinator, Fisk/Vanderbilt Master's-to-PhD Bridge Program
- Eugene Collins, Professor of Physics, Director of CPCoM
- Leslie Collins, Associate Professor of Psychology
- Steven Damo, Associate Professor of Chemistry
- Patrick Fleming, Director Honors Program, Assistant Professor of English
- Holly Hamby, Associate Professor English
- Shavonte Hammonds, Assistant Professor of Business Administration
- Kenneth Jones, Vice Provost for Student Success
- A. Hannibal Leach, Assistant Professor of Political Science
- Lee Limbird, Dean of Graduate Studies
- Cathy Martin, Dean of School of Natural Sciences, Mathematics, and Business
- Marcia Millet, Director of Sponsored Research Programs
- Patricia McCarroll, Instructor Biology
- Dennis McNamee, Assistant Professor of Business Administration
- Steve Morgan, Professor of Physics
- Lei Qian, Discipline Coordinator of Computer Science
- James Quirin, Professor of History
- Dani Smith, Associate Professor Sociology
- Yvette Spicer, HBCU-Wellness Coordinator
- Nicholas Umontuen, Chair of Dept. of Business Administration

Number of Presentations (1998-2019)

The objective of the symposium is to promote research and inter-disciplinary collaboration. The symposium provides an opportunity for our students and faculty to share the results of their recent research efforts with their peers and the university community. Students, faculty, and administrators from all disciplines are invited to submit their abstracts and posters. The FRS participation has steadily increased in the last two decades.



Featured Students

Alhaji Foray

Class of 2020



Hometown: Philadelphia, PA

Major: Biochemistry and Molecular Cell Biology

GPA: 3.89

Future Plans: Healthcare Professional

“ My name is Alhaji Foray and I am a Biochemistry and Molecular Cell Biology major hailing from Philadelphia, PA. I chose Fisk after they offered me the Erastus Milo Cravath Presidential Scholarship. Receiving this scholarship relieved the financial burden of college, and I've had the opportunity to flourish ever since. Throughout my time at Fisk University, I've grown immensely and have taken advantage of many opportunities that this university has to offer. I'm currently a participant of the Fisk-Meharry BS/MD program, an HBCU Wellness ambassador, and a student researcher in partnership with the American Heart Association and Vanderbilt University. In the words of James Baldwin, “The world is before you, and you need not take it or leave it as it was when you came in.” These are words that I live by. After graduating from Fisk, I plan on becoming a healthcare professional focusing on reducing the health care disparities faced by African Americans. Being at Fisk has truly polished me as an individual and has helped with my academic, professional, and personal growth. I couldn't be happier with my choice and I'm forever grateful for the opportunities that Fisk has afforded me. **”**

Anisha Mittal

Class of 2020



Hometown: Dalton, Georgia

Major: Biology

GPA: 3.98

Future Plans: M.D.

“ My name is Anisha Mittal, and I am from Dalton, Georgia. I am a middle child, and my older brother, Ashmit Mittal, is a Fisk alumnus. As a junior Biology (Pre-Medicine) major and Music (Piano/Flute) minor, I have been able to interweave two seemingly different, yet complementary, passions. Fisk, being a small, liberal arts college, has opened doors for opportunities that I may not have received otherwise. I am a participant of the Fisk-Meharry B.A./M.D. program, a student researcher as a Big Data to Knowledge (BD2K) scholar, president of the Rotaract Club of Fisk University, and a student athlete in the Fisk Women's Tennis Team, among other activities. I am grateful for the endless support and mentoring that I have received from professors who strive to push their students to unimaginable heights. In the future, I look forward to attending medical school and eventually practicing medicine in underserved areas. Thanks to Fisk's close-knit, nurturing atmosphere, I have truly been able to step out of my introverted shell and develop a network of friends, mentors, and opportunities that will guide me for years to come. **”**

Bikki Nagarkoti

Class of 2019



Hometown: Kathmandu, Nepal

Major: Computer Science

GPA: 3.99

Future Plans: Software Engineer,
Google NYC

“Namaste, everyone! I am Bikki Nagarkoti hailing from Nepal, and now a senior computer science major at Fisk University in Nashville. Thanks to the Presidential Scholarship that covered tuition, room, and board, I was able to receive a quality education, without worrying about money. The small class size has fostered good relations with my professors and peers. I got immense help and support throughout my undergraduate journey. Fisk has offered countless opportunities in college and beyond. For instance, I recently got a chance to attend Goldman Sachs' HBCU Leadership Summit in NYC. During the summer of my each college year, I did three internships at Google. I did freshman and sophomore Engineering Practicum internship at Google, Mountain View, CA and Software Engineering internship at Google, NYC. I will be joining Google NYC as a full-time software engineer in June 2019 after my graduation. I will always be indebted to Fisk and my professors. The liberal arts education at Fisk has not only shaped my overall development but also helped me look into my inner-self. **”**

Dana S. Franklin

Class of 2019



Hometown: Chicago, IL

Major: Biochemistry and Molecular Biology

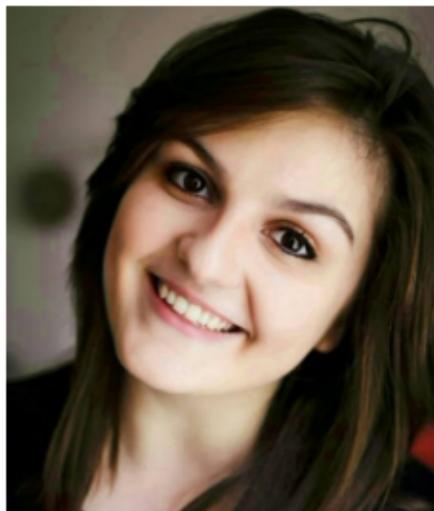
GPA: 3.31

Future Plans: To become a Microbiologist and run a research laboratory

“Hello, my name is Dana Franklin hailing from the great city of Chicago. A first-generation college student, I first started my journey here majoring in Biology. Through countless research opportunities under the guidance of my mentor Dr. Damo, I found my curiosity to be geared towards the Biochemistry program Fisk offered. I have participated in the Fisk Summer REU, UT-Knoxville Microbiology Summer REU, and the UCLA Bruins in Genomics Summer program as a student researcher. Also, I have been blessed to continue research on campus as a Big Data to Knowledge (BD2K) scholar and now as Minority Access to Research Careers (MARC) scholar. My favorite thing about Fisk is that family atmosphere it exudes from administration, faculty, and students. Many of my professors have made a positive impact on not only my life, but many of their students across campus.”

Denise Buliga

Class of 2019



Hometown: Nashville, TN

Major: Business Administration
(Accounting) - Double-Minor in
Computer Science and Data Science

GPA: 3.7

Future Plans: Intel Corporation,
California

“ My name is Denise Buliga and I am a senior graduating from Fisk University with a Bachelors of Science degree in Business Administration (Accounting Concentration) and a Double-Minor in Computer Science and Data Science. I am so thankful to be studying at an institution that values woman empowerment in technical fields, such as computer science and data science. Since freshman year, Fisk professors have fostered my interests and equipped me with the tools and confidence necessary to succeed in my career. During college, I was able to complete two summer internships at Intel Corporation in California and I will be returning to Intel for a full-time position following graduation. I strongly encourage young women to pursue technical disciplines and to consider Fisk University as a launch-pad for their careers. A high regard for academic achievement coupled with outstanding faculty support truly make Fisk University a phenomenal place to learn and grow. **”**

Eirene Francis

Class of 2021



Hometown: Nashville, TN

Major: Business Administration and Data Science

GPA: 3.86

Future Plans: Software Engineer/Data Analyst

“Hello! My name is Eirene Francis and I am from Nashville, TN. I am the daughter of two Fisk Alum from the class of 1995, Thomas and Tandekile Francis, and I have three siblings. I am currently a sophomore at Fisk University and my journey here has been full of many blessings and opportunities so far! I came to Fisk University on a combined Academic and Athletics Scholarship, as I play for our women’s basketball team. I am also the President of our Fisk Computer Science club, and the Vice President of the ENACTUS organization here on campus. At the beginning of my freshman year, I was a Business and Art double major. But while I was in Dr. Hussain’s Intro to Computer Science class, I learned the basics of Python programming which ignited my passion for coding and technology. After taking coding practice sessions through the Google In Residence Program here at Fisk, I was afforded the opportunity to be an Engineering Practicum Google Intern during the summer of my freshman year. At my internship, I worked on YouTube’s Database and UI. I will be back at Google this upcoming summer as a returning Engineering Practicum Intern to continue my growth and development in the technology industry. Here at Fisk University, I have had the opportunity to learn, grow and develop everyday, and I’m looking forward to the future ahead! 🌟”

Lyndon George Rolle Jr

Class of 2020



Hometown: Nassau, Bahamas
Major: Biochemistry and Molecular Cell Biology
GPA:
Future Plans: M.D., specializing in neurosurgery

“ Hi! My name is Lyndon, and I was provided the opportunity to attend Fisk through the Erastus Milo Cravath presidential scholarship. I am thankful towards Fisk because this scholarship has given me the opportunity to pursue my dreams. My dream is to receive a M.D., specializing in neurosurgery and to eventually own a private practice. Coming from a small country and high school, the unique family environment of Fisk University made the transition to university particularly smooth. I could not imagine being anywhere other than Fisk University. The small teacher to student ratio makes it easy to develop good relationships with professors. The professors have made my experience at Fisk particularly awesome. They have provided me with many tools and pathways to enhance and further my education. Professors ensure that we take advantage of our education and help to provide opportunities for us to further our careers. I recently participated in the Bruins-in-Genomics (B.I.G.) bioinformatics summer research program at UCLA which exposed me to groundbreaking scientific research and further ignited my passion for science. It is an absolute pleasure to interact daily with other intellectuals at Fisk. Fisk offers an unparalleled experience and I am proud to be a Fiskite! 🌟

Nancy Udunka

Class of 2020



Hometown: Houston, Texas by way of Nigeria

Major: Biology, Pre - Medicine

GPA: 3.8

Future Plans: Family Physician

“ My name is Nancy Udunka and I am a Junior Biology, Pre-medicine major. I first got to experience Fisk during Scholars Weekend where I spent three nights attending information sessions, interacting with current students, and participating in social events. This experience and the scholarship I was offered encouraged me to join the Fisk family and I could not be happier with my decision. Throughout my matriculation at Fisk, I have had the opportunity to participate in the Fisk - Meharry BS/MD Program, HBCU Wellness Initiative, and the Big Data to Knowledge Program. These opportunities have molded me into a leader and scholar, and I look forward to using the things I have learned at Fisk to succeed in my future endeavors. Fisk Forever! **”**

Oumar Karaga

Class of 2019



Hometown: Burkina Faso

Major: Computer Science

GPA: 3.99

Future Plans: Software (Site Reliability) Engineering at Google

“ Salut! I am Oumar Karaga, and I am from Burkina Faso, a French-speaking country in West Africa. I am more than grateful of my journey at Fisk University. I started out as a Mathematics major in my freshman year in 2011, my love of Mathematics has led me into Computer Science where I discovered I could do amazing things. I never would have imagined prior to 2011 that I would get such a huge opportunity as interning at Google in my freshman year. This was possible thanks to Fisk's Google In Residence Program from which I learned the basics of programming in Python. Fisk University's particularity is that professors are close to and know their students individually and make it a priority for them to prosper and pursue personal projects beyond class work. It is mesmerizing for me to imagine that there once was a time in high school that I would get scared that my laptop was broken just because I would inadvertently open the Command Line GUI on my Windows laptop! Thanks to Fisk for what it has taught me , I am glad that upon graduation I will be joining Google as a Software Engineer in Site Reliability, contributing to developing cutting-edge solutions at scale and doing so with maximum reliability. **”**

Perrin Kennedy

Class of 2020



Hometown: Southfield, Michigan

Major: Political Science

GPA: 3.46

Future Plans: Law School and a Graduate Degree in Public Administration

“ My name is Perrin Kennedy and I am from Southfield, Michigan. In Michigan, I live with my parents and younger brother. I am currently a junior at Fisk majoring in Political Science. Political Science excites me because of the impact politics plays in the lives of others. I believe that in order to be an active citizen for positive change, you need to understand politics. I chose Fisk because of the family-like environment, their focus on developing leaders, and their mission and values. I currently hold a 3.46 GPA, and I am the recipient of the 2018 National Bar Association Gateway to Success Scholarship. In 2017, I was awarded the 3rd Annual Judge Allegra L. Walker Oratorical Contest scholarship. I am very active on the Fisk campus. I am a student ambassador, a student orientation leader, a university chapel assistant, and vice president of the Political Science club. During the summer of 2018, I interned for the Detroit based company, Quicken Loans, in their government relations division. In that role, I was actively involved in the M-1 Rail Detroit Transit project, along with several City of Detroit Revitalization initiatives. After I complete my Bachelors Degree at Fisk University, I plan to pursue a joint degree in law and public administration. My long-term goal is to serve others by representing them in local, state, and federal government. ”

Prince A. Bush

Class 2020



Hometown: Nashville, TN

Major: English Major and Women and Gender Studies Minor

GPA: 3.98

Future Plans: Poet, Poetry Professor

“I am a first generation student and poet at Fisk University. I am grateful to have worked with Arctic Tusk, Rhythm & Bones Lit, Fisk Political Review, and Soft Blow. My lifelong job is one I'm currently living: to write and read poetry. I am fortunate to want a dream job that also supports my favorite activity, conversing with a poem. I want to one day give poetry readings around the world from a book of my own and I would love to win the Pulitzer Prize. At Fisk I feel like I am in conversation with the great poet Nikki Giovanni, a graduate herself.”

T. Dylanne Twitty

Class of 2019



Hometown: Cincinnati, OH

Major: Psychology

GPA: 3.68

Future Plans: Clinical Psychologist

“ Greetings! My name is T. Dylanne Twitty hailing from “The Queen City”, Cincinnati, OH. I am a senior Psychology major at Fisk University. Throughout my matriculation, I have been afforded numerous opportunities to explore different aspects of my field. This past summer, I was selected to participate in the Pre-Doctoral Scholars Institute at Louisiana State University. At LSU, I completed the project entitled “Sexual Minority Women and Cannabis Use: The Serial Impact of PTSD Symptom Severity and Coping Motives”. In addition, as a member of the W.E.B. DuBois Honors Program, I am currently working on a research project revolved around how Eurocentric beauty standards impact the self-esteem of minority women. Fisk University creates an environment that allows students to receive individualized attention and focused instruction. This safe environment has given me the confidence to push myself beyond my perceived limits and ultimately flourish beyond my wildest dreams. I plan to dedicate my career to addressing the barriers and vulnerabilities that underrepresented groups face. I’m very excited to take the skills and strategies that I have acquired from my time at Fisk University and use them in my future endeavors. ☺☺ ”

Textual Analysis of Abstracts



Vocabulary Density:

- Highest: Dept. of Business Admin (0.322); School of Humanities (0.286)
- Lowest: Dept of Life Sciences (0.252); Dept of Mathematics and... (0.260)

Average Words Per Sentence:

- Highest: Dept of Life Sciences (24.0); Dept. of Business Admin (23.5)
- Lowest: Dept of Mathematics and... (21.3); School of Humanities (22.0)

Most frequent words in the corpus: research (92); used (75); using (73); black (61); cancer (59)

Distinctive words (compared to the rest of the corpus):

- School of Humanities: infidelity (17), risky (10), archivist (9), participants (8), gothic (8).
- Dept. of Business Admin: wealth (11), businesses (10), workplace (9), foreign (9), fashion (8).
- Dept of Life Sciences: dopamine (51), genes (37), mage (25), arnett (25), poly (22).
- Dept of Mathematics and...: machine (33), python (23), songs (20), text (16), words (31).



Metrics for Abstracts of School of Humanities & Social Sciences

- Vocabulary Density: 0.286
- Average Words Per Sentence: 22.0
- Most frequent words: research (32); students (27); black (24); behavior (19); study (19)

School of Humanities & Social Sciences

Arts & Languages

1. Analyzing the Depictions of Black Familial Structures in Mainstream Media

Evans, Traveria^{1,2*}

¹English, Dept. of Arts & Languages, Fisk University, Nashville, TN 37208; ²Computer Science, Dept. of Mathematics & Computer Science, Fisk University, Nashville, TN 37208

The goal of this independent research project is to focus on the depictions of Black families in mainstream media and how this impacts the lives of Black children. In mainstream media Black families are often underrepresented and misrepresented in pop culture. Often times it is difficult for minorities to find depictions that aren't toxic and misleading that they can relate to. Specifically *Moonlight*, "Empire" and many of Tyler Perry's films will be used to highlight the familial structures and how they perpetuate common tropes and myths that ultimately contribute to Black masculinity.

Presentation Type: Oral

Presentation Themes: African-American history, Gender and Sexuality

Faculty Advisor: Katharine Burnett

2. Slavery's Eerie Presence

Flood, Anna^{1*}

¹English, Dept. of Arts & Languages, Fisk University, Nashville, TN 37208

In African American literature, the gothic has been a key component for representing slavery and its horrific nature since the nineteenth. This project investigates how the gothic contributes to sentimentalism in representations of slavery. This investigation will analyze the gothic tropes in the autobiographical narratives of Harriet Jacobs and Solomon Northup, a graphic novel adaptation of Nat Turner's confession, and the two films 12 Years a Slave and Birth of a Nation. The two autobiographical narratives offer a perspective from the nineteenth century and use the gothic to draw out a sympathy of understanding from the readers. The modern adaptations that are examined use the gothic to portray shocking aspects of slavery and aim to be emotionally disruptive to the audience. This project builds on existing work to argue that the gothic compels readers and audiences to connect to this past through the obstruction of "normal" feelings. It also investigates the reason people choose to engage with these representations. Society's reactive feelings will never truly understand the extent to which enslaved African American's suffered, but the gothic allows readers to feel and connect while maintaining a distance between sympathizer and the sympathized. I will focus on examining the contemporary adaptations of Nat Turner. The two representations that I will be engaging with are a Nat Turner (2004) a graphic novel by Kyle Baker, and Nate Parker's 2016 film, "The Birth of a Nation". Both of these representations are very visual which has a different impact on how the audience interacts and reacts to these versus the 19th century narratives. This visual presence of the gothic has more influence on sentimentalism and affect. So, for this presentation I will discuss on these two visual mediums.

Presentation Type: Oral

Presentation Themes: African-American history, Literature and Literary Studies

Faculty Advisor: Katharine Burnett

3. The New Negros New Campus: Transformations of the Black College Campus in the Early 20th Century

Hanna, Cassandra^{1*}

¹History, Dept. of History & Political Science, Fisk University, Nashville, TN 37208

The history and legacy of Historically Black Colleges and Universities has maintained a deferential presence within the hearts and minds of all those they have impacted throughout the course of their 150- year existence. However, the collective role and function of these institutions within both African American History and American society as a whole has found itself largely overlooked in terms of academic investigation. While in concept this topic has seen a recent trend, much of the history, culture, and tradition of Black Colleges has yet to find an extensive study or communal understanding. In this report, the transition and renaissance seen by a selected group of these institutions from their versatile experimental beginnings into contemporary ideas of a university will find detail and analysis through explorations of student uprising, administrative shifts, the redefining of American values as well as the growth and emergence of student expressions and engagement on their college campuses. The outlined period of conversion would very much prove critical to the development of the unique characterization HBCU's have adopted over time.

Presentation Type: Oral

Presentation Themes: African-American history, Race Relations, University Life

Faculty Advisor: Patrick Fleming

4. The Effects of Understanding Emotional Actions and Behavior of Students in a Classroom Setting

McPherson, Donae^{1*}

¹Psychology, Dept. of Behavioral Sciences & Education, Fisk University, Nashville, TN 37208

A big factor that contributes to low academic success is emotional and behavioral issues that enter the classroom with the students. The education system has tried solutions to fix behavioral issues but after awhile those solutions have little to no effect on students. Solutions have surfaced, now schools need to implement them to ensure improvement. Research has been conducted to find a more permanent solution for behavioral and emotional issues within the classroom. Social Emotional learning (SEL) is a wide concept that has been introduced in few classroom settings. This technique/curriculum has been proven to improve not only social behavior but academic success as well. Through Social Emotional Learning(SEL), students become aware of how to understand and process certain emotions as well as learning how to express anger in safe and positive ways. Due to emotional development, learning these skills early will adjust how their thought process as their brain continues to develop.

As students learn through this model, they will be able to take this skills taught and apply them to every aspect in their life.

Presentation Type: Poster
Faculty Advisor: Patrick Fleming

5. A New Web Application for Fisk Research Symposium

Nagarkoti, Bikki^{1*}

¹Computer Science, Dept. of Mathematics & Computer Science, Fisk University, Nashville, TN 37208

Fisk Research Symposium is an annual research symposium conducted at Fisk University. It provides an opportunity for our students and faculty to share the results of their recent research efforts with their peers and the university community. The objective of the symposium is to promote research and inter-disciplinary collaboration. I am currently working on a new Fisk Research Symposium as part of my senior honors project. The main goal of the honors project is to create a new platform for Fisk Research Symposium while keeping in mind the features and drawbacks of the current Fisk Research Symposium web application. The new implementation of the Fisk Research Symposium will have all the features that the current implementation has and also offers new features. The new features that are added to the new Fisk Research Symposium are as follows:

- Provide proper documentation so that new website managers can easily understand the codebase.
- Add General announcements from the Admin to all users.
- Add advisor announcements for announcements from advisors.
- Merge all the databases together so that users can refer to all the abstracts submitted on current as well as on previous years.
- Advisors can send email to advisees from within the web application.
- Admin can send email to all users/ advisees/ advisors from within the web application.
- Profile picture/ default picture.
- Crawls the web for hashtags.
- Advisors can nominate for best research when accepting a proposal.
- Clickable profile for students. (Users can click the profile of a student from abstracts to look at all the abstract submitted by that student.)

Presentation Type: Oral
Presentation Themes: University Life
Faculty Advisor: Patrick Fleming

6. Drug and Alcohol Use on Campus

Tate, Kourtney^{1*}

¹Biochemistry and Cancer Biology, Fisk University, Nashville, TN 37208

In today's society teenagers and young-adults are introduced to alcohol and drugs at an early age, but people are not aware of how often they use drugs and alcohol. The goal of this study is to see what are the factors that lead to drug and alcohol use during the school week, and not waiting to for the weekend to have fun and experiment. After conducting research, we will be able to have a better understanding on what factors students face especially at a historical black college (HBCU). Also, we will compare our research to students at predominantly white institutions, because some of the articles compare that the surroundings of white and black students. Kourtney and I are interviewing students from Fisk University who face challenges throughout the week and has made drugs and alcohol an outlet for stress. We will also be conducting a survey with questions and we would like at least twenty-five responses in order to make the data valuable and accurate. I plan on answering the question, "what are the factors that cause you to use drug and alcohol during the school week?"

My approach in this research is to anonymously survey Fisk students and supplement the data with anonymous interviews. With the idea of underage drinking and illegal drug use, having our data completely anonymous would increase the chances of accurate data. With us wanting to know the specific factors and why students do drugs while in school, surveys would be the best approach so that we can accurately speak for a broad audience. Although each person is different, there are common things that can influence a person to take part in drug use. The interviews are just extra research on a more personal level that can give insight of an average college student. Also, with surveys we can gain knowledge about the students involved in the survey. We can correlate classification, GPA, scholarships, and activity on and off campus. These factors can also play a part in why students do drugs and drink alcohol. These surveys will be conducted on Fisk '22 GroupMe offered to all freshman and some upperclassman. The survey consists of one female freshman student and one sophomore male student. Younger students tend to have more time to partake in parties and a more adventurous lifestyle, so the main focus is freshman and sophomores. There might be some complications with the amount of surveys we receive, but with the information from the interviews we can supplement more information if needed.

Questions

- Where are you from?
- Tell me something interesting about your city
- What are fun things to do? Have you ever been to any parties?
- If so, what were they like?
- Did you participate in drinking or drugs? When was the first time you drink or do drugs?
- What is your favorite alcoholic beverage?
- How often did you drink back at home?
- Would you say you drink/do drugs more in college? If so, why?
- Have you ever been around alcohol and drugs? - Comfortable/uncomfortable
- How do you feel while using drugs or alcohol? - Emotions
- What causes you to drink or smoke? - Factors?
- Have you ever tried to reduce the amount of time you drink or smoke? - How?
- Do you have a family history of drinking and smoking?
- Would you say that it is okay, because you've seen people around you do it?

Presentation Type: Oral
Presentation Themes: University Life
Faculty Advisor: Katharine Burnett
Grant: English Department

7. Women in Writing: Anne Bradstreet and Sojourner Truth

Tucker, Caitlin^{1*}

¹English, Dept. of Arts & Languages, Fisk University, Nashville, TN 37208

Anne Bradstreet's poem "Before the Birth of One of Her Children" is addressed to her husband under the pretense that she had died giving birth to one their children. This poem was written in 1678, and during this time it was very common for women to die during childbirth. As mentioned before, Bradstreet's poem is being written from her perspective to her husband. Bradstreet seems slightly apologetic yet content with her own death. She's apologetic to her husband for leaving him, but she is content because she is not just leaving this earth or leaving him alone. She is giving him a child in replacement; she is giving the world something pure in replacement of her wrongdoings. Bradstreet's use of rhyme scheme in her poem adds a romantic feel because of the words that she chooses to rhyme, and it is continuous. Sojourner Truth's speech "Ain't I A Woman" holds such a strong legacy because the message that is being conveyed in it will always be relatable to all women. Considering the current Trump era we are in Truth's speech holds as much relevance even now as it did when the speech was originally given, as many people would see the times that are being experienced today parallel to those that were experienced during the time that Truth had given this speech. There are two different versions of Sojourner Truth's speech; the fact that there are two different versions of Truth's speech, how differently they read, and who wrote them down speaks directly to the very problem that Truth addresses in her speech: that women should be seen as equal to men and given the same opportunities as men, being able to say what they mean and mean what they say without having a man come behind them and reiterate. "Ain't I A Woman" was given during a time when the fight was not only about women, but about Blacks as a whole, the place they held in society, and the importance for them to be seen as who they actually were and not what society decided to deem them as. Though Bradstreet and Truth are writing during the same era, the way they convey events happening during that time are completely different because of the difference in experiences. Bradstreet writes more subtly, and from the "angel in the house" perspective, while Truth's writing is presented to be more "hand-on" and present in the work. Bradstreet and Truth are both very strong and powerful writers, but the way in which they write and how they used to their platform to address current events and movements during that time are different.

Presentation Type: Oral
Presentation Themes: Literature and Literary Studies
Faculty Advisor: Katharine Burnett

8. What are the duties of the Archivist and how are they relevant to the United States today?

Weatherall, Lea^{1*}

¹English, Dept. of Arts & Languages, Fisk University, Nashville, TN 37208

With further research, I plan to find out what the duties of an Archivist are and how they can continue to be relevant today's America. The mission of the Archivist is to ensure the identification, preservation, and use of records of enduring value. The real start of a new archival infrastructure started in the early 1970s. They began having more major organizations and resources being made available. The archivist is very important to keeping historical records and to preserve history.

The question to answer is "What are the duties of the Archivist and how are they relevant to the United States today?" I hope to answer this question fully as to help guide me to my career path. I hope to answer everything there is about how to be an archivist and what the duties entails. Also about how they in the United States and how relevant they are as well.

To answer this question, I plan to do research from online resources and books as well. I plan to interview an archivist about their experiences and how they do their job. I plan to talk to them about how they were introduced into the archival field and their education background as well. I also plan to shadow and be mentor by an archivist to become even more acquainted with the field. My plan is on working with the archive and archivist here at Fisk University.

Presentation Type: Oral

Presentation Themes: Literature and Literary Studies, Media and the Changing Media Landscape

Faculty Advisor: Katharine Burnett

Behavioral Sciences & Education

9. The investigation of Cheating and Infidelity

Deckard, Courtney^{1*}

¹Psychology, Dept. of Behavioral Sciences & Education, Fisk University, Nashville, TN 37208

This survey is an empirical study over the factors of infidelity and the consequences. This study was conducted on the campus of Fisk University with women and men from the ages 18-49. Factors studied are 1) the duration of a relationship 2) the quality of the relationship 3) the way an individual's defines infidelity 4) the way an individual defines a relationship and 5) the effect infidelity has on individuals and their future relationships. We hypothesize that most people would define relationships as being exclusive with a significant other. We also hypothesize that most individuals would define cheating as sexual interactions over emotional attachments and have a negative reaction to being cheated on.

Presentation Type: Oral

Presentation Themes: Gender and Sexuality

Faculty Advisor: Leslie Collins

10. PERCEIVED PARENTING STYLE, SELF-EFFICACY AND COLLEGE ADJUSTMENT OF FRESHMEN UNDERGRADUATE STUDENTS

Doleman, Tyler^{1*}

¹Psychology, Dept. of Behavioral Sciences & Education, Fisk University, Nashville, TN 37208

Researchers have investigated predictors affecting students' decision to pursue higher education or to continue their education after entry to college or university. This research focuses on the relationships between perceived parenting style, self-efficacy, and college adjustment of undergraduate students. Predictors include primary and secondary school preparation, family dynamics, self-esteem, and commitment to goals, and social support systems. Yet with all the services available to students and the research conducted to better understand factors associated with these issues, there are some students who never successfully assimilate into and navigate through the university system. Therefore, through this research, the researcher examined the relationship parenting styles and self-efficacy has on a student's adjustment; as well as determined the most effective parenting style for a healthy college adjustment. This study is based on the assumption that students raised with an authoritative parenting style will have a more positive college adjustment than those raised under different parenting styles and students with a high level of self-efficacy will have a positive college adjustment.

Presentation Type: Poster

Faculty Advisor: Sheila Peters

11. Instafame: The Effects of Instagram Interactions on Perceived Attractiveness

Godfrey, Alonyia^{1*}

¹Psychology, Dept. of Behavioral Sciences & Education, Fisk University, Nashville, TN 37208

Social media is a pervasive utility that has become embedded into American culture and customs. Research has shown that social networks have begun to have a significant impact on how people interact with their environment as well as how they view themselves. This study focuses on the effect that Instagram, one of the most popular forms of social media among today's youth, has on an individual's perception of his/her attractiveness. In this context, perceived attractiveness refers to the level at which an individual believes his/herself to be sexually desirable to others. In this capacity, the researcher used both the participant's amount of likes as well as followers on Instagram to determine whether there is a relationship between one's perceived sexual attractiveness and Instagram interactions. The sample includes 51 female participants, who completed two surveys online via Google Forms. The measures included a project specific demographics survey and the Body Esteem Scale. The researcher intends to focus primarily on the factor of sexual attractiveness. This study is important because it is vital to understand not only the benefits but the repercussions that having a social media presence may have on today's youth. The expected outcome is for there to be a significant correlation between the amount of Instagram interactions as well as the individual's perceived attractiveness.

Presentation Type: Poster

Faculty Advisor: Sheila Peters

12. Reward Sensitivity And Punishment Sensitivity towards Risk Taking

Perkins, Cierra^{1*}

¹Psychology, Dept. of Behavioral Sciences & Education, Fisk University, Nashville, TN 37208

Gambling is a risk-taking activity and involves placing something of value on something with an uncertain outcome, in hopes of winning something of greater value. Gambling which is considered a behavioral addiction, causes individuals to attain positive and negative reinforcement through behaviors. The purpose of this study is to examine the combined influence of positive reinforcement using a behavioral task of gambling to measure risk taking and negative reinforcement among college students. Risk-taking involves engaging in behavior where there is a predictable potential for unwanted or negative outcome. Demographic features come to the fore including age, sex, race and classification. During this study we use Operant Conditioning theory to examine whether reward sensitivity could cause individuals to gamble based on the impact of sensitivity to punishment and reward on risk-taking. Our study is consisting of reward sensitivity as our independent variable and Risk taking as our dependent variable. Hence, we expect that risk-taking will positively correlate with sensitivity to punishment, and positively correlate with sensitivity to reward. During our research we will conduct a Quasi Experiment where we will examine whether the association between sensitivity to reward, sensitivity to punishment and risk-taking could be predicted based on learned behavior.

Presentation Type: Poster

Faculty Advisor: Leslie Collins

13. The Effect of New Knowledge on Learned Behavior

Robinson, Mikaila^{1*}

¹Psychology, Dept. of Behavioral Sciences & Education, Fisk University, Nashville, TN 37208

The basis of this study was to find out if knowledge causes a change in behavior. This was an experimental research study done amongst college students, ages 18-22, in the city of Nashville, Tennessee. This paper analyzes the research methods which included three forms of knowledge deliveries; visual, reading, and verbal. Not only did the experiment seek to find out if the knowledge impacts the participants behavior, but also if one method of delivery was better than the other. Data was collected, coded through an Excel spreadsheet, and then analyzed using the computer program known as SPSS. According to the research findings, providing people with knowledge does not have a direct correlation with a change in behavior. Observations and data showed that most participants did not change their behavior after the study was completed.

Presentation Type: Oral

Presentation Themes: Health and Wellness

Faculty Advisor: Leslie Collins

14. The Impact of Eurocentric Beauty Standards on Minority Women: A Global, Cross-Cultural Review

Twitty, Terri^{1*}

¹Psychology, Dept. of Behavioral Sciences & Education, Fisk University, Nashville, TN 37208

Women of various ethnicities face specialized obstacles, due to their intersectional identity, that are reinforced by the societal power structure in place. Due to historical factors, those of European descent have a place of dominance in societies across the globe. This place of dominance has had a direct impact on societal standards, even what society deems beautiful. As a result, there are standards in place that most women do not meet. These standards dictate what skin color, facial features, hair texture, and body type are favored in society. The purpose of this study is to discuss how Eurocentric beauty standards impact the self-esteem and overall mental health of minority women. Although this review discusses the psychological impact, the influence of history, media, and economic incentive are also discussed. Body modification, specifically skin bleaching, is an extremely lucrative business in many parts of the world regardless of the potential dangers. This study will discuss how colorism has impacted societal views of race, hair type and body type in various cultures. This research differs from previous work because it embodies a holistic approach. The comparison between the United States with Non-Western cultures, with the analysis of various facets of society, embodies a broader scope of issues. Some of the countries discussed include Indonesia, Brazil, Puerto Rico, India, and South Africa. A review of the research suggests that colorism and phenotypic discrimination have manifested within American society, as well as other global communities, and can have a negative impact on the overall life fulfillment of minority women.

Keywords: dominant, intersectionality, Eurocentric, self-esteem, mental health, non-Western

Presentation Type: Poster

Faculty Advisor: Sheila Peters

15. The Relationship Between Infidelity and Risky Behavior

Yapp, Aisha^{1*}

¹Psychology, Dept. of Behavioral Sciences & Education, Fisk University, Nashville, TN 37208

Previous research has shown that there are connections between risky behavior and infidelity such as multiple partners, substance use, and unprotected sex. However, there is very little research on the relationships between infidelity leading to risky behavior. This study seeks to explore these relationships specifically in college age students, but also in the lens of a multigenerational perspective. The empirically validated measures, Intentions Towards Infidelity Scale (ITIS) and the Risky Impulsive Self-destructive behavior Questionnaire (RISQ) will be used to access the variables of infidelity and risky behavior. The participants will take part in a within subjects' study. The goal of this study is to analyze any relationships between infidelity leading to risky behavior. One hundred participants in total, fifty participants from a small liberal arts university and fifty participants from generations beyond the average college age, will complete an infidelity screening and the Intentions Towards Infidelity Scale to measure attitudes towards infidelity. In addition, participants will also complete the Risky Impulsive Self-destructive behavior Questionnaire to measure risky behavior involvement. While data collecting is underway, the researcher hypothesizes that (1) there will be a positive correlation between college students who have been involved in infidelity and their parents who have been involved in infidelity, (2) people who have been involved in infidelity are more likely to be with multiple partners, (3) individuals with multiple partners are more likely to engage in risky behavior, and (4) college men will have higher rates of involvement in infidelity and risky behavior.

Presentation Type: Poster
Faculty Advisor: Sheila Peters

16. The Portrayals of Black Men in the Media: Comparison of Portrayals in Predominantly Black Television Shows Versus Portrayals in Diverse Television Shows

Williams, Alaya^{1*}

¹Sociology, Dept. of Behavioral Sciences & Education, Fisk University, Nashville, TN 37208

This research answered three questions (1) What were the most common portrayals of Black men? (2) Were the most common portrayals of Black men positive or negative? (3) Do media portrayals of Black men vary by the racial composition of the cast? The sample for this content analysis was drawn from approximately 1,000 available shows on hulu.com that had a Black character. Fifty shows from hulu.com were selected; one episode of each of the 50 shows was selected; one Black male was selected from each episode. The shows consisted of two classifications: predominantly Black and Diverse casts. Predominantly Black shows were determined by having at least three to four Black characters, and Diverse shows were determined by having one to two characters of an ethnicity that was not white. The selected episode of each show was either Season 1 or 2, Episode 7, depending on the content available on hulu.com. The shows were selected by browsing the available shows on hulu.com that presented a Black male character. The variables in the study were age, role, employment status, attributes portrayed, character type, type of action, motivation behind actions, and type of portrayal. Characters in predominantly Black casts were younger, played the role of father, and were portrayed more positively than in diverse casts. No difference was found between characters in predominantly Black casts and Diverse casts in terms of employment, portrayal of protagonist, engaged in positive actions, and self motivated. Fewer negative attributes were identified for characters in predominantly Black casts than in Diverse casts.

Presentation Type: Poster
Faculty Advisor: Dani Smith

School of Natural Sciences, Mathematics and Business



Metrics for Abstracts of Dept. of Business Administration

- Vocabulary Density: 0.322
- Average Words Per Sentence: 23.5
- Most frequent words: arts (22); african (21); business (21); women (20); research (19)

Business Administration

17. Beyond Borders: An Analysis of How U.S Foreign Subsidiaries Impact Current Social, Economic, and Political Mechanisms in Brazil and Nigeria

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The purpose of my research is to highlight and analyze the current social, economic, and political effects of U.S foreign subsidiaries in Nigeria and Brazil. I chose these two countries specifically due to the history of Western imperialism and colonialism in these nations. The historical background of how these countries have used or have been used by international financial institutions such as the International Monetary Fund(IMF) and the Word Bank was also strongly considered. Many have argued that the United States has had a history of interfering in the domestic situations of foreign countries, often to their demise and within the singular interests of the U.S. This research not only aims to further explores this long standing perception of international relations, it also seeks to conceptualize international relations within the framework of International Business. In addition, this research will highlight the advantages and challenges that U.S corporations face when doing business in both Nigeria and Brazil. Furthermore, I will frequently draw comparisons between the two countries assessed.

The components of my research are as follows: Part 1 will highlight a brief history of foreign subsidiaries in host countries and other developing countries. Part 2, 3, and 4 will examine the social, economic, and political impacts, respectively. These sections will address various questions including: How do the natives perceive these companies? And how have foreign subsidiaries functioned within different governments? My conclusion will feature closing thoughts and opinions on whether, conclusively, U.S foreign subsidiaries help or harm foreign developing countries.

Presentation Type: Oral

Presentation Themes: Global affairs

Faculty Advisor: Nicholas Umontuen

18. The Social and Economic Implications of Ethical Data Collection in Tech Companies

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It is no secret that computerization has an immense impact on the way organizations work. Digital technology has not only drastically changed the way managers and workers conduct their duties, it has paved the way towards a new form of capitalism, one that author Shoshana Zuboff calls “surveillance capitalism”. Zuboff explains that surveillance capitalism “claims human experience as free raw material for translation into behavioral data”. Although collected data is applied to service improvement, the rest is declared as a proprietary “behavioral surplus”, which is often fed into advanced manufacturing processes that fabricate prediction products which

anticipate individual behavior. Finally, these prediction products are traded in behavioral futures markets, and surveillance capitalists have grown immensely wealthy from trading operations in which companies are willing to lay bets on our future human behavior. This research project examines if it is ethically and legally possible for companies like Google or Facebook to collect user information in a way that stays true to their corporate framework and culture. Currently, corporations view user data as a free resource, and perhaps most alarming is the fact that these processes have developed at a much faster rate than expected, and there are effectively no laws regulating these territories. This research explores how companies have repeatedly compromised user privacy for the sake of improving user experience and delves into what citizens can do in order to retain identity in spite of corporate operations that threaten our democratic societies.

Presentation Type: Poster

Faculty Advisor: Dennis McNamee

19. Revisiting Methods in Business Psychology

Carnes, Imani^{1*}

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When looking at the key elements of successful companies there are a couple of major points that stand out; work-life balance, workspace design, employee engagement and organizational development all play a part in making a business successful. Through my research I have identified specific methods used in Business Psychology and collected data to identify what policies help to shape the most successful workspaces. I have identified four major companies of equal status, compared their policies, employee benefits, workplace atmosphere, and methods of compensation to identify which companies have the best policies; allowing them to remain profitable while having in mind the best interests of their employees.

Presentation Type: Oral

Presentation Themes:

Faculty Advisor: Nicholas Umontuen

20. The Portraying of Black Culture in Social Media as Satire.

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The goal of this independent research project is to bring awareness on how African Americans are still being negatively portrayed in today's society specifically by the media, retailers and the fashion industry. In Today's world, people talk about how much freedom African-Americans have but yet we're still the focus of Satire in many industries. Racial insensitivity to African-Americans by retailers and top fashion brands such as Apple, Audi, Gucci, Prada, H&M, and etc. is an example of one of many issues flooding social media platforms today. These acts display blatant disrespect to the history and oppression's of African-Americans. Often times it is difficult for us as African-Americans to ignore these acts of injustice; especially when it's constantly happening thus leaving our communities no other choice but to take action. These companies continuously produce products that are racially insensitive and instead of trying to address and/or correct the issue all they continuously do is offer meaningless

apologies. One of the main reasons things like this keep occurring is because the lack of diversity in today's society. Most media outlets, retailers, and fashion companies lack the diversity needed to be racially sensitive. These companies are ran by people who produce products through their lens, which is a Caucasian perspective most of the time. In order to combat issues of racial insensitivity companies need to diversify their staff and become educated on social justice issues. Taking these actions will help companies convey messages that aren't racially insensitive to not only African-Americans but all minorities.

Presentation Type: Oral

Presentation Themes: Media and the Changing Media Landscape, Race Relations

Faculty Advisor: Nicholas Umontuen

21. Does Consumerism Negatively Effect the United States

Gibson, Robert^{1*}; Alston, Victor¹

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Consumerism has become an inherent part of the American culture. In today's society it is near impossible to distinguish between it and its effects, and the "American way of life". The goal of our research was to determine if there were any negative effects to our society both culturally and economically and if so what those effects entail. To this end, extensive research was done, observing scholarly articles related to economic finance, the S&P 500, and historically significant periods such as the industrial revolution and the beginning of the technological era, all the way up to the present. Our results have indicated that the negative effects of consumerism are also inherent to our society, however, they have become subtle to the point that it does not negatively impact the majority on a singular level.

Presentation Type: Oral

Presentation Themes: Global Affairs

Faculty Advisor: Nicholas Umontuen

22. Hamilton's Hunting Shack

Hamilton, John^{1*}

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The concept of my business is Hamilton's Hunting Shack is a retail store that sells hunting and fishing gear, guns and ammo, as well as other outdoor products to the public. Our family is very much the outdoors type people and have experience shopping in these types of store, and knowing what the customer base needs and wants are. The target market is one we are familiar with because we are in our target market. We have high hopes to expand our business to a larger store someday to compete with our competitors. The projected future of Hamilton's Hunting Shack is positive and profitable. Hamilton's Hunting Shack has very simple goals. The vision and mission statement show that our company wants to provide necessary gear for all types of outdoorsmen, at a good, quality driven price, for them to have a successful outdoors experience. As Hamilton's Hunting Shack grows, so will our value and drive to succeed.

The mission of my business is to provide the consumer with good quality outdoors items, at fair and reasonable prices, with good customer service thrown in. The goal is to compete with the national brands and be able to provide the consumers with the items at a good price.

Vision Statement: For all outdoorsmen to be comfortable and happy in their comfort place.

Mission Statement: To provide outdoorsmen with the necessary gear for a successful outdoor experience.

Presentation Type: Demo

Faculty Advisor: Nicholas Umontuen

23. The Key to Becoming a Successful Black Owned Business

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A famous quote from Frederick Douglass states, "Who you give your money to, is who you give your power to." From businesses such as The Crayon Case, Roots Beauty Supply, and Slim & Husky's, there has been a significant increase in black-owned businesses that quickly made a name for themselves and their success. They have paved the way by finding a market that is in high demand for something new, innovative and creative. From how they price their product, to establishing sponsorships, brand ambassadors and influencers, these businesses are taking every detail into consideration to guarantee their long-term success. It is important to support black-owned businesses because they play a vital role in entrepreneurial opportunities for other black people to succeed. The rate of African American college graduates from the ages of 22-27 unemployed is at a staggering 12.4%. This validates that they are not getting hired based on skin color or their name on a resume. The real issue that lies here is that there aren't enough black-owned business to employ black people who are looking for work. It is up to us, African Americans, to create opportunities that leave a legacy and positive impact within their community from an economic, social and psychological perspective if we desire to see change. In this research presentation, there will be an analysis of the main characteristics of these thriving businesses and how to discover a need within your own community to create your own business and become successful with this newly, discovered information.

Presentation Type: Oral

Presentation Themes: Race Relations

Faculty Advisor: Nicholas Umontuen

24. Globalization and Income Inequality in Developing Nations: Examining the Correlation between the Gini Index and the Foreign Trade of Select Latin American Nations from 2004 to 2013

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There has been a debate for many years on the correlation between increasing globalization, which can quantitatively be represented as an increase in foreign trade, and income inequality. Many economists have

argued that there is a positive correlation between the increasing globalization of nations' economies and their domestic income gap. This case study seeks to provide more conclusive evidence on the correlation between globalization and income inequality in a select cluster of Latin American nations which includes nations that are developing at various rates. Eight countries which had enough data for a ten-year period from 2004 to 2013 were chosen for this cluster: Argentina, Bolivia, Brazil, Honduras, Panama, Peru, Paraguay, and El Salvador. The Pearson Product Moment Correlation Coefficient was used to determine the strength of the correlation between each country's Gini Index and the trade (total, exports, and imports) as a percentage of GDP and then its p value, also known as its significance level, was tested against an aof .05 representing a 95% confidence interval. The results showed no statistically significant correlation between income inequality and trade in seven of the eight countries. However, one country, Honduras, did have strong positive correlations between all three forms of trade and its Gini index. Further research would need to be conducted to understand this phenomenon.

Presentation Type: Oral

Presentation Themes: Global Affairs

Faculty Advisor: Dennis McNamee

25. African American Women breaking the glass ceiling in the workplace

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African American women have broken a lot of barriers over the years, but one that still remains stagnant is African American women in the workplace. The purpose of this research is to gain an understanding of African American women in the workplace regarding what is holding them back from excelling in the workplace into top management positions and the pay gap that they are facing and to also shine a light on African American women that have broken the glass ceiling in the workplace and how they did so. Ursula Burns, Rosalind Brewer, and Oprah Winfrey are a few African American women that have broken the glass ceiling in the workplace in more ways than one. Ursula Burns (Xerox) was the first African American woman to lead a large publicly traded company and was also featured in the list of world's most influential women CEOs. Rosalind Brewer (Starbucks) is the first African American woman to hold the position of COO (chief operating officer) and group president of Starbucks. Oprah Winfrey is an African American media mogul and entrepreneur. Some key factors that contributes to these women success in penetrating the glass ceiling includes survival skills, network/support system, work ethic, mentors and sponsors, a sense of self-worth and self-confidence, spiritual values, balance in life, leadership style, and cultural identity. Some characteristics are unique to an African American woman that create a cultural model of success which are networking support system, their spiritual values, and cultural identity. The significance of the glass ceiling is twofold: it acts as a pay cap for women; and in the case of African American women it serves to maintain social separation between blacks and whites, which often results in white domination. The overall impact on African American women as a group is that it effectively cuts the pool of potential corporate leaders by eliminating over one-half of the population, and deprives our economy of new recruits and alternative sources of creativity for policy making and implementation i.e. the pioneers of the business world (MSPB, 1992).

Presentation Type: Oral

Presentation Themes:

Faculty Advisor: Nicholas Umontuen

26. Can Women Have It All?

Mhoon, Emani^{1*}

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Over the course of the past several years, there has been significant changes in terms of women employment. Women are no longer confined to working inside the home and they currently make up more than half the workforce. Recently, women have continued to break glass ceilings and participate in more demanding and challenging careers. While women are making great strides today, they continue face challenges of dealing with internal bias, discrimination, maintaining a work-life balance, and dealing with further internal workplace structures. These structures include glass ceilings, imposter syndrome, lack of institutional structure and intersectionality. If a woman must face all these challenges along with the challenge of raising a family, then how can a woman have it all? The “all” is known as the second shift phenomena- the is the idea of having a high profile, ambitious job while also raising a family. This study reveals the hidden barriers that women face in the workplace. How do women who accept the challenge of balancing their careers with their personal lives cope with the impact their ambitions have on their family’s well-being and familial relationships? Given the stipulations that women face, this study proves that women cannot truly have it “all”.

Presentation Type: Poster

Faculty Advisor: Dennis McNamee

27. The Nature of Generational Wealth

Stephens, Sidnie^{1*}; Jones, Azariya^{1*}; Lee, Zachary¹

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The wealth gap among African Americans is a problem that most people are aware of in the abstract. The depths of the issue, however are more than most people realize. At the current pace, the problem isn’t going away anytime soon. Wealth disparity among black families will take years to amend. Generational wealth, financial assets that are passed on and built upon with each generation within a family, is particularly important to future financial security. It’s the foundation for opportunities and gives access to better education, health, and jobs. The racial wealth gap “starts with our nation’s history of institutionalized racism, discrimination, bias, and restrictions from information and opportunity,” says Rodney Sampson, cofounder of Opportunity Hub, the biggest black-owned multi-campus entrepreneurship center and technology hub in the United States. Although these constructs remain today, he goes to say, “black Americans through exposure, knowledge and access to work, entrepreneurship, and investment opportunities in the innovation economy have the greatest opportunity to create new multi-generational wealth with no reliance on pre-existing multi-generational wealth.” Black Americans’ financial legacy is more important than ever, and one group in particular who can start to make a difference in the wealth gap, are black millennials. This group is more independent and was given a different type of opportunity to further their education than the generations before them had; which in turn results in the possibility to create more opportunities and be more innovative to help accumulate the wealth their parents were not able to. As millennials prepare to become the largest generation in the U.S. and the largest group in the workforce, it’s just the right time for black millennials to start securing their legacies by building the generational wealth needed to close the racial wealth gap.

Presentation Type: Poster
Faculty Advisor: Nicholas Umontuen

28. The Unethical Behavior and Unoriginality of the Beauty&Fashion Industries.

Thomas, Calia^{1*}

¹Dept. of Business Administration, Fisk University, Nashville, TN 37208

Purpose: Discussing the ethics of this industry and how.

Research Question: How unethical behavior in the fashion and beauty industries continue to demonstrate a lack of ethics, no matter how people try to act as if certain practices don't exist.

Background: Fashion has always been important to me. We do not have a major here at Fisk, but the behind the scenes of it all is very interesting. It is even more interesting than the clothing and makeup itself. While looking into this information, you have to realize that the truth will never be revealed completely but not hidden easily either. This research will include the testing on animals, low wages for extreme amounts of work, starvation, copyrighting and even drug use. Once you start to realize how things are concealed in this industry, so I must speak out. For Example: There are designers who get their designs stolen by big brands such as Chanel.

Presentation Type: Poster
Faculty Advisor: Dennis McNamee

29. Technological advancement and its impact on (small) businesses

Wemyss, Zachary^{1*}; Armstrong, Achiante^{1*}; Butler, Tyler^{1*}; McGlory, Ronald^{1*}

¹Dept. of Business Administration, Fisk University, Nashville, TN 37208

Technology has revolutionized the way companies conduct business by enabling small businesses to level the playing field with larger organizations. While, there have certainly been a number of things that we could do without, technology has also been extremely beneficial to business development. The powerful, transformative impact is clearly seen in the world of business, with small businesses enjoying the benefit of innovative products like handheld point of sale systems, digital advertising/ marketing and the Internet of Things(IoT). Small businesses use a variety of tech to develop competitive advantages on the economic market, from services to mobile devices. Small business owners have access like never before to a wide array of products and capabilities which they simply would not have the market power or capital to support otherwise. All small business owners should consider implementing innovative technology into their planning process for streamlined integration and to make room for future expansion.

Presentation Type: Poster
Faculty Advisor: Nicholas Umontuen

30. The Importance of The Arts in Primary Education

Young, Ariana^{1*}

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Art is a topic many think little of because they feel school should be all about arithmetic and writing. With art students are able to express themselves by creating unique works and having pride in what they have created in the end. Visual and performance expression can enhance one's personal growth increasing their self-esteem and confidence. It takes time to learn and perfect skills in core classes and that holds true for the arts. It is necessary to develop and direct students with quality lessons in all areas of study to build their comprehension and view of the world we live in. Paul G. Allen, Co-Founder of Microsoft once said, "The rapidly evolving global economy demands a dynamic and creative workforce. The arts and its related businesses are responsible for billions of dollars in cultural exports for this country. It is imperative that we continue to support the arts and arts education both on the national and local levels. The strength of every democracy is measured by its commitment to the arts." Arts are a monetary power in our society from fashion design and movie production to engineering. Art is prevalent in most if not all industries and it needs to be recognized as a valuable component of the curriculum in primary education.

Studies have shown that the benefits of Arts in education are the development of motor skills, language development, decision making, visual learning, innovation, cultural awareness, and improved academic performance. According to the Brookings Institution, "Engaging with art is essential to the human experience. Almost as soon as motor skills are developed, children communicate through artistic expression. The arts challenge us with different points of view, compel us to empathize with "others," and give us the opportunity to reflect on the human condition". Copyright laws were developed based on the judicial system realizing that the need to create and be inspired by arts and the need for inspiration for other art. In this project, we will do extensive research on why art is important in primary education.

According to the National Center for Education Statistics, "In music, female students scored higher on average than their male peers, and students in private schools had higher average scores than students attending public schools. Students in the Northeast scored higher on average in visual arts than their peers in the other regions. There were no significant differences in the percentages of students who reported taking a music class between male and female students and between students attending public and private schools. A higher percentage of students in the Northeast reported taking a visual arts course than their peers in the other regions." From this statistic we can infer that in some parts of the country such as the Northeast, Art has some importance in the school system whereas in other regions not so much. Then the question comes, why is that? The Arts should be equally important all across the nation. The Arts is much more than just something fun to do but it helps children grow in more ways than we think.

Art can also be inclusive in being important in child development. According to an article by Extensive, "Art develops a child's physical development such as their large and small muscle development as well as their hand-eye coordination. Using crayons, markers, and paintbrushes helps children practice the fine motor control they will need for writing later on. It also helps in social development by children being able to interact with one another be responsible for cleanup, and to put materials away, which can ultimately help their social learning skills. By cognitive development, children can learn the names of colors and shapes through creative art activities. They find out what happens when they mix two primary colors together and get a secondary color. Sending older children outside to carefully examine a tree, feel its bark, and study the shape and color of its leaves, and then asking them to draw or paint trees helps them develop observational skills needed for science. Art also aids in

emotional development. Through creative art, children may be able to represent experiences that they cannot verbalize. They may draw pictures out of proportion, exaggerating things that are important to them. When we value children's creativity, we help them feel valued as people, raising their self-esteem." From this article, we see that Art not only is something that children can do just for fun but it truly helps them develop individually that will ultimately help them as they are constantly growing up.

Finally, we conducted a survey analyzing the importance of the Arts in primary education. Some of the Questions that we posed were: Do you feel that the Arts are important in primary education? (Yes or no), Why do you feel that way?, and In what ways do the arts enhance a child's experience? We received 8 responses total and out of those 8 responses 100% of them felt that the Arts are important in primary education. When asked why they felt that way, some responded with it helped them in school, believed that every child should be well rounded and exposed to different principles, and Had a Music Teacher who was extremely passionate about Music, and taught them how to play the Violin, the recorder, taught them how to sing, how to read music, and introduced them to many different musical ideas. When asked about what can be done to enhance a child's experience and how the arts does that, some said more funding for the programs to be implemented, it allows students to explore new things and be open minded, and even opens up their creativity and gives them a new perspective on life rather than just what they are taught in a basic curriculum. From this survey, we can take that most of the people who answered were exposed to the arts at a young age in some form or fashion and they believed that it is important and aids in the development of a child.

In conclusion, from the statistics and other research we feel that the Arts is very important in primary education. It not only helps in a child's creative abilities, but it also helps in the development of a child. Just as much as children needs science, technology, math, reading, and English, they also need art and music. They all correlate hand in hand with each other and helps extensively with children.

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Presentation Type: Demo

Faculty Advisor: Nicholas Umontuen



Metrics for Abstracts of Dept. of Life Sciences

- Vocabulary Density: 0.252
- Average Words Per Sentence: 24.0
- Most frequent words: dopamine (51); cancer (43); using (39); research (38); water (38)

Life & Physical Sciences

31. Examination of downstream targets of the FKH-8 transcription factor in dopaminergic neurons

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The transcription factor forkhead-8 (FKH-8) is enriched in dopamine (DA) neurons and is required for DA neuron function. Disruption of the *fkh-8* gene mimics the swimming-induced paralysis (SWIP) phenotype characteristic of loss of the dopamine transporter (DAT). DAT is responsible for the reuptake of excess dopamine from the synaptic cleft after its pre-synaptic release, and loss of DAT function results in excess dopamine in the synaptic cleft and spillover into extra-synaptic areas. This spillover of dopamine results in the hyperdopaminergic state seen via the SWIP phenotype.

However, neither the expression nor function of DAT-1 are altered in *fkh-8* mutants compared to wildtype worms, and FKH-8 does not seem to impact genes in the dopamine synthesis pathway. While FKH-8 has been shown to regulate important DA neuron functions through phenotypic assays, downstream genes have yet to be identified. Because FKH-8 acts independently of the well-studied DAT-1 transporter, it is likely that its targets will include a number of novel genes whose impact on dopamine signaling have yet to be revealed.

Cell-specific RNA sequencing comparing gene expression in dopamine neurons isolated from wildtype vs. mutant organisms will identify what genes are important in dopamine signaling in the model organism *Caenorhabditis elegans*. More specifically, it will reveal targets and gene expression patterns that are altered by loss of FKH-8. in dopamine neurons.

We anticipate that using this unbiased approach to identify novel genes critical for these functional outcomes in *C. elegans* will provide fundamental new biological insights as well as potential novel molecular targets for therapeutic intervention.

Presentation Type: Poster

Faculty Advisor: Brian Nelms

Grant: NSF CREST BioSS Center Grant HRD15-47757

32. Characterizing dopamine neuron genes in the model organism *C. elegans*

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Dopamine is an important neurotransmitter that functions in the brain. Unregulated levels of dopamine are associated with various human health conditions such as Parkinson's, Amyotrophic Lateral Sclerosis, depression, and drug addiction. Currently, we are identifying dopaminergic neuron genes and their impact on the regulation of the dopaminergic pathway in the model organism *Caenorhabditis elegans*, which despite a different overall

anatomy, still has similar dopamine neurons and many genes similar to those in human. Through cell-specific RNA sequencing, we have identified over 500 genes enriched in dopamine neurons. We describe the characterization of two of these, hsp-12.6 and pals-8. HSP-12.6 is a heat shock protein homologous to human alpha-crystallin B. PALS-8 is uncharacterized but shares some homology with ALS2-CR12 in mice, which phenotypically presents in loss of voluntary movement and has connections to ALS in humans. To test dopamine neuron function in *C. elegans*, we performed a dopamine-related movement assay, the swimming-induced paralysis (SWIP) assay. Mutations in pals-8 cause a slight defect in dopamine-related movement, but mutations in hsp-12.6 have a faster swimming-induced paralysis than wild-type *C. elegans*. Now, we are confirming the dopamine-dependence of these effects through genetic experiments and hope to gain further insight into the molecular mechanism of these proteins in regulating dopamine neuron function.

Presentation Type: Poster

Faculty Advisor: Brian Nelms

Grant: Fisk/NSF BioSS CREST Center (grant #HRD15-47757)

33. Quantitive study of dopaminergic phenotypes via computer-aided video analysis

Garriga, Gustavo^{1*}; Nelms, Brian¹

¹Biology, Dept. of Life & Physical Sciences, Fisk University, Nashville, TN 37208

Dopamine is an important neurotransmitter that regulates a myriad of brain functions ranging from motor control to memory and learning. Dysregulation of dopamine is associated with multiple disorders including Parkinson's disease (PD), attention deficit hyperactivity disorder (ADHD), addiction, and schizophrenia, among others. In order to better understand dopamine function at the molecular level we are investigating the roles and regulation of dopaminergic genes using *Caenorhabditis elegans* (*C.elegans*) as a model system. Current commonly used methods examining dopaminergic genes in the lab lack the capacity to capture nuanced differences in movement defects. To address this issue, we are conducting swimming induce paralysis (SWIP) assays using a computer-aided video analysis system, allowing us to collect more nuanced data to uncover new phenotypes and discover roles for genes involved in dopaminergic signaling. We have selected strains with mutations from among a list of candidate genes (including cpx-1, hsp 12.6, amx-2, calf-1) we identified as highly enriched in dopamine neurons to test and group based on similar phenotypic patterns. We know that these 4 candidate strains show accelerated swimming-induced paralysis when compared to the wild-type strain, N2, but we hope to gain more insight into specific rates and patterns of paralysis and apply to future, unknown candidate strains.

Presentation Type: Poster

Faculty Advisor: Brian Nelms

Grant: NSF CREST Grant #HRD1547757, NIH BD2K R25 Grant #1R25MD010396-01, DOE Title VII Grant MD-HBCU #P382G090004

34. Identifying Genetic Targets of the Transcription Factor FKH-8 in *C. elegans* Dopamine Neurons

Hanna, Marina^{1*}

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Dopamine (DA) is an important neurotransmitter. DA neurons are involved in both motor and cognitive functions, and disruption of DA signaling is associated with multiple diseases and disorders, such as Parkinson's disease, depression, addiction, and ADHD. A better understanding of the molecules that control DA neuron fate and function can help us target and genetically treat these diseases. The transcription factor FKH-8 regulates the expression of other genes and is enriched in DA neurons from embryonic development and continued through adulthood. Loss of FKH-8 results in a DA-dependent movement defect – swimming induced paralysis (SWIP). Cell-specific RNA sequencing has the power to identify all genes that are expressed in a cell and has identified 534 genes abundantly enriched in DA neurons. Using RT-qPCR to validate these data, we are quantifying and comparing the expression of target genes in the presence (wildtype) versus absence (knock out) of FKH-8 in whole-worms and in DA neurons. From these data, we are able to characterize FKH-8's role in regulating

Presentation Type: Poster

Faculty Advisor: Brian Nelms

Grant: NSF CREST Grant #HRD1547757, NIH BD2K R25 Grant #1R25MD010396-01, NSF RIA Grant #HRD1401091

35. The role of epigenome modifiers in eliciting expression of MAGE-B2, an oncogenic member of CT-antigen family

Jackson, Richala^{1*}; Coleman, Ashley¹; Ramanathan, Saumya²

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Cancer-testis antigens are a group of tumor-associated genes that are not expressed in any normal tissue except the testis but erroneously expressed in many cancers. The expression of these genes usually correlates with poor patient prognosis. Melanoma Antigen Genes (MAGEs) are one family of such cancer-testis antigens that are located on the X-chromosome. The topic of this research is focused on MAGE-B2. We are testing the hypothesis that like many germline genes, MAGE-B2 gene expression is regulated by epigenetic mechanisms. The goal of our research is to determine whether environmental stressors like BPA, BaP, Arsenite, Chromium or Hypoxia, can elicit MAGE-B2 gene expression via epigenetic mechanismssuch as CpG methylation or histone modifications. We are using HEK cells that express low levels of MAGE-B2 to determine whether we can cause an increase in expression by the addition of these stressors. We will measure MAGE-B2 expression by RT-qPCR. Our goal is to determine whether MAGE-B2 is an oncogene that is expressed by epigenetic modifications.

Presentation Type: Poster

Faculty Advisor: Saumya Ramanathan

Grant: NSF RIA : HRD1764201

36. Melanoma Antigen Genes (MAGEs): Drivers or Passengers in CARcinogenesis

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Cancer Testis Antigens (CTAs) comprise a group of genes that are ordinarily expressed in the testis but abnormally expressed in a variety of cancers. Melanoma Antigen Genes-A (*MAGE-A*) are Type I CTAs whose expression in cancers has been correlated with poor patient prognosis. The biological function of several members of the *MAGE-A* gene family in cancer remains unclear. We have shown that *MAGE-A* gene expression is regulated by epigenetic mechanisms such as CpG methylation. Our data also indicate that several *MAGE-A* genes can act as single gene drivers of cell proliferation and anchorage-independent growth. We will investigate the molecular mechanisms that *MAGE-A8* and -*A9* use to enhance cell proliferation by performing RT-qPCR arrays for cancer-associated genes and determine binding partners of these MAGE proteins using IP-mass spectrometry methods. Elucidating the role of MAGEs in cancer may provide insight for development of novel therapeutic interventions.

Presentation Type: Poster

Faculty Advisor: Saumya Ramanathan

Grant: NSF Research Initiation Award to S.R. #HRD1764201, Department of Education Award # P382G170104 (TITLE-VII)

37. Determining molecular mechanisms for MAGE-B2 -driven increases in cell proliferation

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Melanoma Antigen Genes (MAGE) are genes associated with cancer. Type I MAGEs are typically restricted to expression in the germline and then aberrantly re-expressed in many cancers. Type II MAGES are more ubiquitous in their expression. The overall goal of the laboratory is to reveal the mechanisms that regulate MAGE expression and to determine how these genes contribute to the development of cancer. MAGE-B2 is a member of the Type I MAGE gene family. Using bioinformatics analysis of the Cancer Genome Atlas (TCGA), we have re-confirmed that MAGE-B2 is not expressed in normal tissue but is expressed in the testis and in a wide-variety of cancers. When normal cells are made to express MAGE-B2 protein, they proliferate faster and form colonies in soft agar, which is a hallmark of cancer. To determine pathways that MAGE-B2 regulates, we performed RT-qPCR arrays probing for cancer associated genes in MAGE-B2 expressing cells. We found that TGF- β target genes are down-regulated when MAGE-B2 is expressed. These data are consistent with our hypothesis that MAGE-B2 expression may be causal for transformation of normal cells to proliferative cells capable of growth in agar. Using a combination of IP-Mass Spectrometry and *in vitro* binding studies our future goals are to determine the binding partners of MAGE-B2.

Presentation Type: Poster

Faculty Advisor: Saumya Ramanathan

Grant: ADJ is a MARC Scholar funded by NIH NIGMS T-34 155501. This research was funded by NSF RIA HRD-1764201.

38. Single Cell Heterogeneity in Small Cell Lung Cancer (SCLC)

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Lung cancer is an aggressive disease and the leading cause of cancer death in the United States. In 2019 alone, the American Cancer Society predicts that approximately 228,000 people will be diagnosed with lung cancer and 142,000 lung cancer deaths will occur in the US. Small Cell Lung Cancer (SCLC) is a specific form of lung cancer that is particularly aggressive and represents about 15% of people diagnosed with lung cancer. It has long been known that SCLC is a heterogeneous cancer, but, for over 50 years, there has been no alteration in the standard treatment (a regimen of chemotherapy) for all patients with this disease and the 5-year relative survival rate has not surpassed 8%. Recently, our laboratory has applied *in silico* methods to RNA-seq data from SCLC cell lines to define four distinct phenotypic subtypes of SCLC and determined that responses to various treatments *in vitro* differs by subtype. I hypothesize that individual cells within SCLC tumors reflect each of the subtypes and that tumors are comprised of mixtures of cells in these different phenotypes in different proportions. I further hypothesize that SCLC cell lines are a composite of different phenotypes as well, and can be used as a faithful *in vitro* experimental model for tumors. In this research I will use mass cytometry on SCLC cell lines (as representatives of patient tumors) to validate the presence of all four phenotypes at the single cell level and examine their relative abundance. If my hypothesis is correct, then individual cells within the patient-derived cell lines will cluster based on their relative levels of expression of the set of biomarkers. Moreover, cell lines will reflect the heterogeneous composition of tumors. Since individual cell lines have unique sensitivity to different drugs, we also expect the relative proportions of the cell types will change dynamically in response to treatment. Characterizing these response dynamics at the single cell level should enable the design of mixed drug cocktails that more effectively manage the entire cell population.

Presentation Type: Poster

Faculty Advisor: Brian Nelms

Grant: WMK is funded by the Fisk-Vanderbilt Bridge Program; the Research is funded by NIH U01 CA215845 to Vito Quaranta

39. Elucidating the role of X-antigen Gene Family (XAGE) in tumor progression

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Cancer-testis antigens (CT antigens) are thought to be excellent biomarkers of cancer and targets for antigen-specific immunotherapy for treatment of cancer because of their unique expression pattern. X-antigen gene family (XAGEs) are a family of genes belonging to the GAGE family of cancer-testis antigens. Their expression is often restricted to the testis but are aberrantly expressed in some cancers. We are testing the hypothesis that they play a role in cancer progression or maintenance when re-expressed. Our bioinformatics analysis reveals that XAGEs are true CT antigens. We will use mammalian cell culture models to determine which cancer cell lines express XAGEs using RT-qPCR. We will then perform both gain and loss of function studies to explore the hypothesis that when re-expressed XAGEs perturb cancer phenotypes such as colony formation, invasion and/or cell proliferation.

Presentation Type: Poster
Faculty Advisor: Saumya Ramanathan
Grant: NSF RIA : HRD1764201 to S.R.

40. Desalination of Water

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A study by Cullingan of Nashville determined that the water around metropolitan Nashville chlorine and other total dissolved solids (TDS). TDS are comprised inorganic salts that originate from natural sources, sewage, urban run-off, industrial wastewater, and chemicals. The TDS in water has been shown to dry out the human skin and causing itches and irritation. In this research the preparation of a polyamide thin film composite (TFC) membranes for removal of TDS will be synthesized by interfacial polymerization. Interfacial polymerization uses a water phase with a dissolved diamine and oil phase (organic solvent) with an acid chloride to form a polymer at the interface. The diamine used in this research was 2,4,6 trimethyl 1,3 phenylenediamine (TMFD) and the acid chloride was trimesoyl chloride (TMC). The purity and chemical structure of the TMFD, TMC, and Poly (2,4,6 Trimethyl 1,3 Phenylene TrimesoylAmide) (PTPTA) will be analyzed using FTIR spectroscopy. Initial solubility test showed partial solubility of TMFD in water. Further solubility test will be conducted to determine a suitable solvent for TMFD that is immiscible with hexane used to solubilize TMC. Before compiling the TFC, the polymerization of the PTPTA will be carried out in a beaker to show proof of concept and after confirmation of PTPTA structure TFC will be assembled. The membrane will be compiled into a small filter disk and water from the Mississippi River in Memphis will be pushed through for purification. The TDS before and after filtration through the PTPTA membrane will be tested.

Presentation Type: Poster
Faculty Advisor: Phyllis Freeman

41. The effects of blue light on behavior and motion in the presence of dopamine mutations.

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Dopamine is a neurotransmitter and neuromodulator found inside the brain that plays a key role in physical movement, learning, and behavior. The mechanism by which dopamine functions can be broken down into six simple steps; dopamine synthesis, storage in vesicles, release from vesicles, receptor activation, and either reuptake or degradation. Disruptions in any of these steps have been linked to many medical conditions, including depression and Parkinson's disease. Other mechanisms within the body, however, have been observed to support loss in these areas. One such observation was in *C. elegans* in which exposure to light allowed worms with an overflow of dopamine to move and behave normally. The focus of our study is to investigate which part of the light sensing mechanism in worms is affecting the mutated worms and how it works to support behavior and

motion in the presence of a dopamine mutation. Worm strains Fkh-8 (transcription factor), Dat-1 (dopamine transporter), and N2 (wild type) were used for the study. The worm strains were first synchronized and allowed to hatch overnight. The worms were then spotted onto plates and grew until they all reached L4 stage. After reaching L4 stage the worms were run through a SWIP assay for until either paralysis or time was up. The worms were then exposed to blue light and their movements were timed. We found that the mutant strains would constantly move under the blue light but would then stop after one-third the time they were exposed. However, we also saw the worms move again after a period of time.

Presentation Type: Poster

Faculty Advisor: Brian Nelms

Grant: MARC U* STAR (NIH Grant# GMTG105551)

42. Genetic Analysis of the Dopamine Transporter Structure and Function in *C. elegans* DAT-1 Coding Variants

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Fisk University has embarked upon a paradigm shift designed to enhance programmatic outcomes through the introduction of authentic research into the undergraduate curriculum of biology majors via course specific implementation strategies. Through extensive curricular re-mapping, the nematode *Caenorhabditis elegans* was introduced and optimized by the Million Mutation Project (MMP, <http://genome.sfu.ca/mmp/>) for the study of DA signaling. The library of ~2,000 mutagenized worm strains was sequenced at a depth of 15X genome coverage. On average, ~9 new non-synonymous alleles per gene, whose characterization can reveal novel links to protein structure and function. To date, four of these lines have been confirmed for their behavior consistent with DAT-1 loss of function assessed by the presence of Swimming-induced paralysis (SWIP). The dopamine (DA) transporter (DAT) is a polytopic, membrane protein that utilizes the co-transport of Na⁺ and Cl⁻ ions to energize the rapid re-uptake of DA from the synapse in order to terminate extracellular DA signaling and facilitate re-release. As worm synaptic structure in general, and the expression of DAT in particular are conserved across phyla, studies with the orthologous *Caenorhabditis elegans* protein model provide an ideal opportunity to probe fundamental questions of transporter structure and function in vivo. Results from the successful genetic cross of mutant worms with cat-2 tyrosine hydroxylase (TH, CAT-2) loss of function mutant lines, reserpine assays, and a site-directed mutagenesis of the wildtype dat-1 will be used to determine the impact of dat-1 missense alleles on DAT function and in DA neurons.

Presentation Type: Poster

Faculty Advisor: Phyllis Freeman

Grant: Supported by NIH award MH095055 (RDB), NIH Re-entry supplement award 404-294-0191: NSF 1505176

43. Characterizing the Role of Novel Genes on Dopamine Neurons in *C. elegans*

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The objective of our research is to test the role of specific molecules needed in dopamine neurons in the model organism *C. elegans* and give insight into how similar molecules work in the human brain. Dopamine is produced in neurons and transports across the synapse to other neurons, which allow the body to move properly. When there is too much dopamine in the synaptic cleft region the dopamine can spill over to other neurons causing paralysis. *C. elegans* are used for research due to their self-reproduction, 2-3 day lifecycle, and gene similarities to humans. The methods we used to test the mutated genes were Swimming Induced Paralysis (SWIP) test and Polymerase Chain Reaction (PCR). The SWIP assay tests the effects of dopamine by placing each worm into water and measuring time to paralysis, while PCR confirms the presence of the correct mutation. The following strains tested were: N2, ffp-33, and dat-1. N2 and ffp-33 lasted the most time in the water before paralyzing and dat-1, which has a known dopamine transport defect, paralyzed within the 3 min range. As a result, it was concluded that the ffp-33 mutant strain is similar to wild-type, showing that this gene doesn't have a large effect on dopamine signaling.

Presentation Type: Poster

Faculty Advisor: Brian Nelms

44. Synthesis and Characterization of 3,3'-Diphosphonic acid-4,4'-Biphenol for Use in Proton Exchange Membranes for Fuel Cell Applications

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Polymer electrolyte membrane for fuel cells (PEMFC) have a wide range of drawbacks: in membrane performance and properties at temperatures $>180^{\circ}\text{C}$, at low relative humidities, and at high sulfonation levels that the widespread commercialization. The following research describes the synthesis and characterization of 3,3'-diphosphonic acid-4,4'-biphenol (PBP)/ biphenol based disulfonated poly(ether ether sulfone) copolymer (BPSH-35) composite membranes for improved proton conductivity. PBP was synthesized in three steps: 1) bromination of biphenol (Br-BP); 2) phosphonation of Br-BP using TEP; 3) acid hydrolysis. ¹H NMR analysis confirmed the formation of phosphonated biphenol (PBP) due to the loss of several peaks between 6.8 and 8.0 ppm associated with brominated biphenol. Mass spectrometry of the unpurified phosphonated biphenol further corroborated the ¹H NMR due to the appearance of a peak at 505 m/z consistent with the mass of PBP.

The effects of PBP on the structure and properties BPSH-35 was investigated by preparing physical blends of PBP in varying ratios with BPSH-35 using solution casting procedures. Evaluation of PBP/BPSH-35 water performance showed no correlation in the water uptake, IEC, and liquid water proton conductivity as a function of PBP amount. Proton conductivity data under relative humidity conditions showed the 10 wt% PBP membrane had the highest conductivity of $1.25 \times 10^{-2} \text{ S/cm}$ at 90% RH. The irregularities in the membrane performance were due to

hydrolysis of the PBP during washing that changed the chemistry of the -OH functionality needed for proton conductivity. Changes to the purification of PBP prior to addition to the composite membranes are currently being investigated.

Presentation Type: Poster

Faculty Advisor: Natalie Arnett

Grant: NSF/CLIPS Grant (DMR-0423914), NSF CAREER AWARD (DMR-1454451)

45. Introduction of 2,4,6-TriBiphenol -1,3,5-Triazine Comonomers into Poly(Arylene Ether Sulfone) for Fuel Cell Applications

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Fuel cell technology is gaining interest because it offers carbon neutral emissions and better efficiency than standard internal combustion engines. However, current polymeric membranes used in fuel cells are limited, along with membrane synthesis being expensive and hazardous. Poly (arylene-ether-sulfone) (PAES) offers a low-cost alternative to modern polymer membranes due to its thermal properties, good film forming properties, and high mechanical strength. High degrees of sulfonation are required for comparable ion exchange capacity to leading proton exchange membranes (PEM), but increased sulfonation levels lead to a decrease in membrane mechanical properties, resulting in water solubility. Previous research has been conducted on PAES, but the research was not able to stabilize the mechanical deficiencies at high degrees of sulfonation. The focus of current research is to stabilize PAES at high levels of sulfonation through crosslinking of the polymer. Cross-linked polymers are essential because they are resistant to heat, wear, and water. 2,4,6-TriBiphenol -1,3,5-Triazine (TBT) is incorporated into the PAES structure to stabilize the mechanical deficiencies caused by high sulfonation. TBT was synthesized and analyzed with Fourier-transform infrared (FTIR) spectroscopy and Nuclear Magnetic Resonance (NMR) spectroscopy methods.

Presentation Type: Poster

Faculty Advisor: Natalie Arnett

Grant: NSF DMR #1454457

46. Understanding the role Iron Superoxide Dismutase plays in the antibiotic resistance of *Acinetobacter baumannii*

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Acinetobacter baumannii is an antimicrobial resistant opportunistic pathogen that causes severe nosocomial infections, representing a global threat to society. Due to *A. baumannii* multidrug resistance its ability to survive for long periods and contribute to patient mortality rates has increased. To reduce this public health epidemic, it is necessary to understand the mechanisms that contribute to *A. baumannii* multidrug resistance. Here, the enzyme superoxide dismutase B (SodB) is introduced as a potential factor in multidrug resistance of *A. baumannii*. An analysis of 247 *A. baumannii* clinical isolates obtained from Nashville General Hospital identified sample MMC4 as an antibiotic resistant strain. MMC4 was subjected to proteomic analysis revealing a <40-fold increase of SodB in response to antibiotics. Sod is an enzyme responsible for protecting bacteria from reactive oxygen species by converting superoxide radicals to hydrogen peroxide and oxygen. To determine structure-function relationships of SodB, we made recombinant protein in *E. coli* and purified it >95% homogeneity using metal affinity chromatography. The structure of SodB was determined to 1.4 angstroms resolution using x-ray crystallography. In total, these results establish the first steps in developing a structure-based drug design pipeline for new therapeutic strategies that will target SodB.

Presentation Type: Poster

Faculty Advisor: Steven Damo

Grant: NSF HRD 1547757, NIH R01 HD090061, NIH R25MD010396, VA IK2BX001701, DOEd Title VII Award #: P382G090004

47. Investigation of Manganese Transport Repressor DR2539 in Mn²⁺ Homeostasis

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Manganese and iron ions are necessary for fundamental cellular processes but are toxic in excess, making tight regulation of their concentrations crucial. Dysregulation of Mn/Fe homeostasis results in various conditions in humans and high Mn/Fe ratios are associated with resistance to gamma radiation, UV radiation and oxidative stress in the famously radioresistant bacterium *Deinococcus radiodurans*. Thus, understanding the mechanism used to regulate Mn/Fe homeostasis has both medical and bioremediation implications. DR2539 is a metal ion dependent transcription factor present in *D. radiodurans* that plays a major role in maintaining the intracellular ratio of manganese to iron. We aim to investigate the role of DR2539 via a structural analysis of the protein and characterization of its DNA binding and protein-protein interactions. Our goal is to determine the structure to a resolution of at least 1.96 angstroms and elucidate the mechanisms of protein-protein and protein-DNA binding.

Presentation Type: Poster

Faculty Advisor: Steven Damo

48. The Enhancement of Non-Antibacterial Toilet Cleaners Using Poly(acrylamide)

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Toilets are breeding grounds for harmful bacteria including shigellosis, staphylococcus, and salmonella. Cleaning toilets is a necessary and arduous task that is needed to control the spread of these germs. On average person most people clean their toilet once every two weeks. The focus of this research was to improve the properties of a non-antibacterial toilet bowl cleaner (NAB-TBC) by Seventh-Generation with poly(acrylamide). Poly(acrylamide) will be used to coat the surface of the toilet with a film that will control bacterial growth and reduce cleaning time. The chemical structure and thermal properties of poly(acrylamide) will be determined using FTIR (Fourier-Transform Infrared Spectroscopy) and TGA (Thermogravimetric Analysis), respectively. The solubility of poly(acrylamide) in the NAB-TBC will be tested and two solutions with different concentrations (NAB-TBC1 and NAB-TBC2) will be prepared. Four porcelain tiles will be cleaned with the NAB-TBC, NAB-TBC1, NAB-TB2, and a store-bought antibacterial toilet bowl cleaner (AB-TBC). The treated tiles will be placed in a campus restroom for a week, swabbed using a cotton swab, cultured, and tested for bacterial growth using Ultraviolet-visible spectroscopy. The effectiveness of the poly(acrylamide) will be accessed based its ability to minimize bacteria growth on the tiles over a week in comparison NAB-TBC and AB-TBC controls. The results of this experiment will reflect if the polymer solution can enhance the cleaning properties of a natural, non-antibacterial toilet cleaning product.

Presentation Type: Poster

Faculty Advisor: Natalie Arnett

Grant: NSF CAREER Award (DMR-1454451)

49. Synthesis of poly(xylitol sebacate) to generate nanoparticles with improved mechanical properties for targeted drug delivery

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Breast cancer is one of the deadliest forms of cancer. 1 in 5 breast cancers have an overexpression of human epidermal growth factor receptor-2 (HER-2+), the most aggressive form of breast cancer. Current treatment of HER-2+ breast cancer involves the use of chemotherapy, radiation and surgery. The cytotoxicity of chemotherapy treatment creates a drive for the development of more target-specific drug delivery to allow for cancer cells only to be treated. The focus of this research is to develop biodegradeable and biocompatible polymeric nanoparticles using poly(xylitol sebacate). Preliminary research has shown that a high degree of branching (~97%) in PXS affects solubility and ultimately biocompatibility. An alternate synthesis reaction route was carried out by replacing the sebacic acid with an ester, dimethyl sebacate to allow slow xylitol addition and minimize branching. A melt polymerization of equimolar xylitol and dimethyl sebacate at 150°C for 15, 20 and 24 hours under nitrogen and vacuum conditions was carried out. The physical properties of PXS polymers showed an increase in viscosity along with a darkening of color as time increased. However, C13 NMR illustrated only partial formation of PXS at all

reaction times due to the presence of the methoxy group from monomer dimethyl sebacate at 50 ppm. Additionally, higher degrees of branching were observed compared to previously prepared PXS polymers with sebacic acid. In the future, an increase in reaction temperature to push the reaction to completion will be explored, along with the formation of nanoparticles via nanoprecipitation.

Presentation Type: Poster

Faculty Advisor: Natalie Arnett

Grant: Funding: National Institutes of Health #1R25GM107754

50. The Preparation of a Natural Based Treatment for Eczema Relief

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Eczema is a group of conditions that cause the skin to become red, itchy and inflamed. The most common treatment for eczema are steroids reducing inflammation and lighting the skin from scar tissue. However, these steroids can have negative effects on the body with prolonged use including liver failure, heart failure, high blood sugar and insomnia. The purpose of the research experiment is to prepare an all-natural cream as an alternative to current steroid based eczema treatments. Two creams will be prepared using beeswax and coconut oil as a base and water as an emulsifier, along with either CBD or aqueous St. John's Wort to control inflammation and reduce scarring. Eucalyptus and lavender oils will be added to both creams for scents. The chemical structure and purity of the cream components will be evaluated using FTIR analysis. The solubility of the creams in various household solvents such as water and alcohol will be tested for skin removal in case of skin irritation after application. The cream will be tested on skin in comparison to a medicated treatment and the results analyzed after a week. The expected results of the natural creams is relief from itching and the inflammation along with a decrease of scarring and infections on the skin. The success of this experiment could lead to an affordable, non-synthetic way to treat Eczema without the use of harsh chemicals that have awful side effects.

Presentation Type: Poster

Faculty Advisor: Natalie Arnett

51. The Effect of the Addition of Tea Tree Oil to Nail Adhesive on the Growth of Bacteria In Acrylic Nails

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The purpose of this research was to reduce the amount of bacteria that grows on the fingernail and fingertips due to the application of acrylic nails. In this experiment, the acrylic nail was synthesized by combining the powdered form of poly(methyl methacrylate) (PMMA) and the liquid monomer methyl methacrylate (MMA).

Cyanoacrylate, which is used as a nail adhesive, was combined with a 5% concentration of tea tree oil (TTO), which is known to have antibacterial properties. The tea tree oil-infused cyanoacrylate was applied to a natural nail clipping. Application of cyanoacrylate without tea tree oil was also assessed under similar conditions, which served as the control variable. To facilitate the growth of bacteria, all of the nail samples were placed into a Luria Bertani (LB) solution. Samples from the inoculated LB solution were collected every two hours and analyzed using a spectrophotometer to test the quantity of bacteria on each nail sample. In addition, characterization tests (specifically DSC and FTIR) were performed to determine the structure-property relationships of the acrylic. The DSC graph showed the temperature at which the acrylic began to cure (crosslinking). FTIR determined the functional groups within the tea tree oil infused acrylic. The results of this research showed that tea tree oil served as an effective antibacterial agent.

Presentation Type: Poster

Faculty Advisor: Natalie Arnett

Grant: NSF HBCU-UP Award HRD 1332284

52. Acid Mediated Misfolding of S100A12 into Amyloid Fibrils

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S100A12 is a member of the S100 subclass of the EF-hand calcium binding protein family. S100A12 is secreted from neutrophils and exhibits antimicrobial activity against human pathogens by sequestering the essential nutrient zinc. Additionally, S100A12 activates inflammation receptors such as the receptor for advanced glycation end products and toll-like receptor 4 and misregulation of S100A12 expression has been implicated in numerous inflammatory disorders, such as Alzheimer's, type II diabetes, and certain cancers. A mouse model of stomach cancer, comprised of *H. pylori* infected transgenic animals that express human S100A12 demonstrates S100A12 leads to increased inflammation, along with cancerous lesions and deposition of amyloid fibrils. Amyloid fibrils are misfolded protein oligomers comprised of beta-sheet fibrils and are associated with numerous diseases. My overarching objective is to characterize the protein folding pathway of S100A12 and determine the role of S100A12 amyloid fibril formation in disease. To this end, I have recombinantly expressed S100A12 in *E. coli*, and purified the protein using ammonium sulfate precipitation, ion-exchange chromatography, and size-exclusion chromatography. Differential scanning fluorimetry experiments provide evidence that the stability of S100A12 decreases under low pH conditions similar to those found in the stomach. In total, these results suggest that native alpha-helical S100A12 can undergo pH mediated conformational changes to form amyloid fibrils.

Presentation Type: Poster

Faculty Advisor: Steven Damo

Grant: NSF CREST 1547757, Dept of VA IK2BX001701, NIH MARC T34GM105551

53. Post-Modifiable Polymers using Cyanuric Chloride Derivatives

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Current fuel cell polymer exchange membranes suffer from a limited operating temperature range of up to 80°C, high humidity requirements, and expensive and hazardous synthesis. Poly (arylene-ether-sulfone) (PAES) offers a low cost, mild synthesis alternative to current fuel cell membranes with better thermal properties and similar ion transfer properties. While PAES is a competitive alternative, it requires higher degrees of sulfonation, a property that allows the transports of ions through the polymer exchange membrane. Previous research has shown the successful incorporated 2,4-dichloro-6-methoxy-triazine (DCMT) into a PAES backbone, as confirmed by C¹³ NMR, via direct polymerization with dichlorodiphenyl sulfone, sulfonated dichlorodiphenyl sulfone, and 4,4'-biphenyl. While thermally stable (~480 °C), high sulfonation levels lead to an increased absorption of water and water solubility, both of which reduce mechanical properties. This current research is focused on preparing DCMT-PAES blend membranes with unsulfonated and sulfonated versions of biphenol based PAES (BP-PAES) to improve mechanical strength without sacrificing proton conductivity. Solution blends with varying molar concentration of sulfonated (DCMT-PAES35) with either unsulfonated (Radel) or sulfonated (BP-PAES) copolymers were prepared by dissolving the polymers separately in DMAc (5 wt%) and adding different volumetric fractions of the DCMT-PAES to the BP-PAES solutions. Initial formation of DCMT-PAES-35:BPS35 (50:50) blend membrane demonstrated good miscibility and improved film flexibility. Further evaluations of changing the concentration DCMT-PAES in BPS35 copolymers will be tested for thermal properties and ion exchange capacity to determine feasibility as fuel cell material.

Presentation Type: Poster

Faculty Advisor: Natalie Arnett

Grant: NSF: DMR1454451, NSF: HRD1547757

54. The Preparation of Water Based Paint without Volatile Organic Compounds

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Volatile organic compounds (VOCs) are organic chemicals that have high vapor pressure and easily form vapors at normal temperature and pressure. VOCs are found within regular paint and are what cause the toxic and foul-smelling fumes that are released from paint. The overall objective of this research is to create a paint that does not have VOCs present to give off the foul, toxic fumes. Research has shown when a common polymer, (PVA) poly(vinyl acetate), is dissolved in diethyl ether and/or acetone VOC fumes are given off. This current research focuses on replacing PVA found in most paints with use Elmer's glue to develop a new odorless paint. A typical paint is composed of a resin, solvent, and pigment. The paint in this research was prepared using water as the solvent, vegetable oil as the resin, and food coloring as the pigment inside the glue to create a paint that doesn't release toxic fumes. Comparison of the visual quality of the paint to commercially available water and acrylic based paints will be investigated to determine the success of the experiment. Gas chromatography will be used

to determine the emission of VOC's before and after use. Additional fragrance, vanilla will be added to the paint to allow a good fragrance to be given off upon application. The formation a non-VOC based paint could potentially revolutionize the paint industry by giving the public an alternative paint that could be made at home or bought commercially.

Presentation Type: Poster

Faculty Advisor: Natalie Arnett

Grant: NSF CAREER Award (DMR-1454451)

55. Determination of Reversible Crosslinkers as Viable Alternatives to Commercially Available Liquid Monomer Crosslinkers.

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Acrylic nails are a strong and durable alternative to gel nails because of easier maintenance at home and repair without the help of a nail technician. The most common drawback of acrylic is the time required to remove these nails after long soaking periods and scraping from your natural nail. This is due to the liquid monomer forming permanent crosslinking with the acrylic powder (poly(ethyl methacrylate)), which are hard to break. The purpose of this experiment is to investigate reversible crosslinkers such as boric acid and sodium borate as an alternative to the current liquid monomer (methyl acrylate) to allow simpler removal of acrylic nails at home or by a professional. To accomplish this goal the solubility of boric acid and sodium borate monomers and acrylic powder will be tested in non-hazardous liquids such as water and alcohol. Prior to forming the reversible acrylic (R-Ac), the chemical structures and purity of the monomers and acrylic powder will be determined using FTIR and NMR analysis. R-Ac nails will be formed using solvents that wet but not dissolve the acrylic powder. A comparison of the hardness of the R-Ac to commercial acrylic (C-Ac) nails will be assessed by dropping weights of varying masses onto the preformed nails from controlled heights. The viability of the new R-Ac nails for everyday use will be based on the acrylic powder solubility and the hardness to commercially available acrylics after the reversible crosslinkers are added.

Presentation Type: Poster

Faculty Advisor: Natalie Arnett

Grant: NSF CAREER Award (DMR-1454451)

56. Improving Acoustic Attenuation of Music Rooms Using 6F Epoxy Resin

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Acoustics refers to the properties of a room that determine how sound is transmitted in it. A huge struggle faced by new musicians is undermining the importance of room acoustics. The objective of this research was to synthesize a new epoxy from the melt polymerization of epichlorohydrin and bisphenol 6F to improve the acoustics of a room or building. The chemical composition of the 6F epoxy will be conducted using FTIR and NMR. A C-O peak at 1050-1150 cm⁻¹ on FTIR spectrum are expected, signaling the successful 6F epoxy synthesis. Acoustic attenuation is the ability of a material to reduce the strength of sound waves passing through it. The acoustic attenuation of the 6F epoxy compared to commercial epoxy will be analyzed using an oscilloscope. It is expected that the 6F epoxy resin synthesized in this experiment will improve acoustics given by documented attenuation values of 17.5Db/cm at 5MHz. This is higher Type I and Type II PVC, Teflon, and polyester values. To characterize the polymer formed and ensure the correct polymer was formed. The thermal stability of the 6F epoxy will also be analyzed using thermogravimetric analysis (TGA) where a temperature >200 C should be observed.

Presentation Type: Poster

Faculty Advisor: Natalie Arnett

Grant: NSF CAREER Award (DMR-1454451)

57. Developing and Testing a Transdermal Perfume Patch to Produce a Long-lasting Scent

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The longevity of perfume of an individual person is dramatically limited depending of the type of perfume used. Although more expensive perfume has a long-term exposure, most perfume users cannot afford to purchase these high-end perfumes and settle for low cost alternatives. This research focuses on designing a cost-effective transdermal perfume patch that has a slow release of fragrance using Polyvinylpyrrolidone (PVP). PVP is a versatile substance used in the cosmetics and beauty industry as a binder and film former and can also form a thin coating on the skin, nail, or hair. The components of the patch include: Polyvinylpyrrolidone (PVP) film to encase the perfume and other components and vanilla extract dissolved in ethanol to mimic the composition of perfume. The purity of the components and chemical structure of the PVP, vanilla, and ethanol will be confirmed by carried out using FTIR analysis. The patch will be prepared by dissolving PVP in ethanol infused varying concentrations of vanilla extract and drying under a heating lamp to form a film. It is expected that the patch with the highest concentration of vanilla in ethanol will produce the longest lasting scent. Gas chromatography will be used to access the longevity of the perfume initially and after 12 hours. Thermogravimetric analysis (TGA) will utilized to determine the thermal stability of the patch above body temperature.

Presentation Type: Poster

Faculty Advisor: Natalie Arnett

Grant: NSF CAREER Award (DMR-1454451)

58. Synthesis of Poly (2,4,6-Trimethyl 1,3-Phenylene TrimesolyAmide) Membranes for Improved Total Dissolved Solid Removal from Water

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A study by Cullingan of Nashville determined that the water around metropolitan Nashville chlorine and other total dissolved solids (TDS). TDS are comprised inorganic salts that originate from natural sources, sewage, urban run-off, industrial wastewater, and chemicals. The TDS in water has been shown to dry out the human skin and causing itches and irritation. In this research the preparation of a polyamide thin film composite (TFC) membranes for removal of TDS will be synthesized by interfacial polymerization. Interfacial polymerization uses a water phase with a dissolved diamine and oil phase (organic solvent) with an acid chloride to form a polymer at the interface. The diamine used in this research was 2,4,6 trimethyl 1,3 phenylenediamine (TMFD) and the acid chloride was trimesoyl chloride (TMC). The purity and chemical structure of the TMFD, TMC, and Poly (2,4,6 Trimethyl 1,3 Phenylene TrimesolyAmide) (PTPTA) will be analyzed using FTIR spectroscopy. Initial solubility test showed partial solubility of TMFD in water. Further solubility test will be conducted to determine a suitable solvent for TMFD that is immiscible with hexane used to solubilize TMC. Before compiling the TFC, the polymerization of the PTPTA will be carried out in a beaker to show proof of concept and after confirmation of PTPTA structure TFC will be assembled. The membrane will be compiled into a small filter disk and water from the Mississippi River in Memphis will be pushed through for purification. The TDS before and after filtration through the PTPTA membrane will be tested.

Presentation Type: Poster

Faculty Advisor: Natalie Arnett

Grant: NSF CAREER (DMR-1454451)

59. Structural and Functional Characterization of *Acinetobacter baumannii* Superoxide Dismutase B

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Acinetobacter baumannii is a nosocomial pathogen which can infect the respiratory tract, skin, soft tissue, and the urinary tract. The global health threat that *A. baumannii* poses is underscored by the identification of multiple drug resistant (MDR) strains that are impervious to all commercially available antibiotics. Our approach is to

understand the molecular mechanisms of antibiotic resistance in *A. baumannii* with the goal of establishing new strategies for therapeutic intervention. Since pathogens, during infections, are confronted with reactive oxygen species (ROS), prior studies have proposed that enzymes contributing to ROS detoxification, including superoxide dismutase B (SODB), are essential virulence factors of *A. baumannii*. In a multi-drug resistant isolate of *A. baumannii* obtained from Nashville Metro General Hospital, SODB was the most upregulated protein in response to antibiotic challenge. Therefore, SODB represents a potential target for the development of new effective therapeutics to control infections caused by *A. baumannii*. In this study, we aim to understand the role of SODB in antibiotic resistance of *A. baumannii* by revealing structure-function relationships of this critical virulence factor. SODB was expressed recombinantly from *E. coli* and purified to >95% homogeneity using metal affinity, ion exchange and size-exclusion chromatography. Consistent with other members of the family, SODB is a thermally stable protein with a T_m of 60.2°C as determined by differential scanning fluorimetry. We assessed the enzyme's activity using a water-soluble tetrazolium salt assay and determined the activity of SODB to be 0.2095 $\mu\text{g}/\text{U}$. Additionally, we crystallized SODB and collected diffraction data to 1.45 angstroms resolution. Future work entails determining the crystal structure of SODB and using *in silico* approaches to identify potential inhibitors. In total, these studies will potentially allow for the development of new strategies and therapeutics to overcome the spread of the MDR pathogen *A. baumannii*.

Presentation Type: Poster

Faculty Advisor: Steven Damo

Grant: This work is funded by Fisk CREST BioSS Center NSF HRD1547757 and NIH Award # R25MD010396.

60. Investigating the role of a calcium channel localization factor in regulating dopamine-dependent movement in *C. elegans*

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Caenorhabditis elegans is a free-living, microscopic worm that is a great model organism for scientific study. It has a relatively simple anatomy with just under 1000 cells, 302 of which are neurons. In our lab we are currently focusing on dopamine neurons and the regulation of genes important to their function. Dopamine is an important neurotransmitter that is used across the animal kingdom to control locomotion, cognition, and reward pathways. Misregulation of dopamine levels is associated with disorders such as Parkinson's disease, ADHD, schizophrenia, depression, and drug addiction. Our lab performed an RNA-Seq experiment to identify genes that are highly enriched in dopamine neurons. One of these is the gene *calf-1*, which encodes a calcium channel localization factor protein (CALF-1). We conducted a test of dopamine-related movement, the swimming-induced paralysis (SWIP) assay, to see if mutant worms lacking CALF-1 could function properly. After bleach synchronization, worms were placed in water and the time until paralysis occurred was recorded for *calf-1* mutants, the dopamine transporter-deficient *dat-1* mutants (a control that paralyzes in water), and N2 (wild-type control) strains. On average *calf-1* worms paralyzed by 10 minutes, much closer to the timer for *dat-1* mutants (about 5 minutes) than for the wild-type control strain. This suggests that CALF-1 may be involved in regulating dopamine levels. Next steps include testing the dependence of SWIP on the dopamine receptor DOP-3, and looking at CALF-1 interactions with UNC-36.

Presentation Type: Poster

Faculty Advisor: Lee Limbird

Grant: Big Data To Knowledge

61. Synthesis of 3-Aminophenol based Polyetheramine Copolymer Membranes for Desalination of Seawater

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Access to clean drinking water is a major problem worldwide. Although water makes up 70% of the earth only 3% of this water is drinkable ultimately causing 1.2 billion to not have access to clean water. The main purpose of this research was to design chlorine tolerant reverse osmosis membranes for water desalination. Preliminary research focused on making copolymers using varying ratios of hexamethylenediamine and p-phenylenediamine with sebacoyl chloride (HDMA:PPD:SC) by interfacial polymerization. The inability of the HDMA:PPD:SC (0:100:100) polymer to form indicated unsuccesful reaction as confirmed by NMR and FTIR analysis, thus an alternative reaction was investigated. Currently a solution-based reaction of 3- amino phenol (3-AP) with unsulfonated and sulfonated dichlorodiphenylsufone (SDCDPS and DCDPS) monomers is being investigated. The combination of these monomers in a 3-aminophenol based polyetheramine (3AP-PEA) reverse osmosis membrane will enhance the mechanical stability (DCDPS), water flux (3-amino phenol or SD-CDPS), and salt rejection (4,4 biphenol) along with provide an additional site for crosslinking. ¹H NMR confirmed the successful formation of 3AP-PEA by the appearance of amine proton and proton adjacent to the ether bond at 3.7 and 7.2 ppm. Further confirmation of 3AP-PEA structure using FTIR showed the C-O and NH bonds on the 3AP-PEA at 1150 and 1600 cm⁻¹, respectively. Membrane fabrication of 3AP-PEA will be carried out on a polysulfone support with various aromatic acid chlorides as crosslinking agents. Salt water of different concentrations will be pushed through a syringe through the fabricated membrane to test the salt rejection properties of the membrane.

Presentation Type: Poster

Faculty Advisor: Natalie Arnett

62. Transcriptomic Characterization of Vascular Cell Types during Aging

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The world population is aging rapidly and this brings a new challenge to health care. Cardiovascular disease continues to be a leading cause of death in this population. To elucidate the molecular changes that occur in the aging vasculature, we performed RNASeq on a longitudinal cohort of mice aortae ranging from 4 weeks to 78 weeks of age. Utilizing both cpm-based (EdgeR) and count-based (DESeq2) transcriptional analysis, our findings revealed a striking increase in the expression of inflammatory genes and decreased in transcripts associated with adhesion and fibrosis, processes known to contribute to age associated cardiovascular disorders such as dementia. Taken, together these findings suggest that key molecular processes that can modulate disease risk predominate the vascular transcriptome in an age-dependent manner and support the concept that vascular aging itself is a crucial modulator in the development of cardiovascular diseases, independent of additional risk factors.

Presentation Type: Poster
Faculty Advisor: Lee Limbird
Grant: NIH grant #1U01HL131019-01.

63. Synthesis and Characterization of Poly (Xylitol Sebacate) Polymers for Improved Nanoparticle Drug Delivery

Tindal, Jasmin¹; Grier, Tecia²; Brown, Jerry²; Arnett, Natalie²

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Polymeric nanoparticles as a drug delivery system have the potential to minimize side effects that arise from conventional chemotherapeutic agents and radiation therapy. This research focused on synthesizing linear poly (xylitol sebacate) (PXS) will be used to prepare nanoparticles for drug delivery with low degrees of branching. PXS nanoparticles have better degradation, biocompatibility, and mechanical properties compared to poly(lactic-co-glycolic acid) (PLGA). A linear PXS are prepared when the primary alcohols react with sebacic acid. Reactions with secondary alcohols on PXS lead to branching that limit solubility and prevent nanoparticle formation. Previous research has shown successful synthesis of PXS polymers by FTIR through the loss of the C=O peak at 1685 cm⁻¹ from the sebacic acid and formation of the ester stretch between 1713-1715 cm⁻¹. Further confirmation of PXS structure was given by ¹³C NMR by the presence of C=O peaks at 173 ppm. This current research investigates the effect of reaction times on PXS branching. Melt polymerization of xylitol and sebacic acid at 150 °C were carried out at 10, 15, and 20 hrs. Lower degrees of branching and improved solubility were only observed at 10 and 15 hrs. Branching of the copolymers were found to be dependent on reaction time confirmed by position of inverted peaks in DEPT-135 ¹³C-NMR. The 10 hr reaction demonstrated the lowest degree of branching (72%). Nanoparticles were fabricated through a precipitation method from the 10 and 15 hr. Successful nanoparticles as confirmed by SEM and DLS were formed for the 15 hr PXS.

Presentation Type: Poster
Faculty Advisor: Natalie Arnett
Grant: NIH GRANT 1R25GM107754

64. Elucidating the Molecular Mechanisms of Antibiotic Resistance in *Acinetobacter baumannii*

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The threat of antibiotic resistance has increasingly become a global issue because of the gradual emergence of multi-drug resistant (MDR) pathogens. Identifying mechanisms of resistance as well as characterization of attributes deemed beneficial for the survival of the pathogen is vital in contributing to the development of new therapeutics. *Acinetobacter baumannii* is a gram-negative opportunistic, nosocomial MDR pathogen that

primarily targets immunocompromised patients in medical care facilities around the world. From an assembled bank of clinical isolates of *A. baumannii*, there is a diverse spectrum of antibiotic resistance patterns, cell motility and biofilm formation represented. Initial RNA sequencing studies implicated the importance of the Gcn5-related N-acetyltransferases (GNATs) in facilitating *A. baumannii* resistance to the aminoglycoside class of antibiotics. We aim to determine the role of GNAT proteins to antibiotic resistance in *A. baumannii* as well as identify which physiological processes are associated with antibiotic resistance. GNATs belong to a superfamily of enzymes that are found in all domains of life and are involved various functions including acetylation of a broad spectrum of substrates and, often times, conferring resistance to antibiotics. We performed structural and functional experiments to understand the mechanisms causing the resistant nature of *A. baumannii*. Preliminary crystallization studies of the enzyme GNAT 2199 yielded 4 initial conditions suitable for optimal crystal growth. We also conducted a series of enzyme activity assays which revealed that GNATs acetylate various clinically used aminoglycosides, seeking to reveal the natural aminoglycoside substrate for GNAT 2199. Furthermore, cell motility and biofilm assays were used to determine the physiological processes attributed to antibiotic resistance of *A. baumannii* isolates. Future work entails optimization of the crystallization conditions to produce samples suitable for X-ray diffraction studies. This will allow us to develop GNAT superfamily structurefunction relationships as well as identify physiological processes of *A. baumannii* that contribute to antibiotic resistance. In total, this information will be useful for initiating new strategies to control the spread of this bacteria as well as developing new therapeutics to effectively combat this MDR pathogen.

Presentation Type: Poster

Faculty Advisor: Steven Damo

Grant: NSF No. HRD-1547757

65. DEXA Prototype Using SrI₂:Eu²⁺ Coupled to a Silicon Photomultiplier (SiPM) for Bone Imaging

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Osteoporosis is a disease of the bone where the density of the bone is reduced and is susceptible to fracture. For this reason, Bone Mineral Density (BMD) reports are crucial for the diagnosis of osteoporosis. The creation of these reports relies heavily on Dual Energy X-ray Absorptiometry (DEXA) scanners, the gold standard to diagnose osteoporosis. Commercially available DEXA scanners use CZT as the detector of ionizing radiation passing through the area of interests but sometimes yield unreliable results [1]. At Fisk, we are set on developing innovative sensing technologies to achieve low power, low cost, and lightweight sensors that have the capability to be used as handheld probes for BMD measurements. We have paired a Strontium Iodide doped with Europium (SrI₂:Eu²⁺) scintillator crystal coupled to a Silicon Photomultiplier (SiPM) array as an alternative to CZT detector. Dual-energy (60 keV and 122 keV) exposure was used for BMD measurements of a phantom containing CaHPO₄ to mimic bone and resin to mimic soft tissue.

[1] Ulivieri FM, Messina C, Sconfienza LM, Bandirali M, Guglielmi G (2016) Adult Dual-Energy Absorptiometry in Clinical Practice: How I Report it. Semin Musculoskelet Radiol 20(03): 246-253.

Presentation Type: Poster

Faculty Advisor: Arnold Burger

Grant: National Science Foundation under Grant No. HRD-1547757

66. An Introductory Physics Experiment to Measure the Moment of Inertia of the Human Forearm

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The long term goal of this project is to develop an introductory physics for life sciences (IPLS) course in which we can modify the content to include authentic biological applications, and strengthen skills that are most effectively taught in a physics context. It has been recognized that the IPLS community needs to work together to create resources such as lab manuals, homework and exam problems, etc. that can be shared and modified as required by local needs. The specific problem we address here is the development of a biomechanics experiment to be used in an instructional laboratory for the first semester of an IPLS course. This experiment uses the relaxed oscillation technique to determine the moment of inertia of the human forearm. In this experiment, the subject's forearm with the limb musculature completely relaxed, and the motion tracked with a smartphone camera and open-source video tracking software. Physics concepts used include torque, angular displacement, angular velocity, angular acceleration, and damped harmonic motion. The results of this lab are relevant to the life sciences since inertial body segment parameters (BSPs), including the moment of inertia, are important for motion analysis in research as well as in clinical settings. A knowledge of BSPs is necessary for the design of work activities or the improvement of athletic performances. It has particular value in understanding orthopedic and prosthetic problems and can result in a better design of braces and prosthetic devices. We have designed and built the requisite apparatus and obtained preliminary data which will be used to refine the experiment and develop a written manual and other pedagogical materials. The apparatus can be easily and inexpensively replicated by any institution which chooses to implement this experiment.

Presentation Type: Poster

Faculty Advisor: Steven Morgan

67. UNDERGRADUATE AWARENESS OF PRECONCEPTION HEALTH AND INFANT MORTALITY

Roberson, Jasmine^{1*}

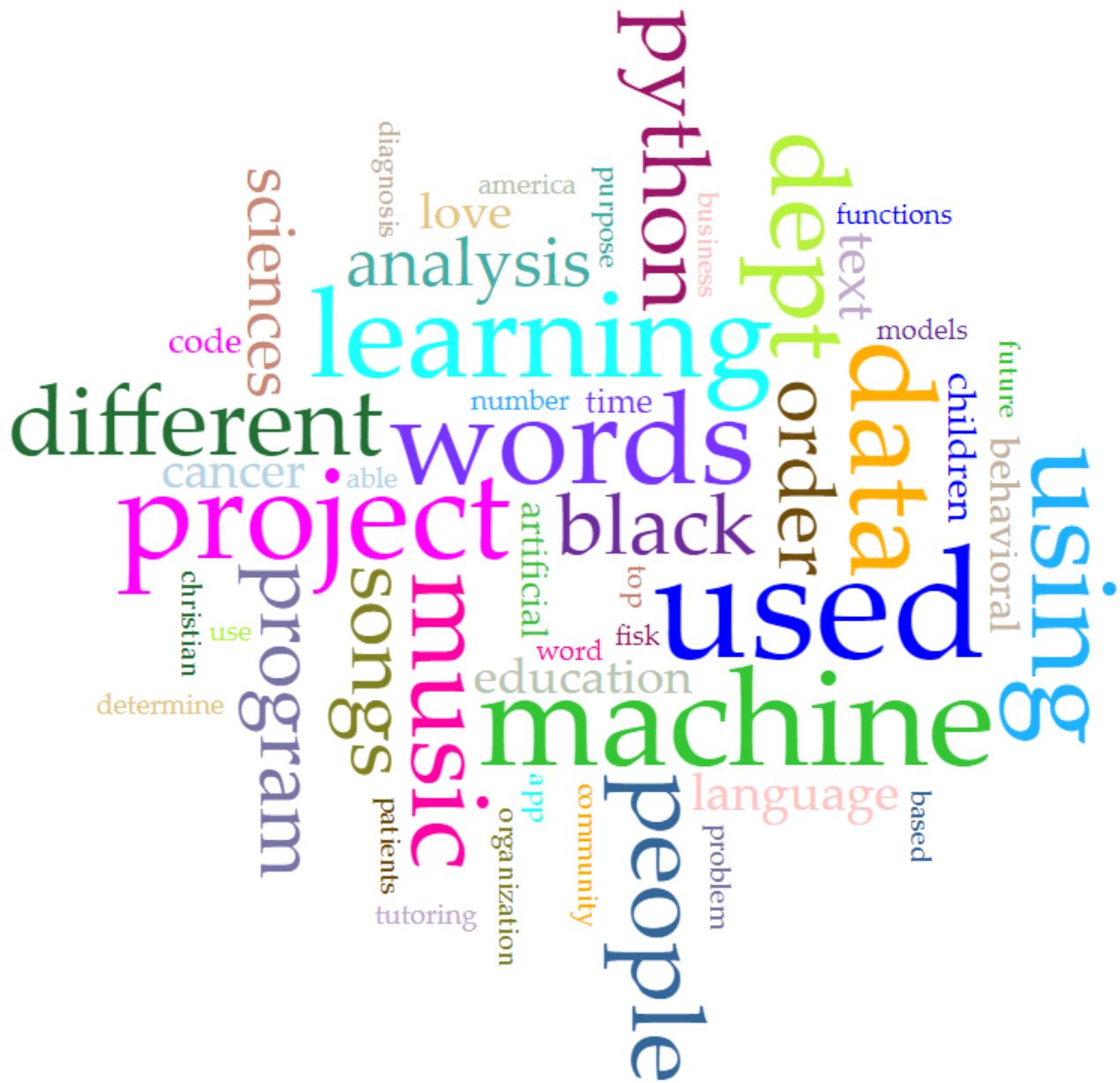
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Alcohol impacts over 1000's of black communities in the United States. This study primarily focuses on the ready availability of alcohol to African Americans. Impact-fully, this research positively affects the community due to the fact of how geographical demographics play a leading role in African American alcoholism. Which eventually can lead to infant mortality in black women. According to the Harvard School of Public Health, the rate of black infant deaths under the age of 1 in the United States is more than twice that of white infant mortalities [Harvard 1].

Presentation Type: Poster

Faculty Advisor: Yvette Spicer

Grant: Fisk-Meharry HBCU Wellness Program



Metrics for Abstracts of Dept. of Mathematics & Computer Science

- Vocabulary Density: 0.260
 - Average Words Per Sentence: 21.3
 - Most frequent words: used (40); project (35); learning (33); machine (33); data (31)

Mathematics & Computer Science

68. Fisk Q'buzz: Web App that helps gain, access contact messages easier and faster

Anyaeché, Caleb^{1*}

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The purpose of this project is to create a web app, Q'buzz, that specifically helps Professors, staffs, administrators at Fisk University keep track of contact messages, especially from students, more easily. In this electronic age, people sometimes fail to recognize the disadvantages of sending contact messages through emails. The sheer number of emails which employees send and receive can be overwhelming. Having newsletters, contact messages, and other day to day activities emails in your personal inbox can be really hard to distinguish, to group, and to keep up with later in the future. Some companies do understand that when sending emails, information can be overloaded; So they develop policies restricting outgoing and incoming emails after-work hours and days off. Q'buzz doesn't restrict contact messages from clients (students) but provides a flexible platform for all employees at Fisk to easily keep track of contact messages. Students can easily send messages to any office at Fisk without interrupting the day to day work emails received by that office. With this flexible platform, employees and students at Fisk University are going to be able to communicate much better.

Presentation Type: Oral

Presentation Themes:

Faculty Advisor: Lei Qian

69. Mobile Health and Treat (mHAT)

Armah, Ebenezer^{1*}

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Despite recent control efforts, malaria remains endemic in 104 countries and 3.4 billion people are at risk of infection. In sub-Saharan Africa, Plasmodium falciparum is the most prevalent form of the parasite and results in the deaths of 650,000 children under five years of age annually. While disease control strategies have made progress – an estimated 274 million fewer cases and 1.1 million fewer malaria-related deaths reported in the last decade – significant hurdles, including case identification, surveillance, and resource management, remain to achieve elimination 4-6.

MHAT is a mobile Health Platform targeted at Malaria elimination in Zambia. The scope of the project covers a web application which allows field workers to go to the homes of people and test them for Malaria and give recommendations and treatment plans based on results. There is a data driven component also where decision makers could get insights to the effectiveness of the solution by viewing dashboards.

Presentation Type: Oral

Presentation Themes: Pragmatic Applications for Computational Thinking

Faculty Advisor: Lei Qian

70. Discrimination in the Black Community

Brown, Joi^{1*}

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A website is developed about the various examples of discrimination in the black community and how it affects us until this day. Discrimination is the unequal or unfair treatment of a person based upon some personal characteristic. There is discrimination in the schools, prison, also in the community which leads to gentrification when the school and also we are at war with ourselves in the streets which makes black on black crime constant problem. The black psyche is always under attack in America. Being black has become a negative thing and derived from the hate that we have inside us. Also, this country was created by black people who were used and abused also looked at as the lesser. My organization sheds light on the discriminative acts that are put on black people in America. 64% of people in America feel that racism is a major problem. This huge number is not fabricated and my organization shows why this number is so large. My organization cares about African Americans and want their struggle to be known clearly with facts and statistics to back up our claims. The hate is very real in this country and has to be learned in order to prevent ignorance in this country. In conclusion, my partners in my organization know about the black struggle and want to encourage others to learn about it as well. The problem in black America needs attention and needs attention fast before its too late.

Presentation Type: Oral

Presentation Themes: African-American history, Global Affairs

Faculty Advisor: Sajid Hussain

71. Predictive Analytics in Portuguese Banking Institution

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In the past several years, predictive analytics has played a major role in society. In banking, predictive analytics helps customers manage their accounts and complete banking tasks quickly and efficiently. Financial institutions benefit greatly from predictive analytics as it assists in reducing risk and minimizing costs. This project analyzes a data set containing approximately 4,500 instances from a Portuguese banking institution in 2014. Based on several important attributes such as client age, occupation, level of education, and more, the classification goal is to predict if the client will subscribe to a term deposit. The predicted output variable is binary, as the scope of the project aims to predict if the client will in fact subscribe a term deposit ('yes') or not ('no'). This project utilizes pandas (a software library written for the Python programming language for data manipulation and analysis) and scikit-learn (a tool that provides supervised and unsupervised learning algorithms), as well as various other machine learning tools (such as logistic regression, artificial neural network, and the support vector machine) to draw accurate predictions from the data input. The program results indicated that the both the training and testing sets achieved over 88% accuracy, demonstrating an effective program performance. The tools used in the project are often used in predictive analytics, as more industry sectors seek to attain incredibly accurate data prediction in order to gain competitive advantage.

Presentation Type: Oral
Presentation Themes: Global Affairs
Faculty Advisor: Lei Qian

72. The King of Pop

Claiborne, Chandler^{1*}; Williams, Colin²; Brewer- Carroll, Kiara³; Wallace, Richard⁴

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The purpose of this project is to code different songs from The King of Pop, Michael Jackson. Michael Jackson was born in 1958 and he was the youngest of his brothers, Jackie, Tito, Jermaine, and Marlon, which later became known as The Jackson 5. During this time Michael became a phenomenal force in the music business because of his beautiful voice and good looks. He began his solo career in 1971 and then started to become a dominant figure in the music business. He created music that made the world dance and inspired them to be better. Our project will code several of these great songs such as, "Thriller", "Bad", "Remember the Time", and "Black or White". When we were looking at the legacy of this great artist, these were the staple songs that helped change the music industry forever. Our hypothesis for our project was that if Michael Jackson's music was compared, the results would show that there are similarities which made these songs become number one hits. In conclusion, our motivation for our research was to dive deeper into the music catalog of this very impactful musician. We have not yet reached a result but we will have one prepared by the presentation date.

Presentation Type: Oral
Presentation Themes: Media and the Changing Media Landscape
Faculty Advisor: Sajid Hussain

73. Development of the Alchemy Programming Language and Interpreter

Clark, Matthew^{1*}

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Alchemy is a high-level, functional programming language featuring automatically curried functions, thrush and reverse thrush operators, duck typing, and lazy evaluation. The language utilizes these features to allow for straightforward collection manipulation in a remarkably concise manner. It was developed concurrently with a parser and interpreter pair. The former was generated utilizing the ANTLR4 library, while the latter is written in pure Java. As the interpreter was created through the use of a well-organized collection of interfaces, it may be easily modified to include new data types or operators. This allows for developers to be able to define their own custom operations at the syntactic level, rather than being relegated to working exclusively within the language itself. While Alchemy isn't especially likely to gain traction as a general-purpose programming language like Python or C++, it can serve as a unique display of features that may be found desirable for such languages in the future.

Presentation Type: Demo
Faculty Advisor: Lei Qian

74. Community Outreach Project (NewGeneration Tutoring)

Currie, Kira^{1*}; Brewer, Camryn²; Masam, Jaiho³; Rubin, Jestin⁴; Bryson, Markiah⁵; Cook, Be'Kaiyla⁶

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There are many children in Nashville, TN that struggle with their learning. Not all the time the children come home and are able to discuss what they learned in school. Not only is this a problem across the school board of MNPS but it is even more noticeable in low income neighborhoods. Parents who struggling to provide for their children often times don't have the money or time to make sure their children are getting the proper learning. It takes more than the time spent in school for children or any student of any age to remember what they learned in class. The time spent outside of class is actually more crucial in obtaining the information learned for moving to a higher-grade level. That is why the community needs a more affordable more convenient after school program that will help fix this issue.

The community should create a more affordable tutoring program that has professional help for the children. The tutoring program should be located in areas that are convenient to children all over town. This will help raise the test scores in low income neighborhoods and just raise the scores all over the board in the community.

A non-profit organization was able to use their donation money to create a tutoring program inexpensive for the community. Children of all ages and grade levels are eligible to attend the tutoring program. This non-profit organization provides transportation, two snacks a day, and teaching specialist for the children with special learning abilities. The non-profit organization named their tutoring program NewGeneration Tutoring, and their motto is growing the new generation one child at a time. not only are the children taught about school skills but they are also taught teamwork and everyday life skills.

NewGeneration Tutoring is located in three location around town (East Nashville, Midtown and West Nashville, North Nashville). The cost of the tutoring program is \$10 a child per week attending the program. NewGeneration Tutoring is seasonal so sessions are only available during summer (July 6-August 8) and winter (December 12-January 10). The Tutoring program is making an extremely positive impact on the community. Children all over town are more motivated to learn.

The future is brighter for the children. Parents are more confident that their children are retaining what they're learning in school and outside of school.

Presentation Type: Oral

Presentation Themes:

Faculty Advisor: Sajid Hussain

75. Color Changer

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I spent this semester learning the basics of javascript. Along with javascript, I also learned about making chrome extensions. As a result, I have developed a chrome extension that can change the color of the background and other elements such as the text of any webpage. The user can enter any color that the user wants for background and text. Furthermore, there are some of the themes in different colors. By clicking on those these themes, both background and body color gets changed. Moreover, the user can also change the background color without changing the body color and vice-versa.

Presentation Type: Oral

Presentation Themes:

Faculty Advisor: Lei Qian

76. An Analysis of The Color Purple, The Handmaid's Tale and Their Eyes Were Watching God using Python coding

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The purpose of the project is to complete an analysis of various texts using a code that will determine how many times certain words appear in the texts. *The Color Purple*, *The Handmaid's Tale* and *Their Eyes Were Watching God* will be compared using the code to show a pattern and the overlap of themes among the novels. The code will help form a conclusion about the novels and the importance of the key words that appear frequently. The following words that will be used to complete the analysis are "love", "God", "power", "relationship", "family", "trust", "hit", and "fight". These words will help describe the common themes that are present in the novels through the frequency percentage code in Python.

Presentation Type: Oral

Presentation Themes: Gender and Sexuality, Literature and Literary Studies

Faculty Advisor: Sajid Hussain

77. Car Acceptability

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The purpose of this project is to test the acceptability of a car based on the buying price, maintenance price, doors, person capacity, trunk size and most importantly the safety rating. The importance of this project is consumer protection in the car industry. The protection of the consumer's well-being and also financial means.

The data for the various cars and their features was originally gathered to demonstrate DEX, an expert decision making system and was donated in June 1, 1997 to the UC Irvine Machine Learning Repository. To continue to solve the problem of consumer abuse, machine learning techniques of regressors and classifiers are being implemented to test and train the data. Those machine learning techniques include: Logistic Regression, Support Vector Machine, Artificial Neural Network and Decision Trees to name a few. The tools being utilized to process this data are Numpy, Pandas and scikit-learn. Through these tools the data is accompanied by: Numpy, a “fundamental package for scientific computing with Python”, Pandas, “an open source, BSD-licensed library providing high-performance, easy-to-use data structures and data analysis tools” and scikit-learn, a “simple and efficient tool for data mining and data analysis”. With these tools, data structures, algorithms and classifiers, the judgement of the car’s acceptability is able to be trained, tested and improved to obtain a good prediction rate.

Presentation Type: Oral

Presentation Themes: Machine Learning & Intelligent Systems

Faculty Advisor: Lei Qian

78. African American Men and the Media: What Is Really Being Said?

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Looking into how African American men are portrayed when they are victims of assault, police brutality, and other crimes, the research aims to analyze the words used to describe the violated. It is common to read an article about an African American victim of crime where the journalist uses terms that highlight whether they were involved in criminal activities before they became a victim of crime or if they've been arrested or incarcerated previously. The words that were searched for were any words synonymous with the words 'thug' or 'criminal'. The research question asked was 'what word is most commonly used to describe the victims?' In order to adequately obtain the results code had to be used. Before a word of code was written, however, sources had to be gathered. That is when 5 news articles, with black men being the main subject, were gathered for review. After gathering and reviewing the articles, the articles were put in a zip file on the computer. Next, python is opened and used to get data on how many times the article refers to the men as thugs or criminals. The results are compared to evaluate how the news portrays individuals of other races to see if there is a legitimate difference. The code will list the most commonly used words in the article and how often they are used. The code is then analyzed to interpret the strength or connotation behind them. The importance of the study lies in the underlying presentation of African American males through media influence. By analyzing the language and portrayal methods for these individuals compared to those of other racial backgrounds. Spotlighting the techniques used can open potential research for the sociological explanations as to why this so often occurs in African American depiction in legal and political affairs.

Presentation Type: Oral

Presentation Themes: Race Relations

Faculty Advisor: Sajid Hussain

79. Chat App

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This semester, I worked on Building Chat Application. When the user is directed towards the Chat Application they will land on the login page. There will be the following pages:

1. Login Page
2. Conversation Page
3. Register Page
4. About Page

This chat-App provides the capability for new users to register their profile. After registering, they will be redirected to the login page where they can input their registration information. After the information is validated, they will have access to the conversation started by any users. The main feature of this application is starting a conversation between two users on any topics. After the user registers their information, they can raise any topics on the conversation page.

All the registered user can see the conversation topics. Anyone can start a discussion on that topic. This web-application is more like a discussion forum design for a college student to discuss the various subject of interest.

Technologies used: JavaServlet, Java, HTML/CSS, Google DataStore, IntelliJ Idea

Presentation Type: Oral

Presentation Themes:

Faculty Advisor: Lei Qian

80. An Android App for Ordering Tea

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It is often difficult to order food from restaurants. Their phone lines are always busy, and sometimes they mistakenly misplace the order. On top of that, the delivery apps--like UberEats or Doordash--take away more money just for ordering via their apps.

My Android App can resolve these issue as it can be used to order tea right from the smartphone. The app has GUIs, pictures and sleek animations. It shows the menu of pictures of different tea to order. Once tea picture from the menu is tapped, it asks for additional details like size, milk choices, sugar choices, and quantity. Options can be selected from the dropdown options and the total price is reflected in real-time at the bottom. After the order is placed, the next screen shows the order summary and also gives an option (a button) to email the receipt. The receipt can be used as proof in case the order is lost or misplaced.

The app is made using Android Studio and the pictures used in it are downloaded from Google. Further improvement can include payment system integrated with the app itself, location-based tracking of the order, reviews, leaving suggestions, etc.

Presentation Type: Demo

Faculty Advisor: Lei Qian

81. "The Decade of Love"

Green, Kiare^{1*}; Grant, Eliana²; Iwu, Kemanzi²; Echols-McGhee, Daijon³; Deckard, Courtney¹

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The purpose of this project is to break down through code the amount of times the word “love” is used in the R&B songs that the group lists. The songs that are listed are compared by decade (from the 1960's until today). The group wants to see how often the word “love” was used in each decade. With the results, the group and the ones witnessing the project will see which decade of R&B used the word “love” the most and vice versa. The computer codes of this project runs through the Python app.

With Python, the analysis of the songs the group picks is broken down through coding by being defined as functions. Each function is classified by decade. The decades that are used are the 1960's, the 1970's, the 1980's, the 1990's, 2000's, and the 2010's. One song from each of those decades will be analyzed in each function. After each code is ran, the word count will determine for each function how many times a certain word is used. The main word that the group is focusing on is love. The outcomes of this project reveals if the word “love” is used more or less in R&B music in this day in age.

Presentation Type: Oral

Presentation Themes:

Faculty Advisor: Sajid Hussain

82. The Analysis of the Different Styles of Christian Music

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Are the different styles of music really what the older generation christians say they are? In the world of christian music, there are different styles of music: Traditional Gospel, Contemporary Gospel, Praise and Worship, Rap, Country, Heavy Rock, and more. Some people would argue that some of these styles of christian music are not considered “Holy Music”. This project is going to share the comparison of all these styles of music based on their lyrics. The songs that are used are “Go Tell it on the Mountain”, “Resurrection Power” by Chris Tomlin. “Rez Power” by Israel and New Breed, “Holy Water” by Lecrae, “Rooftops” by Jesus Culture, “Jesus, Take The Wheel” by Carrie Underwood, and “We Bless The Name” by BJ Putnam.

The words that are searched in the files are love, God, resurrection, mercy, grace, blood, Jesus, Christ, Lord, and forgive. Some words are enhanced due to the different types of songs. All of the information are provided through Python. There is also a chart provided for the information that is collected.

Are these styles of music sharing the gospel as it should? Based on youtube, under some of the newest Christian songs, people call them “ Devil’s Music”. The negative comments are more likely from the older generation of christians. They argue that country music, rock, and rap are not to be associated with Godliness. They are more than likely to look past the message that is being shared. The Bible does not talk about the styles of christian music that christians should listen to, but people would still argue that those types of music are of the world.

A Christian song should not be judged whether it is righteous or not based on the style of music. It should be judged by the lyrics. Some people are more attracted to one style of music than the other. In order for the gospel to be heard by many others, its ok to be different than the traditional christian music; as long as the gospel is being shared.

Presentation Type: Oral

Presentation Themes: Pragmatic Applications for Computational Thinking

Faculty Advisor: Sajid Hussain

83. Artificial Intelligence in the Workforce

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Machine learning far outpaces the capabilities of human workers, causing many to fear a large increase in unemployment. This project seeks to evaluate incorporation of artificial intelligence into the workforce and predict its role in the growth and decline of labor and capital. Using compiled secondary sources- testaments to the impact of artificial intelligence in areas as various as art, banking, crime, and quality of life, to name a few- allows us to measure this impact and conclude that cooperation between man and machine is more prevalent than competition. Artificial intelligence is pervasive in every sector, the arts included. Generative adversarial networks(GANs), at the crossroads of data science and visual art, have been used to produce works of art for over a decade. It has proved crucial to consider the incorporation of artificial intelligence into a workforce being redefined by close collaboration. In the most practical sense, the advantages of this collaboration are seen in the human piloted robots customizing Mercedes sedans at the Stuttgart plant in Germany. The scope goes beyond the car plant and into interactions as intimate as banking. Artificial intelligence in this field has learned to differentiate meaning from the tones and pitches of customers and respond in a way most appropriate to the customer's emotions, using the interaction as future reference. Promising outcomes of this wide economic development include a reliable workforce to suit the needs of the advancing "Silver Tsunami" and the premise of greatly improved quality of life. Released from the drudgery of repetitive work, more people will be free to pursue interests dear to them, such as conservation and exploration.

Presentation Type: Oral

Presentation Themes: Global affairs, Health and Wellness, Machine Learning & Intelligent Systems, Pragmatic Applications for Computational Thinking

Faculty Advisor: Sajid Hussain

84. Predicting Whether An Image is an advertisement ("ad.") or not ("nonad.") Using Various Machine Learning Models

Karaga, Oumar^{1*}

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Image recognition plays a critical role in users' experience on the Web. In fact as more and more organizations are seeking to sustain their content, there is a high proliferation of advertisement in the form of popups, pictures across the Web. Most users find such ads to be distractive, pervasive, and annoying at times. Therefore increasingly there has been a need for blocking or removing such content from the Web for users who wish to have uninterrupted experience with content on the Web. This has set the ground for Ad-Blocking technology, and at the core of these technologies is essentially artificial intelligence models for recognizing content that is deemed advertisement and one that is not. As such, in order to understand the logic behind these ad-blocking technologies, it is important to have first-hand experience of the cutting edge machine learning models used in

the process. That is why the main task of this project is to predict whether a given image is an advertisement or not. In order to achieve that, several machine learning models- namely classifiers, as per the nature of the problem are implemented. The workflow in this project involves data collection, preprocessing, splitting data sets into training and testing disjoint sets, and a pipeline for training and testing the datasets. The datasets in question represents a set of possible advertisements on Internet pages. With over 2000 samples and 1158 attributes, post preprocessing, the features encode the geometry of the images (if available) as well as phrases occurring in the URL, the image's URL and alt text, the anchor text, and words occurring near the anchor text. A suite of classifiers such as Logistic Regression, Multilayer Perceptron (Artificial Neural Network), and Support Vector Machine coupled with GridSearch are used in the pipeline for determining the most suitable, and performing model for this specific problem space.

Presentation Type: Oral

Presentation Themes: Machine Learning & Intelligent Systems

Faculty Advisor: Lei Qian

85. Intelligent Symptom Checker and Adaptive Medical Diagnosis Tool

Karaga, Oumar^{1*}

¹Computer Science, Dept. of Mathematics & Computer Science, Fisk University, Nashville, TN 37208

Medical diagnosis has for long been central to a doctor's routine, and the most interactive methods for information gathering and decision making in the medical industry. In the era of cutting edge technology that have unprecedentedly improved the efficiency of doctors in helping treat diseases, artificial intelligence plays a critical role and will continue to do so for years to come. In fact medical diagnosis is a modelable task and can be automated without the need of a physical doctor, with of course the discretion of a doctor or specialist. There are many tools and one of such tools is SmartDiagnose, the goal of which is to assist doctors' in monitoring their patients and administering automated and AI backed-up diagnosis, such that patients could take a diagnosis irrespective of a physical location, prior to medical appointments, at the discretion of their doctor. SmartDiagnose provides an interface for patient triage and preliminary medical diagnosis with an intelligent symptom checker. A patient can choose between directly talking to the tool which supports voice recognition or providing a text input. Using a voice recognition API such as Houndify and a medical diagnosis API such as Infermedica, SmartDiagnose is able to, in a decision-tree model, disregard irrelevant factors as it pursues each time a more refined answer for the patient. Beyond the interactive Q&A in the interface, the tool also provides a sorted visual representation of the conditions that a patient may have along with the probability of them occurring.

Presentation Type: Oral

Presentation Themes:

Faculty Advisor: Lei Qian

86. Social Justice

Lawrence, Genesis^{1*}; Brown, Timberley²; Houston, Mikel³; Jossell, Nate²; Massey, Kamea¹

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The purpose of this website is to analyze different aspects of social justice by comparing sets of data related to social justice and creating possible solutions to solve the many problems that surround social justice. The topics related to social justice that can be found in the website include feminism, police violence, race relations in athletics, religion, and stereotypes in society. Based on the topics that were chosen, it can be concluded that many of the problems concerning each topic is due to lack of understanding. Therefore, the ultimate solution for each of the problems would be to educate people about the common misconceptions of each of the topics. The data that was collected for each of the topics contained in the website was obtained by researching different statistics that relate to each topic. The data was then analyzed and the problems that related to each topic were identified. The solutions for each of the problems were then created. Although we have did research on each topic, the only way to fully stop these misunderstandings from occurring is the rebuilding of our communities, and the right teaching of those who will be living in this world after us.

<https://sites.google.com/site/socialjusticeeeee/>

Presentation Type: Oral

Presentation Themes: Race Relations

Faculty Advisor: Sajid Hussain

87. Reflection on the Humanistic and Religious Experience

Mosley, Dartisha^{1,2*}; McDuff, Micah³

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As it relates to a person's moral belief, religious text has been a grounding guide and cornerstone in the lives of many believers. The purpose of this research project is to conduct a comparative analysis of three different religious texts using python idle. Python is a programming language used for data science and analytics. The three different religious texts used are the Bible, the Quran, and the Torah. Each book represents the teachings of the Christian, Muslim, and Jewish faith. There is a comparison done using the same eight words from each text. The eight words include: "repent", "obedience", "salvation", "peace", "forgiveness", "faithful", "love" and "marriage". The words selected represent the most common life experiences or issues people turn to religion for. Our aim for this project is to show the commonality between these major religions on the grounds of humanistic and religious experience. Each book is downloaded as a pdf file and saved as a file. Secondly, each word's usage is found in the file. Next, each word is checked for its appearance frequency. Lastly, each word and the percentage of frequency is printed out. Ultimately, this work is a reflection on religious text and the impact of religious belief on the human experience. As referenced repeatedly, these major texts stand for the teaching, correcting, and moral guide for nations and masses of people throughout the world. Discovering what constitutes the primary content within them, shines a light on the overall pressing points of the humanistic experience.

Presentation Type: Oral
Presentation Themes: Global Affairs
Faculty Advisor: Sajid Hussain

88. Translator

Nagarkoti, Bikki^{1*}

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Translator is a handheld device made using raspberry pi which translates speech in one language to a speech (device generated) in a different language. The Raspberry Pi is a tiny and inexpensive computer that can be used to learn programming through fun but has a lot of potentials to work on practical projects. The U.S. is known for its diversity of people from all around the world. As English is not a primary language for some people, it is hard for them to interact with other people. Translator is a portable device which will help different language speakers to interact with each other. Translator will also help people who are traveling to a different country. First the user select two languages they want to translate from and to and speak. Translator will first use Speech-to-Text API to get text and use Google Cloud Translation API to translate the text to a different language and Text-to-Speech API to play the text.

Presentation Type: Demo
Faculty Advisor: Lei Qian

89. Religion as an Eternal Commitment

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As of 2010, nearly one third of the world's population (31%) identifies as being Christian. The Bible is a major part of the Christian religion and is a guide for their beliefs. Often times, people use this book to make the lifelong decision to follow Jesus Christ with the hopes of earning an "eternal" life. This study examines certain language in the Holy Bible through Python coding to study the length of this commitment to Jesus Christ. In particular, words that pertain to definite lengths of time to are being examined. Always, eternal, and forever are examples of the words that are being observed. The Python programming language is used to determine how many times these words are mentioned in the Bible. This will demonstrate the permanence and eternity of one's commitment to the Christian religion. Although the results have not been found yet, the hypothesis is that these words are used over 100 times in the King James Version of the Bible.

Presentation Type: Oral
Presentation Themes: Literature and Literary Studies
Faculty Advisor: Sajid Hussain

90. Virtual Tour of the Fisk Art Gallery

Portillo, Marlon^{1*}

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Create a Virtual Tour of the Fisk Art Gallery using Unity Game developing engine to create the environment and give a visually appealing environment to immerse the player(potential student, faculty and aluminum) into the environment, while giving them information of the art pieces that are on display in the art gallery. In this project, I used C# to program the different commands that the player will be able to use. Unity is a game developing program that allows for very realistic environments, and to an extent, it allows for easy web deployment that will make it convenient for it to be placed on the Fisk Art Gallery website. Unity will be used be to created as close as possible recreation of Fisk Gallery. Blender is a tool that can both create games and make models. I will be using blender to create the model of potential sculptures that the Art Gallery will be showing.

Presentation Type: Demo

Faculty Advisor: Lei Qian

91. Using Machine Learning to Predict the Survival of Lung Cancer Patients after Thoracic Surgery

Rasuli, Zahra^{1*}

¹Computer Science, Dept. of Mathematics & Computer Science, Fisk University, Nashville, TN 37208

Lung Cancer is the leading cancer killer in both males and females in the United States. Most patients with lung cancer undergo Thoracic Surgery, in order to completely remove the tumor and nearby lymph nodes in the chest. Since the survival rate of lung cancer patients is staggeringly low, models in machine learning were used on a dataset from Wroclaw Thoracic Surgery Centre to determine key features that may contribute to the death toll. Machine learning uses artificial intelligence to train models on datasets to determine patterns and/or outputs. The machine learning algorithms Artificial Neural Network, Support Vector Machine, Logistic Regression, and Decision Tree were used to predict the survival of lung cancer patients one year after Thoracic Surgery. The Support Vector Machine had the best training and testing scores when using the polynomial kernel. The features that play the most significance is the Diagnosis, Zubrod Scale, Tumor Size, Pain before surgery, Dyspnea and Smoking. Overall, machine learning is an effective way to predict the survival of patients with Lung Cancer undergoing Thoracic surgery. The features that were found to be most impacted depict that the diagnosis, state before surgery, and the history habits of the patient play a pivotal role in determining their survival. In the future, this model can be used on other datasets that affect individuals with lung cancer and it can provide a different perspective of how the problem can be solved so that the number of families broken can be minimized.

Presentation Type: Oral

Presentation Themes: Machine Learning & Intelligent Systems

Faculty Advisor: Lei Qian

92. Object Detection Using Machine Learning Models

Rasuli, Zahra^{1*}

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Object detection is a use of technology that involves using image or video processing to detect and label objects. Machine learning uses artificial intelligence to train models on datasets to determine patterns and/or outputs. Using machine learning models from Apple's developer site, an app was built to detect and label images using the iPhone's camera. The app asks the user for permission to use the camera and uses Vision framework, AVKit framework; in addition to the machine learning model Resnet50 to detect objects presented to the camera. The future of possibilities that this could be used for is endless and is currently used by major corporations such as the invention of the self-driving car, and face detection for security purposes. In the future, this can be used with other machine learning models to detect skin cancer using one's phone camera as people may not have direct access to a physician.

Presentation Type: Oral

Presentation Themes:

Faculty Advisor: Lei Qian

93. Analysis of Former President's Inaugural Speeches

Robertson, Alliyah^{1*}

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Former Inaugural Speeches are examined through Python coding to show if keywords resembled the respective President's term. By using code, Python will examine these speeches and group together positive words that were spoken at the Inauguration. I will then look at the data collected and compare them to the overall approval rate of the last term of each former President. This will determine if keywords in these speeches resemble the President's term. President Barack Obama's keywords resembled his presidency while President Bill Clinton and President George W. Bush did not have keywords that resembled their presidency. Together these findings prove that positive keywords at Inaugural speeches resemble presidency.

Presentation Type: Oral

Presentation Themes:

Faculty Advisor: Sajid Hussain

94. Using Python to Analyze the Lyrics of a Rhythm & Blues Song By Frank Ocean

Robinson, Mikaila^{1*}; Bullock, Shelby²

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Within this project, we were able to successfully determine the top ten most occurring words within a text file. We used five definition functions, and an import function in order to achieve this goal. We were able to remove all punctuations and condense several short lines into one continuous list with all words in the file. Our results showed that the top ten most frequently used words in the lyrics were 'you', 'I', 'thinkin', 'bout', 'been', 'think', 'ooh', 'do', 'not', and 'so', respectively. This program was successful because we could have found the top 5, 15, or 20 most frequently used words, simply by changing the second input parameter in the "def TopN(filename, top_num)" function. We encountered a few problems when writing the code for this program, such as creating a document with the correct format so that Python could read it, putting functions in the correct order so that there would be no errors returned, and removing the end-of-line characters so the Python could accurately count the number of times each word occurred in the file. After resolving these issues, our program ran successfully.

Presentation Type: Oral

Presentation Themes: Media and the Changing Media Landscape

Faculty Advisor: Sajid Hussain

95. Textual Analysis of Songs of Beyonce

Robinson, Mikaila^{1*}; Bullock, Shelby²

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Music and songs represent cultural diversity and creativity. In this study, the lyrics of Beyonce's songs are analyzed. Beyonce was chosen as the artist because she is a very popular musician and is commonly heard across all genres. Python programming language is used for data analytics. The software is designed using functions and iterative loops. The code can be applied for different applications related to textual analysis. Several data related functions are developed; for example, functions related to data collection, data preparation, data cleaning, and data analysis. We encountered a few problems when writing the code for this program, such as creating a document with the correct format so that Python could read it, placing functions in the correct order so that there would be no errors, and removing the end-of-line characters so the Python could accurately count the number of times each word occurred in the file. The results show that the top ten most frequently used words in the lyrics are 'you', 'love', 'baby', 'been', 'ooh', 'do', 'not', and 'so', respectively. The lyrics are compared in terms of number of words, common words, different words, and length of words. In future, the work can be extended to determine the similarities in the songs of different artists.

Presentation Type: Oral

Presentation Themes: Media and the Changing Media Landscape

Faculty Advisor: Sajid Hussain

96. Othello

Thompson, Jordan^{1*}

¹English, Dept. of Arts & Languages, Fisk University, Nashville, TN 37208

William Shakespeare has played such an enormous role in English-literature. *Othello* is one of the most prominent and well-known plays related to Shakespeare. One of the main reasons this love tragedy is different than some of Shakespeare's other plays is his choice of an implementation of race. However, Othello associated with William Shakespeare was not a story originated by William Shakespeare. Scholars believe the first person to publish a tragedy as such was known to be Cinthio who titled his work 'Gli Hecatommithi'. This then makes Shakespeare's Othello an adaptation of a literary text. Often in English, scholars are responsible for comparing different adaptations of similar texts. For Intro of Computing the intended goal for this project is to compare Cinthio's interpretation of the work to that of Shakespeare's. Ideally, the time frame in which they are constructed should show differences on the perceptions of race, love and tragedy. For example, in Gli Hecatommithi, Desdemona is known to be the only centralized character who is definitively named in the story. As for, Shakespeare most scholars are aware that this is not the case. Shakespeare incorporates a host of named characters and creates a twisted plot to Cinthio's version. By using well-known characters in Shakespeare's Othello, the project will present differences on the themes of love and tragedy. This will be measured not only by characters but also by using key words in python (coding tool). Using words such as: love, Iago, trust, despair, and death as key focal points will help to establish this claim.

Presentation Type: Oral

Presentation Themes:

Faculty Advisor: Sajid Hussain

97. From Slavery to Freedom

Townsend, Brian^{1*}; Bell, Kamari¹

¹Political Science, Dept. of History & Political Science, Fisk University, Nashville, TN 37208

There are many books written about African Americans going from the terrors of slavery to becoming free citizens in America. The Narrative of Frederick Douglass, Twelve Years a Slave, and Up from Slavery are autobiographies of three men with different stories but a similar theme: overcoming slavery and gaining freedom. These three texts give insight of how America operated and the horrid lives of African Americans in the 19th Century. The purpose of this project is to analyze the stages of each of the authors' lives to understand their perspective and outlook during their years of struggle. Three words that are focused on in each book are "slave," "freedom," and "believe." These words reflect how these men viewed their lives, what they wanted to achieve in life, and how they were going to get what they wanted. Their belief guided them to transition from being bound in slavery to having freedom and essentially freeing others.

Presentation Type: Oral

Presentation Themes: African-American history

Faculty Advisor: Sajid Hussain

98. Diagnosing Breast Cancer with Machine Learning Methods

Watson, Tykeena^{1*}

¹Mathematics, Dept. of Mathematics & Computer Science, Fisk University, Nashville, TN 37208

Breast cancer is the second leading cause of death within women. Although the death rate due to breast cancer has declined in the past few years, there is still room for improvement. The decline is said to be a result of better treatment and pre-awareness with screening.

The goal of this study is to use machine learning methods to predict the property of breast tumors, so physicians can better prepare patients to get rid of a cancerous cell before it takes over their entire body. One will also study the correlation between the properties of tumor images and malignancy of tumor.

The purpose of the project is to diagnose breast cancer using digitized images. Three professors from the University of Wisconsin used fine needle aspiration to collect images. The data was initiated in 1984 and published in 1995 with a total of 569 patients. Most of the samples obtained were from palpable masses and ultrasound guidance. Only solid masses that yielded epithelial cells were computer-analyzed.

Presentation Type: Poster

Faculty Advisor: Lei Qian

Grant: Funding support was provided by NSF Award 1719450 to Fisk University

99. The Comparative Study of Billboard Top 10 2018 vs 2016 & How They Impacted The Rap Community

Wellington, Kadeer^{1*}; Kinsey, Jamillah²

¹Art, Dept. of Arts & Languages, Fisk University, Nashville, TN 37208; ²Political Science, Dept. of History & Political Science, Fisk University, Nashville, TN 37208

The project consists of a comparative study of the top 10 songs from the billboard's top 100 in 2018 in contrast to 2016 to see the most famous artists and their lyrics in order to gain an understanding of the state of the rap community's interests and state of mind. It will also be able to tell if there were any new artists to make the top 10 of the top 100 and analyze their style of rap in that year's album/single.

There are a number of steps that will be made in order to find this end goal. Firstly, finding and downloading the lyrics to Microsoft Word, then turning those files into ones useable in python. Then, defining a set of functions in order to find the most frequently used words in the song (which are usually found in the chorus), to check their frequency. Lastly, recording the results of the study by documenting the conclusion drawn from the observation of the data given from the functions defined throughout the project.

The state of the rap community is ever changing as the interests of the people differ, in addition to the artists' mind and emotional state while they made their top rated songs of that year. A thorough analysis of the rap community's interests, along with the mental and emotional state of the rappers will be done. This is due to people not only liking a song because it sounds good, but because of the impact the lyrics of a certain song will have on them.

Presentation Type: Oral

Presentation Themes: Media and the Changing Media Landscape

Faculty Advisor: Sajid Hussain

100. After Surgery Patient Diagnosis using Machine Learning

Wells, Jamaal^{1*}

¹Computer Science, Dept. of Mathematics & Computer Science, Fisk University, Nashville, TN 37208

This machine learning program is being developed to combat the issue of overcrowding in hospitals. There are a finite number of doctors available to get to each patient in a hospital and doctors are currently needed for the identification and release of patients from the hospital. This program allows the diagnoses of patients who have undergone surgery and provides information on the likely hood they will need to stay in the emergency care unit of the hospital based on several biometrics from a person. These biometrics are patient's internal temperature in C, patient's surface temperature in C, oxygen saturation in %, last measurement of blood pressure, 90/70 stability of patient's surface temperature stability of patient's core temperature, and stability of patient's blood pressure. These readings are then used to make a judgment on the future health of the patient with a current 98% accuracy (using the logistic regression method). Other methods are being tested and used to determine the best type of algorithm to use as this program scales.

Presentation Type: Oral

Presentation Themes: Health and Wellness, Machine Learning & Intelligent Systems

Faculty Advisor: Lei Qian

101. Textual Analysis of Holy Bible

Whetstone, Nataliah^{1*}

¹Psychology, Dept. of Behavioral Sciences & Education, Fisk University, Nashville, TN 37208

In this work the Holy Bible is analyzed using Python programming language. The most frequent words are obtained; moreover, specific words and themes are investigated. The textual analysis of Bible provided the opportunity to apply computing knowledge for relevant application. In future, the work can be extended for comparative analysis of different books.

Presentation Type: Oral

Presentation Themes: Literature and Literary Studies, Pragmatic Applications for Computational Thinking

Faculty Advisor: Sajid Hussain

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Faculty Advisors

Natalie Arnett, PhD

Dr. Arnett's doctoral research focused on the synthesis and characterization of poly(arylene ether sulfone) random copolymers as multipurpose membranes for reverse osmosis and fuel cells. Currently, Dr. Arnett's research focuses on the synthesis and characterization of modified poly(arylene ether sulfone) random copolymers to enhance proton exchange membrane fuel cell performance and novel polyamide-polyetheramide (PAPEA) copolymers that have the ability to improve chlorine degradation during desalination by reverse osmosis applications. Dr. Arnett's overall research program, which includes undergraduate and graduate trainees, has the overall objective to prepare varieties of polymers with disulfonated poly(arylene ether sulfone)s (PAESs) with hydrophilic polymers to achieve suitable polymers for use in fuel cells, reverse osmosis for water purification, and for solar cells.

Dr. Arnett's teaching efforts include General Chemistry I and II and Organic Chemistry Laboratory for undergraduate students and upper level graduate/introductory graduate courses in Polymer Chemistry as well as guiding the Chemistry Colloquium.

Dr Arnett serves as the Director of Graduate Studies in Chemistry at Fisk University and has an Adjunct Appointment in the Department of Chemistry at Vanderbilt University as part of her participation in the Fisk-Vanderbilt Master's to PhD Program.



Arnold Burger, PhD

Arnold Burger obtained the B.Sc. degree in Physics-Mathematics (1976), M.A. in Materials Science (1981), and Ph. D. in Materials Science (1986), all from the The Hebrew University of Jerusalem. In 1986 he joined the Department of Physics at Fisk University and since then he has developed at Fisk a program in crystal growth of wide bandgap semiconductor materials and their use in electronic and optical devices. He participates presently in the research at the Center for Physics and Chemistry of Materials. Currently, Dr. Burger is a Professor in the Department of Life and Physical Sciences and the Director of the Materials Science and Applications Group. He also holds the position of adjunct professor of physics in the Department of Physics and Astronomy at Vanderbilt University. Dr. Burger advised over 70 graduate students and 16 postdoctoral scholars; has published over 400 papers, book chapters, proceedings and invited presentations and was awarded seven patents in these fields. In 2010, Dr. Burger was appointed to a three-year term as a member representative to the Board of the Association of



Universities for Research in Astronomy (AURA). Dr. Burger is an elected Phi Beta Kappa Honorary Member and a Fellow of the SPIE optics and photonics society and together with his colleagues and collaborators is a three-time recipient of the R&D100 Award, in 1998, 2001, and 2010 for developing new methods to grow crystals and various compact sensors to detect and image radiation.

Katharine A. Burnett, PhD

Dr. Burnett is an associate professor of English with specializations in early American literature, 19th-century literature, and literature of the U.S. South. She has been the recipient of an Andrew W. Mellon/American Council of Learned Societies dissertation completion fellowship and a University of Tennessee Humanities Center fellowship. Her articles and essays have appeared in PMLA, the Southern Literary Journal and the Global South Journal. Her book, *Cavaliers and Economists: Global Capitalism and the Development of Southern Literature, 1820-1860* (LSU Press 2019), examines antebellum southern literature in the context of free market capitalism and the 19th-century global economy. She is a native of Nashville.



Leslie V. Collins, PhD

Dr. Leslie V. Collins is an Assistant Professor of psychology in the Behavioral Sciences and Education Department. She has taught general psychology, social psychology, quasi experimental design, abnormal psychology, psychology of gender, and psychology of race and ethnicity. Additionally, she leads an independent study group about Participatory Action Research theory and methods. She received her PhD in Community Research and Action from Vanderbilt University in 2012.

Her research interests primarily focus on using community based research methodologies (e.g., participatory action research [PAR], community based participatory research (CBPR) and action research) and mixed method case study design to examine the following factors: 1) means of community change and activism; 2) The effects of social inequality (e.g. racism, sexism, elitism, heterosexism, etc.) on individual and collective well-being (mental, spiritual, financial, physical, relational); 3) the relationship between resilience and resistance in marginalized communities; and 4) how inequality and diversity among service providers and between the service providers and recipients affect how non-profit organizations function, and how they meet the need of low-income individuals and communities.

Finally, Dr. Collins has extensive experience in the realm of non-profit work including direct service and program management. Prior to pursuing a PhD, I was employed for over twelve years as a counselor, program director, and volunteer in several community based social service organizations.

- Resident Experts: Creating Grassroots Policy in Public Housing and Workforce development
- Examining how community based research translates to action (resistance) and resilience

Steven Damo, PhD

Research in the Damo lab employs the methods of structural biology to inform questions of biomedical relevance. A diverse array of physical chemistry experimental approaches are utilized including x-ray diffraction, nuclear magnetic resonance spectroscopy, and computational modeling to characterize protein–protein and protein–ligand interactions. Current areas of investigation include calcium signal transduction, DNA recognition by transcription factors, and the role of transition metals in virulence. These programs in basic science research have broad implications for problems of global health concern such as cancer, diabetes, immune and inflammatory disorders, and antibiotic resistance. Undergraduate and graduate trainees obtain an education and skill set suitable for careers in academic research, pharmaceutical industry, and biomedical health professions.

Dr Damo's teaching efforts include Physical Chemistry I and II and Inorganic Chemistry for undergraduate students and upper level graduate/introductory graduate courses in Biophysical Chemistry. Also, Dr Damo serves as co-facilitator for Professional Skills for Graduate Study.

Additionally, Dr Damo serves as the Associate Director of the Minority Access to Research Careers (MARC- hotlink) Program at Fisk University , a program funded by the NIH to provide tuition and stipend support to assure that undergraduates interested in obtaining a PhD and ultimately engaging in a career in biomedical research have the academic support and opportunities for academic year and summer research that assures their successful entry into the PhD-granting program of their choice.

Sajid Hussain, PhD

Dr. Sajid Hussain is Associate Vice Provost for Innovation & Information Technology (CTO) and Discipline Coordinator of Data Science, Fisk University. In 2009, he joined Fisk University as Associate Professor in the Department of Mathematics and Computer Science. Dr. Hussain has served as Chair of the Department of Business Administration, Fisk University, 2010-13. Prior to Fisk, he worked as Associate Professor and Assistant Professor in the Jodrey School of Computer Science, Acadia University, Canada, 2005-09. He received Ph.D. in Electrical Engineering from the University of Manitoba, Canada, 2004.

Dr. Hussain is interested in applying machine learning techniques for inter-disciplinary research projects related to healthcare, bioinformatics, digital humanities, and criminal justice. He is also interested in energy efficient communication protocols and security techniques for mobile, ubiquitous, and pervasive applications. He has published more than 70 refereed journal, conference, and workshop papers. His research is financially supported by several grants and contracts, such as NSF Implementation Award (Grant #1817282), NSF TIP Award (Grant# 1332432), NIH/BD2K-R25 Diversity, UNCF/Google etc.



He has co-organized several journal special issues, conferences, and workshops. He has served on many technical program committees and reviewed papers for several journals. He is a senior member of IEEE.

Lee E. Limbird, PhD

Though Dr Limbird closed her biomedical research laboratory when she retired from Vanderbilt University in 2004, She joined Fisk University in 2010 and continues to serve as a faculty member with a focus on students' achieving their highest aspirations and faculty having the resources and encouragement to further their own development and passions. She works with undergraduate researchers through her participation in the NIH-funded MARC U*STAR Program and in the American Heart Association HBCU Scholars Program. **As Dean of Graduate Studies**, Dr. Limbird **collaborates with other faculty to oversee** the extant and planned graduate programs and serves as a liaison for partnerships with other institutions, including the Fisk-Vanderbilt Master's to PhD Bridge Program. **Dr. Limbird is also an Adjunct Professor of Pharmacology** at Vanderbilt University.



Steven H. Morgan, PhD

Dr. Steven H. Morgan is currently Professor of Physics and Chair of the Life and Physical Sciences Department Physics at Fisk University. He received his undergraduate training in physics from Tennessee Technological University in Cookeville, Tennessee, in 1974, and his Ph.D. in physics from Vanderbilt University in 1981. After receiving his PhD, Dr. Morgan began working at Fisk as a Research Associate in the Physics Department and became full Professor in 2000. He was chair of the Physics Department for just over 10 years and then became chair of the newly formed Life and Physical Sciences department. Dr. Morgan teaches Physics at the graduate and undergraduate level, and serves as a research adviser for both graduate and undergraduate students.

Dr. Morgan's research interests include the development of new optical materials for applications in the areas of lasers, scintillators, waveguide devices and biosensors. Materials being studied include rare-earth and transition-metal doped glasses and glass-ceramics for waveguide and scintillator devices and solar energy applications.

Brian Nelms, PhD

As a graduate student, Dr. Nelms was a member of the lab of Dr. Wendy Hanna-Rose, where he used the small nematode worm *C. elegans* as a model system for studying genetic regulation of organogenesis. After finishing his Ph.D. work, he moved to Nashville to begin postdoctoral work with Dr. Patricia Labosky at Vanderbilt and broaden his perspective beyond *C. elegans*. During his postdoctoral fellowship, part of which was supported by an American Heart Association fellowship award, he investigated the role of the transcription factors Foxd3 and Pax3 in the development of the cardiac neural crest in mice, and engineered transgenic mouse lines and mouse embryonic stem cells to assist in studies of Foxd3.



Now at Fisk, he is pursuing his love of both teaching and research. He has developed and taught courses in Developmental Biology and in Biotechnology/Molecular Biology. For his undergraduate- and Masters-level research program at Fisk, he has returned to using the ideally suited *C. elegans* as a model system and has ongoing research projects examining the role of a group of genes encoding forkhead transcription factors ("Fox" genes in mammals) in *C. elegans* neuron development.

Dr. Nelms serves as the Director of Graduate Studies in Biology at Fisk University and is also an Adjunct Assistant Professor of Cell and Developmental Biology at Vanderbilt University School of Medicine, as part of his involvement as a faculty member in the Fisk-Vanderbilt Masters-to-PhD program (<http://www.vanderbilt.edu/gradschool/bridge/>).

Lei Qian, PhD

Dr. Qian's research interests include optical computing, pure and applied logics, formal methods, computer security, pattern recognition, data mining, bioinformatics and grid computing. His researches were funded by NSF, NOAA, MDA, AFOSR and Hewlett Packard.



Dani Allred Smith, PhD

Dr. Smith recently has returned to Fisk from a year-long sabbatical. She served as a Faculty Fellow at the James Weldon Johnson Institute for Advanced Interdisciplinary Study of Emory University. Dr. Smith received a summer stipend from the UNCF/Mellon Mays program to support her research on gender and violence in young reader fiction. Dr. Smith is expanding her research to also consider age and religion within young reader fiction. Dr. Smith has collaborated with colleague Dr. Sheila Peters on a grant through the Office of Victims of Crime to produce four curriculum modules related to criminal victimization across the life cycle. They have developed a case-book approach to the topic meant to be integrated into the introductory courses in sociology and psychology.



Dr. Smith's greatest passion is student research. She serves as a mentor to sociology majors accepted into the UNCF/Mellon program. She also supervises student research as a component of the senior capstone course in sociology. Since 2009, she has accompanied 39 students to present at regional sociology and undergraduate sociology conferences. In 2013, one of her students won first place at the Southeastern Undergraduate Sociology Symposium.

Dr. Smith sponsors and serves as chapter representative for the Alpha of Tennessee chapter of Alpha Kappa Delta, the sociology honor society. She is also the faculty editor of the *Looking Glass*, the sociology newsletter. She has spoken at local and regional private colleges for academic convocations, symposia, and Alpha Kappa Delta initiations.

Dr. Smith is a member of several professional associations: American Sociological Association, American Society of Criminology, and Southern Sociological Society.

Dr. Smith consults with Educational Testing Service as a test item contributor and test development committee member and chair for a variety of tests which assess knowledge of sociology content.

Research Interests: Gender and violence in young reader fiction, Validation study of Major Field Test results

Yvette N. Spicer, MHA

Yvette N. Spicer

Director, Fisk-MMC HBCU Wellness Program/ HBCU Obesity Awareness Campaign
Academic Advisor-Biology
Adjunct Faculty-Core

Education

BS –Spelman College
MHA- Georgia State University

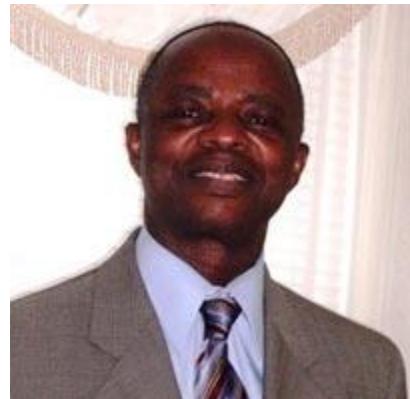
Nicholas Umontuen, MBA

Nicholas Umontuen has over 20 years of college teaching experience. His teaching area is management with emphasis in strategic management/business policy, business communication, organizational behavior and leadership.

Apart from teaching, Nicholas has over 10 years of business management experience from the industry.

As an entrepreneur, he co-founded HealthCore Alliance LLC, and served as CEO and chairman of the Board for four years.

He is active in philanthropy and has 18 years in non-profit organizational leadership. He founded AKISAN in Tennessee (a non-profit organization) where he currently serves as chairman of the board. He directs the efforts to raise money to restore dilapidating primary schools in rural Nigeria.



Currently he serves as discipline coordinator, Department of Business Administration, faculty advisor to Delta Mu Delta National Honors Society in Business Administration and Campus Liaison, the Black Executive Exchange Program (BEEP).

He is a member of the National Business Education Association and Honorary member of Delta Mu Delta. His area of interest is in Business Policy/Strategic Management, Organizational Leadership, Entrepreneurship, and Organizational Behavior.

Nicholas holds Master of Public Administration and Master of Business Administration with a Concentration in Health Care Management.

Patrick C. Fleming, PhD

I teach courses in British literature, including surveys for majors and seminars on Victorian literature, Romanticism, children's literature, Shakespeare, and the history of the novel. In my teaching I take a historical approach to literature, but in a modern context: my students blog, write Wikipedia entries, create ersatz Facebook and LinkedIn profiles for literary characters, and test their scansion skills with [For Better for Verse](#).

I also direct the W. E. B. Du Bois Honors Program, helping students meet the program requirements and develop their senior honors projects, and am the Fulbright Program Coordinator for Fisk University.

Besides my academic interests, I enjoy ultimate Frisbee, cooking, and playing board games (I'm especially fond of Scrabble — my wife and I have been playing continuously almost since we started dating). I used to compete as an amateur ballroom dancer, and still enjoy dancing socially

My research focuses on Victorian literature and children's literature. My book about childhood reading and the Victorian novel, [The Legacy of the Moral Tale](#), is available from the University of Tennessee Press. My current book project, tentatively titled, *Disney's Victorians: Literary History in a Global Media Age*, examines how the Walt Disney Company adapts Victorian-era texts, and argues that corporations follow similar objectives to literary scholars, despite obvious differences.

I am also working with a group of scholars to develop a curated website, [Streaky Bacon](#), which is a resource for teachers and scholars interested in adaptations of Victorian texts.

Phyllis Freeman, PhD

Dr Phyllis Freeman is an Associate Professor of Biology and Curriculum Coordinator of Biology in the Department of Life and Physical Sciences at Fisk University. Her teaching efforts include interdisciplinary exposure to the sciences and humanities in the core undergraduate curriculum, and in advanced courses in molecular cell biology, genetics and microbiology. Her efforts also include mentoring undergraduate research in the sciences. Dr. Freeman's doctoral research focused on the trypanosome parasite endemic to South and Central America, *Trypanosoma cruzi*.

As a result of embedding authentic research into her course in Genetics, Dr Freeman became aware of the power of the nematode, *C. elegans*, in revealing developmental pathways that result in the formation of the central nervous systems and its continuing functions in adult animals, where most of the molecular pathways have their counterparts in human beings. This awareness led to her receipt of a National Institutes of Health Award to participate as a research collaborator in the laboratory of Dr Randy Blakely at Vanderbilt University, and then bring back to Fisk her new research program and broad-based collaborations as a venue for undergraduate and graduate research.

As a recipient of the Bush-Hewlett Award from the American Council on Education, Dr Freeman has participated at the University of the South, Sewanee, Tennessee, in a focused externship on assessment of academic programs and university governance.



Sheila Peters, PhD

Dr. Peters is a licensed clinical psychologist with expertise in working with diverse populations including vulnerable children and youth and their families. Within the Fisk community, she has served as Associate Provost, Chair of Psychology and Faculty Assembly Chair. She served as Interim Director of the Fisk Race Relations Institute and continues to provide training for cultural competence in communities, institutions and systems of care. She has co-lectured with former Vice President Al Gore in the multidisciplinary course on Family-centered Community Building. Dr. Peters serves as the QEP (Quality Enhancement Plan) Director and provides leadership to the infusion of critical thinking across the curriculum with a focus on the entire university community. In this capacity, she develops staff and faculty training focused on innovative practices in the application of the Paul/Elder framework of critical thinking. Dr. Peters values service learning and serves as a faculty sponsor to the Fisk C.A.R.E.S. (Compassionate Activism through Responsible Engagement in Service) program. She has served as an advisor to the Fellowship of Christian Athletes (FCA), The Collegiate One Hundred , the N.A.A.C.P. College Chapter, WHO(Women's Health Organization and the Alpha Beta Chapter of Delta Sigma Theta Sorority, Inc.

Dr. Peters is a national expert on youth development in the juvenile justice arena and provides training and technical assistance on gender-specific programming for females as well as males at risk for entering the juvenile justice. She has worked with youth for over twenty years including serving as a Board member to Realsports Leadership Academy, a mentoring programming focusing on positive life skills for student-athletes. As she continues to serve as a volunteer for the I Have a Future program, she is the former Coordinator of Community Services for this adolescent health promotion initiative founded at Meharry Medical College and recognized as the 404th Point of Light. Her work in the area of sports psychology has afforded her the opportunity to serve as the clinician for the Tennessee Titans organization. Her civic obligations have included serving as past President of the Nashville Branch of the N.A.A.C.P., former commissioner and chair of the Metro Human Relations Commission, former commissioner of the Tennessee Commission on Children and Youth., the Oasis Center and NashvilleRead. She serves as a Board member to Tennessee Voices for Children. She is a former member of Societas Docta, Inc. and the Coalition of 100 Black Women. Currently, she is a member of the Parthenon Chapter of the Links, Inc., Delta Sigma Theta, Inc. Nashville Alumnae Chapter, and the Nashville Women's Breakfast Club.

Dr. Peters' research focuses on various psychological topics including the evaluation of youth development initiatives including the promotion of health careers for children, STEM-related activities with children and youth, biased based policing and community perceptions, gender-specific programming for both males and females and health disparities within U.S. and Brazilian communities.



Dennis P. McNamee, J.D., M.P.A., Esq

Dr. McNamee is an attorney and arrived at Fisk University in January of 2003, initially in a part-time capacity. His areas of instruction are: law, ethics, applied mathematics and statistics, management, and financial investment (U.S. and International). He currently holds appointments to teach in the various business majors. He also taught business, law, and economics at Vanderbilt University from 1997 to 2004.

As a public servant, Dr. McNamee has fifteen years in the military in the enlisted and officer ranks. During his career he has served in state government as a socioeconomic analyst, and as the Legal Services Director and General Counsel for the Tennessee Regulatory Authority. His business legal experience includes practicing as an attorney in banking and investments. He has also appeared as trial counsel before the trial and appellate courts in Ohio, Tennessee, and before the United States Supreme Court. He insures that his license remains current, and that he continues to perform research as well as continuing legal education to benefit his students.

As a volunteer, Dr. McNamee has been with the Boy Scouts of America for most of his adult life, as a unit leader (Cub Scouts, Boy Scouts, and Venture Crew) and member of the commissioner service. He is still active although both of his children have earned the highest ranks attainable in their Scouting programs. His daughter has now joined him in the adult Scouting ranks as a leader.

He formerly served with Alpha Phi Omega national service fraternity (Omega Lambda Chapter at Fisk University), as the faculty adviser; and is the counselor to the Knights of Columbus at Saint Ann Catholic Church in Nashville, Tennessee.



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