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Oral Presentations

Biological and Life Sciences:

**Direct Interactions of Oral Bacteria and Oral Squamous Cell Carcinoma Cells**

Head and neck cancers (HNC) are the sixth most common cancer worldwide with more than 90% being squamous cell carcinoma. HNC can occur in the oral cavity, oropharynx, larynx or hypopharynx, or nasal cavities. Oral squamous cell carcinoma (OSCC) is estimated to be diagnosed in 50,000 patients this year with an overall 5-year survival rate of 64%. The tumor microenvironment has been shown to play a vital role in the progression of many human cancers, including OSCC. Given the complexity of the oral microbiome, we hypothesize that OSCC and oral bacteria interact to affect the tumorigenic properties of OSCC. OSCC cells were cultured in the presence of oral pathogenic and non-pathogenic bacteria. OSCC cells were assessed for changes in cell proliferation, gene expression, and capacity to invade. We found that certain pathogenic oral bacteria did increase proliferation in several of our OSCC cell lines. Additionally, analysis of several gene markers relevant in tumor progression revealed that pathogenic oral bacteria influenced increased gene expression. Both the chemical and spatial interactions between OSCC and oral bacterium may play a role in tumor progression and migration by regulating proliferation of cancer cells and cellular signaling. A direct infection model, as opposed to interactions with bacterial spent media, showed more potential in terms of affecting cell viability and likely gene regulation as well. Future experiments will further explore the interactions, including the complexity of the oral biofilm in cancer patients and the presence of multiple bacteria.

*Stefan Kovac, Tiara Napier, Jessica Scoffield, Hope M. Amm*

**Method Optimization for Spin Probe-Based Electron Paramagnetic Resonance Spectroscopic Detection of Oxidative Species**

Electron Paramagnetic Resonance (EPR) spectroscopy coupled with spin traps/probes are less ambiguous for oxidative species detection compared to chemiluminescence, immunoassays, or fluorescent probes. The spin probe 1-hydroxy-3-methoxycarbonyl-2,2,5,5-tetramethylpyrrolidine hydrochloride (CMH) reacts with extra- and intracellular one-electron oxidants generating the EPR detectable radical, CM•. Though CMH is widely utilized in enzymatic systems, cell cultures, and in vivo models using fresh or frozen samples, we observed significant variability in these applications. This study aimed to optimize methodology to increase consistency in CMH/EPR measurements. To minimize CMH auto-oxidation, we tested the effects of various concentrations of metal chelating agents: diethylenetriaminepentaacetic acid (DTPA), diethyldithiocarbamate, deferoxamine mesylate, or Chelex®. Our results indicated that 1mM DTPA most optimally decreased the rate of CMH auto-oxidation (CM• generation), from 0.44 to 0.17µM/min for 0.5mM CMH in phosphate-buffered saline (PBS). Given that
continuous auto-oxidation was still present, we suggest that the CM• generation rate over time be used as a quantitative outcome instead of a single CM• measurement, as is commonly employed. To control for probe autooxidation in our samples, the rate of CMH auto-oxidation was subtracted from the rate of CM• generation to determine the basal CMH-detectable oxidants produced in non-stimulated RAW264.7 cells. Cells were suspended in PBS containing 1mM DTPA and 0.5mM CMH and were maintained at room temperature. Aliquots of these samples at various time points were utilized to measure CM• generation directly or were snap-frozen with CM• generation measured at 150K. Using fresh samples, the rate of CM• generation was proportional to cell concentration (3.55±0.61 pmol/min/106cells, R2=0.792). In contrast, 150K measurements using frozen samples had significant variability (R2=0.519). Our data indicate that utilizing the rate of CM• generation, minus the rate of CMH autooxidation, in fresh samples is optimal for CMH/EPR measurements. Future studies will implement these methods in our cell culture and in vivo models.

John Gotham

Physical and Applied Sciences:

The Cholyl-coA Model with the Less Binding Free Energy has the Better Binding Affinity to the Active Site of hBAAT.

Research Question: Which bioinformatic model of Cholyl-coA is the fittest for the active site of enzyme hBAAT? Method: The most essential step is to display the model of the objects, enzyme Hbaat and Cholyl-coA which is the ligand of Hbbat as a bile acid, by visualizing them. With the method of introducing an analytic chemistry software called YASARA, both of them can be observed on the computer screen. Next, to analyze each Cholyl-coA model mathematically, the relevant data of the model should be collected. AutoDock Vina is a software which can transfer the models of PDB files into PDBQT files in which the data can be collected, analyzed and presented on notepad directly. In the notepad, the value of the binding free energy can be observed at the first line in the result list of each model. Comparing the values of binding free energy in each of the models, get the lowest one and determine it as the ligand to the enzyme with the most binding affinity. Results: According to result of the lab research, the Cholyl-coA model with the binding free energy at -8.8 can be concluded as the most affine ligand to enzyme Hbaat. The bioinformatic Cholyl-coA model with the lower binding free energy value will have the highest binding affinity Future work: With the abstract analytic conclusion from the research, the concrete evidence to prove the conclusion should be collected by the biochemistry experiments in the lab. With the compliment of analytic and experimental evidence, the best shape of Cholyl-coA can found.

Rongzhen Liu

Service-Learning:
The History and Future of Norwood Neighborhood

As part of the University Honors Program at the University of Alabama at Birmingham, we were assigned a particular neighborhood in Birmingham called Norwood, to research about its community, specifically the people who inhabited the neighborhood, local businesses, and any changes that the area has undergone through the years to name a few. As fellow Birmingham community members, it is important to understand the rich history and characteristics of Birmingham to ensure the community is preserved but at the same time is given the appropriate opportunities to grow. As our assigned neighborhood was Norwood, we set out to explore the area and initially made note of any observations, and we also made sure to speak to influential people in the community as well as residents of the area. We did extensive research into the history of the neighborhood as well as made logical inferences regarding the future of the neighborhood after analyzing the collected data. Our results indicated that Norwood has become somewhat of an industry-oriented area when it once used to be more of a residential area. The area is mainly rundown and there are not many actual businesses such as grocery stores, shops, and banks. It is mainly an area dominated by large factories, trucks, and neglected houses along with a school. The area is near places that attract a large volume of people so therefore there is a possibility of economic growth. The neighborhood of Norwood is a big part of Birmingham’s history and its general community’s identity. Norwood is an example of an area that has transitioned from a highly populated and sought after area to the deserted and run-down state it is currently in. It serves as an example to fellow Birmingham community members about the need to focus on making sure Birmingham as a whole does not digress in its path to economic success. Norwood is only one example out of many.

Sristi Das, Allie Whitt, Tate Ozbirn, Lauren Senwo, Nicole Naylor, Jasmine Ramsey

UHPGroup6 Arlington West End Tutoring Initiative

For the 2018 University Honors Program (UHP) group project, the goal is to work with community members in order to conduct a project that will ultimately enrich our understanding of a grassroots community-based project that enriches a neighborhood in the city of Birmingham. When Group 6 was first assigned to the West End community, we looked into working with Urban Ministries, Inc., an initiative that offers various services and opportunities to the community. After several failed attempts to contact Urban Ministries, Inc., Group 6 decided to reach out to the West End Branch Library. We were immediately put into contact with Ms. Denise Ford, a librarian and program coordinator at the library, as well as Ms. Maya Jones, the branch manager. Ms. Ford stressed the need for an after-school tutoring program and thus our project found some ground. A meeting with Group 6 members and library staff was organized during which it was decided that every Tuesday between 3:30 p.m. and 5 p.m. members of Group 6 would go to the library and tutor students from local schools. Thus far, the project has been successful. At each session we work with students, ranging from K-12, on homework and various study habits. We have made efforts to partner with another UHP group, Group 1, that is conducting a similar project as well as efforts to work with UAB’s Department of Education and UABTeach in the hopes of establishing a more sustainable program at the West End Branch Library.
Jaclyn Aida, Parker Rose, Whitman Miller, Alexander Thomas, Daphne Embry, Linda Lin

For a Change: Tutoring in North Avondale
The City of Birmingham is a multifaceted area teeming with diversity and inclusivity, yet burdened with impoverishment and hardships for some of its residents. Our group has developed a service learning project in partnership with the neighborhood of North Avondale to facilitate learning for children within their area, as well as to help alleviate, firsthand, the educational strain felt there. Through this initiative, we have consulted with experts in early childhood education—concerning children ranging primarily from kindergarten to third grade—on how to develop and strengthen the aforementioned kids’ reading/retention skills. Additionally, our group visited with the children of North Avondale three times per week, for a total of five weeks, in an effort to tackle each individual child’s unique reading barriers. Throughout this time, we also collaborated with another group of UAB students working in Arlington—West End on a similar project of their own: providing tutoring and guidance to students of need within the area. Our group began working alongside the Arlington—West End group in hopes we could facilitate longevity and greater self-sustenance in the future beyond the parameters of our semester-long projects. In doing so, our collective efforts have yielded support from UAB-based organizations such as UABTeach, garnering interest from prospective volunteers willing to participate in future efforts within both communities. We hope this trend of tutoring the underprivileged spreads beyond our original intentions, and that our initiative marks a pivotal first step in accomplishing those goals.

Zachary Watson, Melissa Cummins, Bailey Dumlao, Madison Shelby, Elizabeth Bradley, Kayla Phillips

UHPGroup5: Enhancing Community Identity within the Crestwood North Neighborhood
Using social media, our group asked the Crestwood community what a group of college volunteers could do that would make a permanent, positive impact on the neighborhood. After struggling to make contact with community leaders, we made contact with Darrell O’Quinn, a current city councilman and a previous president of the Crestwood Community Association, and he allowed for us to complete a project that had been defunct for a year. This project consisted of assembling and hanging metal Crestwood street signs to enhance the overall sense of identity within the community. The signs had been made over a year ago when Darrell was the president of the community, but he resigned before he was able to have the signs hung and the current president was never able to finish the project. Through this project, we gained important insight into the challenges of online communication, the issues that arise when positions of leadership are vacant and power transitions, and the vital role that volunteer work plays in providing improvements for the community.

Tyler Thomas, Ciearria Samuel, Julia Rowe, Logan Cobb, Sydney Biswal

UHP Group #16 - Southside Canned Food Drive
UHP Group #16 - Southside Canned Food Drive Authors: Olivia Saunders & Bethany Bracker Our team chose to assist the neighborhood of Southside for a group project, and we decided to hold a canned food drive to help the homeless and food insecure population there. The idea was inspired after two team members volunteered at the St. Andrews Episcopal Church Soup Kitchen to help serve food to people affected by homelessness and food insecurity. The director, Randy Yarborough, mentioned concerns with the inadequate amount and wrong types of food being donated to the shelter that were contributing to the financial instability of the Soup Kitchens. This inspired our group to help by organizing a canned food drive for fruits and vegetables to help this soup kitchen get the proper food it needs. Team members made posters, flyers, and drop boxes to alert the Southside community of our food drive. Our group decided to place drop boxes for food items in highly populated areas in Southside such as Saw’s Southside and the University Laundromat. The ongoing food drive and volunteering at the soup kitchen has allowed us to immerse ourselves in the community with different types of people in the community, including small business owners, volunteers, and the residents of Southside who are struggling with homelessness and food insecurity. Our connections and interactions with the residents of Southside will create a continued relationship with them and we hope that our influence in Southside will help dispel stigmas associated with the homeless and food insecure population.

Olivia Saunders, Bethany Bracker

UHPGroup#17: Revitalization of the South Woodlawn Community by Promoting Community Wellness

The Woodlawn community in northeast Birmingham, Alabama thrived until social and economic turmoil struck in the 1960s. The need to seriously address these socioeconomic problems was evident by the beginning of the 1980s, and the creation of the Woodlawn Foundation in 2010 marked an attempt to revitalize the community. The Foundation adopted the Purpose Built Communities model of revitalization, which stresses the importance of community wellness programs for lower-income individuals in Woodlawn. These programs attempt to foster the growth of the community and prevent the displacement of disadvantaged individuals that often results from rising housing costs and increasing middle-class ideals post-revitalization — an effect known as gentrification. Our group investigated community wellness programs in the neighborhood and discovered the 55th Place Thrift Store, a non-profit, all-volunteer organization that acquires its merchandise through donations. After continued communication with lead volunteers at the thrift store, we decided to host a winter clothing drive through UAB. We accomplished this by setting up two clothing drive boxes, distributing flyers, promoting the clothing drive on a variety of social media platforms, and encouraging classmates, faculty members, and family to donate. We hope that by making this clothing drive an annual project at the start of each winter season, we can help a community partner in the Woodlawn area provide necessary cold-weather apparel to individuals facing temporary or long-term financial hardships. This will ultimately reinforce the community wellness prong of the Purpose Built Communities model and aid in the revitalization of the Woodlawn community.

Sunya Reddy, Mary Faulkner, Alex Zayzafoon, Chloe Cater, Ohtra Awad
**UHPGroup8: Bush Hills Community Clean Up**

Bush Hills is a historic neighborhood located between Interstate 20, Arkadelphia Road and 3rd Avenue West. It is a mostly residential neighborhood with businesses along Arkadelphia and 3rd Avenue. The main problem in the neighborhood is residents not repairing and maintaining their homes, and then moving out. Another significant problem in the area is litter, throughout the residential part of the neighborhood. Our project is focused on this problem, and taking steps to cleanup the neighborhood. The group participated in community events to clean up the neighborhood garden, and surrounding streets. The leaders of the neighborhood association, including Walladean Streeter, who has been president for over 20 years, coordinated the community events. We also organized our own group cleanups, along the streets that residents indicated have the most problems with litter. Through helping the neighborhood association organize community events to clean up the streets, we hope to create an environment where people take pride in their neighborhood. This will help curb littering and increase participation in litter clean up. The neighborhood association is currently working with the city of Birmingham to create a multi-year plan to improve Bush Hills as a whole. One of the goals of the neighborhood leaders is to get vacant houses up to code and encourage remodeling as a step towards developing the neighborhood. The combined efforts of our group and the community volunteers will improve the appearance of the area and work towards this goal.

*Ben Allen, Zahab Aleezada, Hannah Comstock, Jenni Morgan, Cindy Nguyen, Ben Willingham*

**UHPGroup#19: Volunteering with Avondale Elementary School to Serve East Avondale**

This service learning project aimed to assess the needs of East Avondale and implement a positive change in the community. Avondale Elementary School, serving children in the East Avondale community, is a Title 1 school with majority low-income disadvantaged students and below average test scores in all subjects. In approaching this project, Joann Taylor, Assistant Principal of Avondale Elementary School, allowed this group to volunteer at the school and interact with the kids for a total of 24 hours over the span of 2 weeks. The activities included assisting in the school library, interacting with students at car line drop off, and guiding students that walk to school. This presentation explores the relationship between individual interactions with young kids in the East Avondale neighborhood and the possible effects upon the neighborhood — as observed in essential one-on-one interaction with young kids.

*Capri Alex, Aleena Khan, Julia Sherman, Luci Shin, and Massimo Nuzzo*

**UHP Group 11: Murals in Druid Hills**

The Druid Hills neighborhood is mainly known as the location of the BJCC and Top Golf, but the rich history of the residential community and its members often goes forgotten. After discussing multiple options for service projects with neighborhood president, Amie Evans, it was decided that the planning of a large-scale mural would have the biggest impact on the community. At the north entrance to the
neighborhood, a large, tall concrete wall is located between 18th Ave North and 17th Ave North on FL Shuttlesworth Drive. Without any vegetation, coupled with the fact that it is a retaining wall, the wall is a prominent and permanent feature of the neighborhood. With the former medical center transferred to new owners, Druid Hills is currently going through a transitional period. The planned mural will freshen up the entrance to the neighborhood in order to welcome new residents and businesses into the community. Since many of the residents took part in the civil rights movement in Birmingham in the 1960's and the neighborhood itself played a crucial role in the movement, the mural will depict this portion of history as well as the vision for the future. The group hopes that this project will have a positive impact on the community, inviting Birmingham residents to explore further into the rich neighborhood of Druid Hills.

Lara Tapy, Bailey McDaniel, Joseph Varghese, Kassaundra Paddison, Maria Harika and Erin Hutchison

UHP Group 7 (Gate City): Trust-Based Relational Intervention
Caregivers use the trust-based relational intervention (TBRI) technique with children who grow up in difficult environments to recognize and fulfill the needs of children. TBRI is made up of three main steps: empowering, connecting, and correcting. This method of caregiving is designed to teach children self-regulation, trust, and behavioral skills in a manner that enables them to feel safe and protected. The Birmingham area has a large amount of low-income, intermittent housing. Many children in such situations grow up in unsafe environments where they are not able to develop normally. Using TBRI with children growing up in harsh areas enables them to rise above their surrounding conditions and contribute more to society. Oak Tree Ministries is an organization working in Birmingham to apply this method of intervention to children ranging from elementary to high school ages. Our group volunteered with the Reading Club on Tuesdays and Thursdays, working with children ages 7-9. The program involved reading, homework help, snacks, and play time, to ensure that the children learned new information while being in a fun, safe environment. The administrators at Oak Tree Ministries described the children as having drastic behavioral changes after using TBRI. The anecdotes they shared allude to the effectiveness of TBRI in shaping the early development of children growing up in harsh environments.

Callie Walls, Maha Ahmed, Dina Kasman, Eric Latham, Michaela Philip, Garrett Jebeles

Deconstructing Genocide: Colonial Ethnology, Administrative Discrimination, and Access to Arms
We investigated institutional patterns of genocide among four different countries in a comparative case study. We chose to pursue a two-pronged approach: a conceptual approach by deconstructing imperialistic processes that shape divisions between perpetrator/victim, and a pragmatic approach by looking at how a population’s access to instruments of violence impacts genocide. The three cases of genocide we researched were Rwanda, Sudan, and Myanmar; we also included India as a case study without the factor in question (genocide). Our findings from the conceptual approach suggest that colonial administration plays a key role in forming
and enforcing perpetrator/victim roles, but that perpetrators of genocide were not always systematically empowered in colonial administration. Rather, the strongest correlation between perpetrator groups is a commitment to nationalism fueled by ethnic supremacy in a post-colonial setting. In all cases, the division between perpetrator/victim were determined by colonial ethnography based in Aryan ideology. This leads us to conclude that while colonial administration did not always empower future perpetrators of genocide, the combination of Aryan-based ethnology and application of divide-and-conquer strategies in colonial administrations is a lethal precursor to genocide. From the pragmatic approach, we have found that an increase in accessibility to arms is not the root cause of ethnic conflict but is often a result. Given that all four countries in this study experienced an increase in small arms and light weapons trade and three out of four also experienced a genocide, it is our argument that an increase in accessibility to arms and weapons increases the likelihood of genocide taking place under the common circumstances present in ethnic conflicts. Thus, colonial ethnology and divisive administrative tactics provide the foundation for ethnic conflict to manifest in genocide, but is directly facilitated through access to arms and weapons.

Marlee Townsend, Tyler Goodwin, Zack Davis, Zoya Ahmed

Poster Presentations

Arts and Humanities:

Investor-State Dispute Claims
Investor State Dispute Settlement (ISDS) cases have increased dramatically over the past three decades, increasing after NAFTA was signed. However, the outcomes of ISDS cases has been the causation discussion among states on whether or not ISDS clauses in trade agreements has served as a hindrance to a state’s sovereignty, as it is believed that investors were given power to change domestic policies. The research focuses on the outcome of those cases as and helping to distinguish if there are bias towards investors in those cases or if it’s simply based off of merits of the case. To analyze, the United States will be the state used to assess. There is a total of 156 cases involving the United States and its investors. The sectors of cases reviewed will be on environmental changes, energy, public health, and financial stability.

Brianna Lyons, Haley Harries, Daniel Pinheiro, Anwar Muthana

Technology’s Effect on Various Generations
Taking part in Cyber Seniors, a service learning program in which students teach seniors how to use various forms of technology, has given us the opportunity to understand the importance of technology within our society today. Today’s younger generation uses cell phones in almost every aspect of their life, while many of the seniors simply wanted to learn how to use these devices for basic communications to connect with family members. The usage of electronic devices is considered normal amongst people today, so trying to teach seniors how to use them revealed a large technological gap between the generations. This close interaction with our
seniors also allowed us to form personal relationships as we got to know them over the weeks. Our personal connections with the seniors made it very enjoyable to teach them about technology and give them tips on how they can be more accessible when it comes to technology. As the program concluded, we were able to use and share our experiences in relation to our assignments in the classroom. Our overall goal is to display how Cyber Seniors has helped us realize the influence of technology in society and how this reflects within our classwork.

*Cassidy Wells, Austin Takes, Hailey Manakides*

**Transgender Rights in Pakistan**

The transgender community in the country of Pakistan is a greatly marginalized group. Concentrating on the issue of their relationship with basic fundamental rights over the years, ranging from before the creation of Pakistan to its present state, has helped Pakistanis better understand transgenders as a whole and teach them to become more open to their acceptance into society. Culture and discrimination are two major themes that have had the most impact on the transgender community. The legacy of colonialism, the religion of Islam and the conservatism of the populace influenced the ill treatment of transgender people. Pakistan’s laws and policies, which aimed to discriminate the transgender people, as well as the public perceptions of transgender people have also led to ill treatment. Recently, culture has become less of an obstacle in granting the transgender community their basic fundamental human rights, and the people of Pakistan, as the country continues to develop post-partition, has become more accepting, reducing discrimination. Ultimately, through research, despite the recent passage of landmark bills declaring a “third gender” and the newfound tolerance of the transgender community, it has proved that even with the resolving of these issues, there may not be a real positive difference for the transgender community.

*Zoya Ahmed*

**Biological and Life Sciences:**

**Method Optimization for Spin Probe-Based Electron Paramagnetic Resonance Spectroscopic Detection of Oxidative Species**

Electron Paramagnetic Resonance (EPR) spectroscopy coupled with spin traps/probes are less ambiguous for oxidative species detection compared to chemiluminescence, immunoassays, or fluorescent probes. The spin probe 1-hydroxy-3-methoxycarbonyl-2,2,5,5tetramethylpyrrolidine hydrochloride (CMH) reacts with extra- and intracellular one-electron oxidants generating the EPR detectable radical, CM•. Though CMH is widely utilized in enzymatic systems, cell cultures, and in vivo models using fresh or frozen samples, we observed significant variability in these applications. This study aimed to optimize methodology to increase consistency in CMH/EPR measurements. To minimize CMH auto-oxidation, we tested the effects of various concentrations of metal chelating agents: diethylenetriaminepentaacetic acid (DTPA), diethyldithiocarbamate, deferoxamine mesylate, or Chelex®. Our results indicated that 1mM DTPA most optimally decreased the rate of CMH auto-oxidation (CM• generation), from 0.44 to
0.17µM/min for 0.5mM CMH in phosphate-buffered saline (PBS). Given that continuous auto-oxidation was still present, we suggest that the CM• generation rate over time be used as a quantitative outcome instead of a single CM• measurement, as is commonly employed. To control for probe autooxidation in our samples, the rate of CMH auto-oxidation was subtracted from the rate of CM• generation to determine the basal CMH-detectable oxidants produced in non-stimulated RAW264.7 cells. Cells were suspended in PBS containing 1mM DTPA and 0.5mM CMH and were maintained at room temperature. Aliquots of these samples at various time points were utilized to measure CM• generation directly or were snap-frozen with CM• generation measured at 150K. Using fresh samples, the rate of CM• generation was proportional to cell concentration (3.55±0.61 pmol/min/106cells, R2=0.792). In contrast, 150K measurements using frozen samples had significant variability (R2=0.519). Our data indicate that utilizing the rate of CM• generation, minus the rate of CMH autooxidation, in fresh samples is optimal for CMH/EPR measurements. Future studies will implement these methods in our cell culture and in vivo models.

John Gotham

Anti tumor Drug Topotecan Slows the Unwinding of Positive DNA Supercoils
Understanding the mechanism of action of Camptothecin derivative, Topotecan, on Human DNA enzyme Topoisomerase 1B in chemotherapy treatments of cancer. Data was collected using single molecule nanomanipulation with optical tweezers, supported with in-vivo trials in mutant yeast cells. Topotecan mediated Topoisomerase 1B was shown to a have a pronounced effect on Positive DNA supercoils over Negative DNA supercoils. The uncoiling of positive supercoils by Topotecan mediated Top 1B proceeds on average 20 times slower than normal Top 1B. Accumulation of positive DNA supercoils ahead of the replication fork causes a stall in machinery progression that could result in fork collapse and the formation potentially lethal DNA lesions.

Daniel A. Koster, Komaraiah Palle, Elisa S. M. Bot, Mary-Ann Bjornsti & Nynke H. Dekker

Reduction of Sleep in Children Leads to Decreased Leptin Hormone Levels and Increased Weight
Past studies have determined that when adults decrease sleep, a decrease in leptin and an increase in hunger are observed. The purpose of this study was to determine the effects of changes in sleep duration on leptin levels and weight in children. 37 children ages 8-11 were selected for the study; half were told to increase their sleeping patterns by 1.5 hours for one week and decrease their sleep by 1.5 hours for the subsequent week, while the other half reversed the schedule. Subjects reported sleeping patterns and wore actigraph watches to confirm experimental sleeping conditions were met while resting. Blood tests and weigh-ins were conducted at the end of each week to determine leptin hormone levels and weight, respectively. At the end of the study, it was determined that subjects weighed an average of 0.22 kg more (P <0.001) at the end of the decrease week when compared to the increase week. Leptin levels were decreased on average by 1.3 ng/mL (P <0.05) at the end of the decrease week when compared to the increase
week. The study concluded that a reduction of nightly sleep by 1.5 hours for children resulted in decreased leptin levels and increased weight when compared with data for the same children increasing their nightly sleep by 1.5 hours.

Grace Cepero-Lopez, Jacob Mesina, Alexis Murawski

Effects of Antipyretic Therapy on the Detection of Reactive Oxygen Species in Various Tissues During Lipopolysaccharide-Induced Fever

Fever is the body’s natural immune response to infections, caused by inflammation in body tissues. This research is used to determine the effect of antipyretics, drugs used to reduce fever, in relation to Reactive Oxygen Species (ROS) formed during fever. Rats were used in this experimental research, prepared with oral doses of different antipyretics. Lipopolysaccharide was used to induce the fever in rats instead of bacterial or viral infection. After preparation, blood, brown adipose tissue (BAT), hypothalamus, and liver samples were taken from the rats and were assessed by Electron Paramagnetic Resonance (EPR) for Reactive Oxygen Species (ROS). The results showed that antipyresis and its effect was insignificant to the reduction of Reactive Oxygen Species (ROS) during fever, and they concluded that further research must be done to determine the effect of antipyresis.

Iilly Peete, Holli Traffanstedt, Tykendria Lee, Anna Grace Murphy, and Carmen Williams

Increased Expression of EZH2 Leads to a Shift in Metabolic Substrate Preference in Human Hearts with Ischemic Cardiomyopathy

Ischemic Cardiomyopathy or ICM is the leading cause of heart failure in the United States but there are limited treatments for the disease due to inadequate understanding of its pathogenesis. Understanding the transcriptional mechanisms of ICM may potentially lead to more efficient therapies. To accomplish this, researchers took samples from patients suffering from heart failure with or without the presence of ICM to attempt to find a molecular target. Genome-wide DNA methylation was then performed on the tissue. They were able to see that EZH2 persisted in ICM patients, but not in the non-ICM patients. Researchers then created mouse models using transfection of EZH2 into cells, followed by western blot analysis. The researchers found that DNA methylation was the mechanism that governed the switch from fatty acid to glucose metabolic substrate preference in the heart. EZH2 was a negative regulator of gene expression for ICM on KLF15 through an increase in DNA methylation in the promoter region. Since repression of KLF15 is implicated in the development of ICM, a potential new treatment for ICM has been identified.

Raegan Adams, Margi Patel, Divya Annamalai

Protein RG108 Decreases Memory Formation in the Ventral Tegmental Area of the Brain

Pavlovian reward conditioning shows that there is a mechanism in the brain that causes animals and humans to remember an event more when given a stimulus. The researchers of Dr. Days lab wanted to find out what exactly causes that reward conditioning. The lab tested three different groups of mice: a conditioned group, a dissociated group, and a control group to prove there is association with reward learning. The conditioned group was then further tested through injection of a protein RG108, which decreased memory formation. The team found that the
A decrease in memory formation only occurred in a specific area of the brain: the ventral tegmental area of the brain, or where dopamine neurons create reward pathways. They also discovered that DNA methylation, or the change in activity of DNA is associated with reward learning. In summary, memories and DNA methylation can be blocked by injection of RG108 into the VTA. The implications of this discovery can actually assist people struggling with addiction to block certain memories, as well as those suffering from PTSD.

**Students:** Bethany Brock, Emily Gaines, Jeetesh Kunche Liaison: Nick Southern PI: Jeremy J. Days

**Nutrient Limitation Stress Enhances Escherichia Coli’s Polyphosphate Synthesis through Gene Mutations**

This lab explores the mechanism behind bacterial survival for the purpose of finding more control over bacterial diseases. When the bacteria E. coli is stressed, polyphosphate (polyP) levels increase due to the enzyme polyphosphate kinase (PPK) synthesizing polyP. Three genes of PPK—ppk, ppx and phoB—were individually mutated and polyP levels were recorded before and after undergoing nutrient limitation stress. Results show that the gene mutations caused lower levels of polyP. Furthermore, the activity of the promoter of ppk (Pppk) was determined using b-glucuronidase activity assays. These results show that there is not a significant difference in b-glucuronidase levels when mutated genes, ppk and ppx, were paired with the promoter Pppk. In conclusion, the results suggest that polyP production is not due to gene expression. More specifically, polyP production is not affected by the transcription process from DNA to mRNA.

**PI:** Dr. Michael Gray Research Liaison: Leanna Crafford Presented by: Angela Lee and Ginger Guthrie

**Effects of ROCK1 on Amyloid Beta Levels in Patients with Alzheimer’s Disease**

Alzheimer’s Disease (AD) affects over 3 million Americans each year. The formation of amyloid plaques in the brain is a driving factor in the development of Alzheimer’s Disease and is therefore a possible target for treatment of the disease. It was suggested that depletion of rho-associated protein kinase 1 (ROCK1) in the brain would be an effective method of mitigating the production of amyloid-β (Aβ) that forms these plaques. To determine how the amount of ROCK1 in the brain changes throughout the disease’s progression, immunoblots were performed on brain tissue with different stages of Alzheimer’s Disease. Then, amyloid-β levels in neurons that were depleted of ROCK1 were then measured. The immunoblot revealed that ROCK1 levels were increased in brains affected by Alzheimer’s disease and steadily increased throughout the disease’s progression. It was also determined that neurons depleted of ROCK1 had reduced levels of amyloid-β. Due to this, it was suggested that depletion of ROCK1 suppresses amyloid-β production in neurons. This leads to a reduction in amyloid plaques in the brain, helping to reduce the effects of Alzheimer’s Disease.

**Reshu Chandra, Peyton Perry, and Remy Stuckey**
GSK3 activity regulates rhythms in hippocampal clock gene expression and synaptic plasticity

Circadian rhythms in the hippocampus can regulate synaptic plasticity, memory acquisition, and various other cognitive functions. GSK3, a regulator of the circadian rhythm, is characterized by its inhibition over a day-night cycle. Many neurological diseases such as depression, Alzheimer’s, and bipolar disorder, tends to exhibit a dysfunction of the circadian rhythm. In researching the GSK3 activation/inhibition rhythms, there could be new chronotherapeutic approaches to these diseases. As the phosphorylation of GSK3-b showed to obey an internal circadian rhythm, efforts were made to disrupt the activity rhythm, by inhibiting or activating GSK3-b. As such, mice with inhibited GSK3-b showed lower values of synaptic plasticity at night, despite being nocturnal. Mice with activated GSK3-b over the day, indicated heightened synaptic plasticity after long term potentiation was induced throughout the day-night cycle. Taking these two facts together, it shows that GSK3-b regulates day-night differences of synaptic plasticity and the molecular rhythms.

Connor Sprader, Nicole Grana, Shubh Malhotra

Dendritic Spine Plasticity Improve Cognitive Resilience in Alzheimer’s Disease Pathology Cases

Studies show that 30-50% of older individuals who exhibit Alzheimer’s disease (AD) pathology do not demonstrate clinical dementia, possibly due to cognitive resilience. This paper studies the structural changes in the dendritic morphology to see if it would distinguish individuals with clinical dementia. Slices of tissue from the prefrontal cortex were taken from brains with varying cases of AD pathology and used to develop computer generated images of neurons and their dendrites for analysis. From the data, spine density and head diameter were significantly reduced in AD cases. Due to these results, it can be interpreted that dendritic spine plasticity is a process of cognitive resilience.

Benjamin D. Boros, Kelsey M. Greathouse, BS, Erik G. Gentry, BS, Kendall A. Curtis, Elizabeth L. Birchall, BS, Marla Gearing, PhD, and Jeremy H. Herskowitz, PhD

Verbal Consent and Participation: Harvest for Health Research Study

UAB’s Harvest for Health research study focuses on improving physical functioning, diet quality, and physical activity of older cancer survivors with a yearlong home gardening intervention. Because the study involves human participants, the study’s methods are subject to higher levels of regulation; therefore, obtaining verbal and written consent from participants must be acquired before experimentation begins. Investigators and staff must be trained in human subject protocols. The study’s consent process involves personally addressing participant questions and concerns of the consent form and informing participants of their rights set forth by the Belmont Report. At the start of each verbal consent phone conference, participants were informed of the study inlaymen’s terms and in a stepwise format. The general order of the consenting process begins with the purpose of the experiment, an explanation of procedures, risks, benefits, discomforts or risks, voluntary participation in and withdrawal from the study, ability to contact the IRB personally, and giving the investigator verbal consent. Throughout each step, participants were encouraged to ask questions and address concerns. Out of four verbally consented
interactions, two participants were concerned about their identifying information and how it was going to be utilized, three expressed concerns about drawing home visit phlebotomy samples, three were concerned how the experiment would interfere with their daily lives, and all participants were concerned with the freezer storage of fecal wipes which contained their microbiome specimens. In adherence of the stringent regulations that protect human research subjects, the study received verbal consent from the four participants.

Joseph Pulliam

**A novel light-inducible CRISPR/dCas9 system for controlling gene expression.**
The tightly regulated control of gene expression is critical to life, and can cause disease when disrupted. As gene expression directly influences and is altered by cellular activity, studying rapid gene expression fluctuations is necessary for understanding normal cellular physiology and diseased states. Investigations of gene expression have relied on overexpressing or knocking down genes of interest, but most approaches lack the temporal precision to directly study how cells are modified by and respond to changes in their environment on the timescale at which cellular reactions occur. Additionally the development of technology capable of mimicking these highly specific events has proven difficult. Through fusing light regulated FkF1 and GIGANTEA elements with deactivated Cas9 and a transcription activator, we created a new system to investigate gene expression by targeting specific genes for upregulation in the presence of blue waveform light. When this FkF1 Light Induced CRISPR Construct (FLICC) is compared to an existing light-activated CRISPR based transcriptional control system (LACE), FLICC confers several specific advantages. For example, previous reports suggest FLICC requires shorter blue light exposure times than LACE to activate. FLICC successfully upregulated both endogenous gene targets at the mRNA level and a luciferase reporter at the protein level, allowing for tight temporal manipulations of gene expression controlled by blue waveform light. FLICC also demonstrated less baseline gene upregulation relative to LACE. FLICC provides the tight temporal control required to investigate fluctuations in gene expression at the time scale which they occur, while offering specific benefits over currently available technologies.

Nicholas T. Southern, Corey G. Duke, Katherine E. Savell, Faraz A. Sultan, Jeremy J. Day

**Crispr-based induction of reward related genes**
Drugs of abuse increase dopamine concentrations in the nucleus accumbens. This surge of dopamine activates dopamine receptors to trigger cell signaling cascades that converge in the nucleus to cause changes in gene expression. These changes in gene expression are thought to lead to structural and functional alterations in brain reward circuits after exposure to drugs of abuse. One gene that has been shown previously to be elevated in the nucleus accumbens after chronic drug use is Fosb and its highly stable isoform ΔFosb. Fosb is a transcription factor that has been shown to accumulate and atypically persist within the nucleus accumbens after chronic exposure to drugs of abuse. However, locus-specific manipulation of the FosB gene and the impact on dopamine-dependent neuronal physiology remains largely unexplored. Here, we employed a CRISPR-dCas9 system allowing for targeting
of a transcriptional activator to the FosB locus using target-specific guide RNAs. Additionally, RNA-sequencing revealed a dopamine-mediated gene expression profile and a novel, uncharacterized candidate gene, Fam46b, was also targeted with the CRISPR-dCas9 activator system. Utilizing this flexible method paired with high-throughput multi-electrode arrays, we measured the extracellular electrophysiological responses in striatal cultures in which Fosb or Fam46b were induced for both baseline and dopamine-dependent changes. Upon analyzing over six-hundred neurons, we did not find a significant difference in baseline activity or the response to dopamine with induction of either gene. Therefore, future directions are aimed at mimicking the gene expression profile observed after dopamine to understand how large gene expression programs impact neuronal function.

Nicholas A. Goska

HIV Increases Plasma Lipopolysaccharide Levels Through Increased Microbial Translocation
This research aims to clarify the connection between HIV infection and chronic immune activation through microbial translocation and raised plasma lipopolysaccharide (LPS) levels. Information derived from this research could lead to more effective therapies and treatments for HIV. The authors of the paper measured plasma LPS levels in various cohorts of HIV patients as well as controls. The authors also measured the plasma LPS levels of 11 rhesus macaques before infection with SIV and approximately 100 days after infection with SIV. Results show that plasma LPS levels increase as the disease progresses. The early/acute cohort had the lowest plasma LPS levels and the AIDS cohort had the highest. Plasma LPS levels of rhesus macaques also significantly increased from before infection to 100 days post-infection (P=0.002). The research showed increased plasma LPS levels in the chronic and AIDS phases in comparison to uninfected individuals (P<0.0001). The research also showed increased plasma LPS levels are due to increased microbial translocation by using a bowel-sterilizing antibiotic course in SIV-infected rhesus macaques. This resulted in decreased intestinal bacterial load as well as decreased plasma LPS levels.

Natalie Joseph and Ian Markham

Effects of HIV TAT on the pro-inflammatory marker Translocator Protein (TSPO)
With the use of antiretroviral therapy, HIV is no longer a death sentence. As a result, the proportion of chronically infected, HIV-positive individuals over the age of 50 is approaching 50%. However, with increasingly longer life expectancies, there has been a rise of serious HIV comorbidities in the long term. Up to one half of HIV-positive individuals will have their quality of life impacted by neurological manifestations of the virus. HIV-associated neurocognitive disorders (HAND) are associated with chronic neuroinflammation due to initial infection of the CNS with HIV. HAND leads to neurodegeneration and is associated with systemic complications and accelerated aging. This chronic neuroinflammation may be due in part to the persistent expression of the HIV Tat protein that is expressed in microglia and astrocytes. Tat has been demonstrated to have neurotoxic effects as it is potently pro-inflammatory both in vitro and in vivo. This immune response activates
glial cells in the brain and can lead to neuroinflammation. The activation of glial cells has been shown in many disease states to correspond with upregulation of the translocator protein (TSPO), a mitochondrial membrane protein. Understanding the mechanisms by which TSPO is upregulated and the consequences of this increase may lead to a better understanding of disease pathogenesis and to effective therapies for HAND. Through experiments that use either exogenous or endogenous HIV Tat protein treatment as a model for HIV in mouse glial cell cultures, it is possible to measure TSPO overexpression in vitro in order to demonstrate the resulting neuroinflammation.

Kaitlin McLeod

**Dysregulated Eating correlates with Decreased Executive Function in Obese Pediatric Obesity**

While 2/3 of the patients going to a pediatric obesity clinic receive treatment that remediates the problem, 1/3 of the patients given the same treatment do not present successful results. The objective of this study is to determine if there is a correlation between poor executive function and dysregulated eating. This correlation may help the 1/3 of patients not obtaining successful results to remediate their obesity. Children already attending an obesity clinic and their caregivers were given surveys to determine if there was correlation between executive function and dysregulated eating. The study found that there was correlation between executive function and dysregulated eating.

Megan McGraw, Kaylee Orr, McKenzie Johnson

**Overexpression and Validation of Glucagon Receptors in an AML12 cell line**

Glucagon is a fasting hormone and regulator of glucose and lipid metabolism. Activation of the glucagon receptor (GCGR) via GCGR agonism has a strong anti-obesogenic effect in diet-induced obese mice. While we have identified the hepatic GCGR, as well as downstream regulators of GCGR as necessary for this effect, the signaling between the GCGR and these critical proteins has not been fully elucidated. The optimal system to investigate this signaling pathway would be an immortalized hepatocyte cell line. However, current hepatic cell lines do not contain GCGR in their cell membranes, making bioenergetic experiments outside of primary hepatocytes impossible. To overcome this issue, a GCGR-expressing plasmid was transfected into AML12 cells. However, despite the successful reintroduction of GCGR – confirmed via a fluorescent marker – the AML12 cellular responses to GCGR agonists did not match responses seen in primary hepatocytes. Specifically, phosphorylation of CREB showed a biphasic response rather than a typical half-logarithmic response. The AML12 response to co-treatments of insulin and GCGR agonists lacked potentiation of phosphorylation of AKT, as normally seen in primary hepatocytes. Likewise, in primary hepatocytes, Fgf21, Pepck, and G6pase mRNAs are expressed in response to GCGR binding. The AML12 cells showed little expression of these genes in response to GCGR agonism. These results indicate that while GCGR is present and functional in the cells, the downstream metabolic pathway composed of enzymatic and gene expression is non-functional and cannot be used for further experiments, leaving primary hepatocytes as the only current option for studying the GCGR signaling pathway.
Natalie Presedo, Shelly Nason, Teayoun Kim, Jessica Antipenko, and Kirk Habegger

**Superhelicase Allows Study of Vectorial Folding Rate During Transcription**

This experiment attempts to better understand the processes and interactions that occur during co-transcriptional RNA folding using an artificially created system. In particular, RNA-protein synthesis and the various malfunctions that occur during it may be better understood. In this experiment, the researchers unwind two strands of RNA using two different processes (Vectorial Folding Assay - VFA and Refolding Assay - RFA). Each of the two systems is labelled with fluorophores and the unwinding process is observed using FRET assay. The resulting data showed that VFA initially occurs at a greater rate than RFA but also had more occurrences of misfolding. This misfolding is likely due to the formation of alternate secondary structures or instability of a structure called the P1-stem. By better observing what occurs during this process and others like it, new insights into protein and gene expression can be advanced.

_Boyang Hua, Subrata Panja, Yanbo Wang, Sarah A. Woodson, and Taekjip Ha_

**Magnetic Resonance Thermometry as a Novel Way to Detect Neuroinflammation Post-TBI**

Recent studies have shown that about 2% of the United States population is living with disabilities relating to a Traumatic Brain Injury (TBI). TBI leads to lasting neuroinflammation which results in physical and cognitive impairment. The aim of this study was to identify a relationship between neuroinflammation post TBI and brain temperature. This study hypothesized that patients with TBI would have higher brain temperature compared to a group of healthy controls. Twelve males aged 18 to 55 who had experienced a TBI within 2 years as well as 10 healthy controls were recruited to participate. Participants underwent Magnetic Resonance Spectroscopy thermometry (MRSt) to determine temperature in the brain. Spectroscopy scans showing voxel-wise metabolite peaks in the brain were used to determine brain temperature. Whole-brain and regional temperature was compared in the TBI and control groups using two-tailed independent-samples t-tests. The MRS method yielded metabolite spectra across the entire brain in the study sample. The results from t-tests did not support the study hypotheses. Temperature did not differ between TBI patients and controls in any of the assessed regions (\(p > 0.05\)). Limitations of the study include the small sample size and potentially limited accuracy of MRSt for calculating brain temperature. These limitations should be addressed in future studies to determine whether brain temperature may be useful for detecting neuroinflammation in TBI patients. Further studies can possibly develop brain temperature as a predictor for outcomes in patients post TBI while also helping develop more targeted medicines and treatment for TBI patients.

_Altamish Daredia_

**Determining the Impact of Genetic Background on Fitness in Drosophila melanogaster**

According to the CDC, obesity, one of the most prevalent diseases in the United States, affected 93.3 million US adults in 2015-2016. Although obesity is preventable, traditional approaches to losing weight--such as a strict diet and exercise
regimen—are not effective for everyone. Recent studies suggest that an individual’s genome might impact their metabolism and thus affect their ability to maintain overall health. When investigating the link between metabolic ability and genetics, Drosophila melanogaster is a promising model organism for several reasons: they are small, they have a relatively short life span, and their genome contains homologs of approximately 75% of human disease-causing genes, with major pathways being highly conserved. We used a climbing assay to determine whether fruit flies respond to an exercise treatment with an increased physical fitness. In this climbing assay, flies of both sexes and various genotypes were tapped down to the bottom of their enclosures, and the height to which the flies climbed in a two-second interval was scored. We found that how the flies responded to the exercise treatment strongly depended on their sex and genotype. Generally, there was significant difference between the sexes in both the control and treatment flies, but the response to the exercise was highly variable between individuals. Thus, similar to humans, genetic background impacts how Drosophila respond to exercise, illustrating how flies can help us understand the impact of genetic diversity on exercise, health, and lifespan.

Sarah Sims, Louis Watanabe, Nicole Riddle, and Mina Momeni

Examining the Fibromyalgia Immune Response with Lipopolysaccharide

Fibromyalgia (FM) is a neurological condition characterized by widespread pain, soft-tissue tenderness, fatigue, memory problems, and difficulty sleeping. Fibromyalgia is thought to involve pathological immune processes, but the exact mechanism has not been defined. To examine aberrant immune processing in FM, we contrasted immune response in 8 FM participants and 8 healthy controls (HC), using small doses of lipopolysaccharide (LPS). LPS is the major component of the outer membrane of Gram-negative bacteria, and it triggers a robust immune response via activity on Toll-Like Receptor 4 (TLR4) on macrophages and microglia. Each participant completed two experimental sessions – a 0.1 ng/mL LPS dose, and a 0.4 ng/mL LPS dose. Each session lasted nine hours with 0.5mL of blood being drawn at every hour. Blood plasma was assayed for C-Reactive Protein (CRP) and fractalkine. In the 0.1 ng/mL session, FM participants had a delayed immune response compared to controls. In the 0.4 ng/mL session, FM participants had a heightened immune response. The results suggest that FM involves abnormal response to everyday immune challenges, leading to overactive systemic inflammatory activity.

Levi Parker, Larissa Strath B.S., Luke Parkitny Ph.D., Jarred Younger Ph.D.

Circadian dependent regulation of NOS3 activation in endothelial cells

Nitric oxide synthase 3 (NOS3; endothelial NOS) activity regulates endothelial nitric oxide (NO). NO is a known endothelial-derived vasodilator that regulates vascular tone and blood pressure. Vascular tone and blood pressure oscillate with circadian rhythmic patterns throughout the 24 hour day with higher levels during the active period and lower levels at night during sleep. The hypothesis of this study was to determine the circadian rhythmic regulation of NOS3 transcription in cultured endothelial cells and to correlate this expression to known circadian clock genes Bmal1, Dbp, Per2, and Cry1 transcription. Mouse hemangiothelioma cells were cultured and serum-shocked in 50% fetal bovine serum to synchronize cells to the same circadian pattern. We isolated RNA at 4-hour intervals over 24 hours. RNA was
utilized to perform quantitative real time PCR (qRT-PCR) were normalized to the 18s housekeeping gene. Utilizing delta-delta CT analysis to obtain the transcription values of the each gene (N=1), qRT-PCR data of NOS3 and Circadian genes Bmal1, Per2, Cry1, and Dbp indicated gene amplification oscillating with a period of 24.0 hours. Dbp cycled significantly on a circadian pattern with a robustness= 79.40%, mesor= 3.90, amplitude= 4.58, and acrophase= 16.64 hours. Genes Per2 and Cry1 shared similar acrophases of 20.30 hr and 20.11 hr, respectively. Bmal1 recorded a mesor= 1.56, amplitude= 20, and acrophase= 1.14 hours. Due to a utilization of an N=1, further replications of this experiment are warranted to accurately measure circadian rhythmicity, as well as to test where clock genes regulate NOS3 transcription.

Jillian Tinglin; Paramita Pati; PhD, Jennifer Pollock, PhD

**Dextromethorphan in Fibromyalgia**

Fibromyalgia (FM) is a debilitating disease that affects over 5% of women in the United States. Individuals with FM experience a wide range of symptoms that include widespread pain, fatigue, sleep disturbances, and cognitive deficiencies. There are few approved treatments for FM, and the majority of individuals have significant symptoms even after receiving all available treatments. Dextromethorphan (DXM) is an N-methyl-D-aspartate (NMDA) receptor antagonist that has been used for decades as a dissociative, analgesic, and antitussive medication. It has also been demonstrated in animal models to diminish central inflammation at a low dosage. Because several lines of research have indicated a role of systemic inflammation in driving FM, we tested the possible therapeutic effects of DXM in FM. We conducted a single-blind, longitudinal study where participants completed 6 visits over 5 months. Participants were given DXM 10 mg twice per day or placebo twice per day over a 15-week period. All participants received both DXM and placebo at some time in their participation. Participants also reported their pain and other symptom severity twice daily over the course of the study. We hypothesized that participants would have a decrease in self-reported pain during the DXM period when contrasted with placebo. We further hypothesized DXM would lead to increased self-reported physical activity. The daily self-reported pain of participants while taking DXM was significantly lower than the self-reported pain rating during baseline (p<0.024). Compared to the daily reported pain rating of participants during placebo, the daily reported pain rating of participants while taking DXM was significantly lower (p<0.024). The results suggest that DXM is effective in lowering the self-reported pain of participants with FM.

Alexis E Lambert, Alexandra Otto, Levi Parker, Gregory Lashley, Kate Wesson-Sides, Jarred Younger PhD

**Role of the immune system in hair graying**

We observed that mice of a certain genetic background (Dct-Sox10) were predisposed to an early loss of pigment, or hair graying, upon artificial activation of their immune systems by Poly I:C, a viral mimic. This occurrence suggested an unknown link between the immune system and the pathway of pigment deposition. Specifically, it indicated that melanocyte stem cells (McSC), which give rise to melanin pigment-producing melanocyte cells, were lost as a secondary effect of the
activation of either an adaptive or innate immune response in the hair follicle. Highlighting key factors involved in this process could not only lead to a better understanding of stem cell maintenance but also of human diseases that may develop as a result of this malfunction, such as vitiligo. We first focused on the possibility of an adaptive immune response, meaning a specific, extrinsic stimulus initiated McSC death. To investigate, we collected skin tissue samples from Dct-Sox10 and wildtype (WT) mice and evaluated them for the presence of a number of immune cell types using immunofluorescence assays. We then quantified this information and conducted statistical analysis to compare between the genetic backgrounds. We found that there was no significant difference in the number of immune cells present near the hair follicle between Dct-Sox10 and WT mice. These results indicate that the loss of pigmentation observed is more likely due to an innate immune response signaled by the melanocytes themselves. A possible trigger could be the inflammasome, a protein complex within cells involved in immune signaling.

Autumne Lee

Assessing Pd-l1 as a Biomarker for Cell Quiescence

The cellular state of quiescence preserves the long-term regenerative potential of stem cell populations throughout the body. Cells are able to exit the cell cycle one of two ways: senescence or quiescence. We are interested in looking into when the McSCs are in a state of quiescence, found to be in the telogen stage of the hair cycle. Cells can be identified to be in a state of quiescence by identifying surface markers presented by the cells. The surface marker of interest in assessing cell quiescence is Pd-l1. Our aims for this research project are: 1) Determine if Pd-l1 expression changes following the hair cycle via western blot staining of whole skin. 2) Evaluate if Pd-l1 co-localizes with McSCs in quiescence via immunohistochemistry. 3) Determine if Pd-l1 is a biomarker for only stem cells or quiescence of cells via cell culture and western blot staining.

Kyreene Villavicencio, Joseph Palmer, Dr. Melissa Harris

Potential use for mito inhibitors as a secondary treatment for a subset of ovarian cancer patients identified by DBGES

A diagnosis of ovarian carcinoma can be especially devastating for a woman, and a recurrence of the disease is especially fatal as it is incurable. Two different subsets of patients have been identified using the dynamin related protein 1 (Drp1) based gene expression signature (DBGES): those who are Drp1 “up” (upregulated Drp1 after chemotherapy) and those who are Drp1 “down” (downregulated Drp1 after chemotherapy). Drp1 performs fission of the mitochondria double membrane, or the breaking down of larger mitochondria into smaller mitochondria. Thus, cells with low Drp1 have highly tubular, and cells with high Drp1 have highly fragmented mitochondria. Current preliminary data shows a possibility that Drp1 down cells in their fused mitochondrial states are more sensitive to mitochondrial energetics, and therefore may be more susceptible to mitochondrial inhibitors. We set out to determine which identified subset of patients would benefit from a secondary treatment using mitochondrial inhibitors. A series of survival and proliferation colony assays were performed with chemotherapeutics and mitochondrial inhibitors on four
different ovarian epithelial cancer cell lines, two form the Drp1 down subset and two from the Drp1 up. By analyzing and quantifying cell survival among the different drugs, we discerned that the Drp1 up cell lines had the most benefit from supplemental treatment with mitochondrial inhibitors in conjunction with regular chemotherapy drugs. This goes against our original hypothesis; therefore, further studies must be done to better understand which subset of patients may benefit the most from mitochondrial inhibitors.

McKenzie Foxall, Brian Spurlock, Danitra Parker, Kasturi Mitra

Alteration Gene Architecture of bZIP11 Regulatory Region by CRISPR-Cas9 to Study Pathogenicity in Arabidopsis thaliana
In Arabidopsis thaliana, basic leucine zipper transcription factor bZIP11 is involved in low energy metabolism pathways as well as amino acid synthesis by regulation of ASN1 and ProDH2, related to asparagine and glutamate biosynthesis pathways respectively. It is regulated by a Sucrose Control peptide (SC-peptide) encoded in uORF2, which can be translated as a 42 amino acid peptide from uORF2a or a 28 amino acid peptide from uORF2b. High sucrose levels in the cell prevent the main ORF from being translated, which has been predicted to be due to direct action of the SC-peptide. The CRISPR-Cas9 system was utilized to alter uORF2 to increase basal levels of bZIP11 in Arabidopsis. DNA fragments containing AtU6 promoters and guide RNAs flanked by BsaI sites were generated using polymerase chain reaction. These units were organized by Golden Gate cloning onto an entry vector, and then transferred to the destination pCUT6 vector containing Basta resistance. Similarly, fragments containing targets for the eIF-2-alpha kinase GCN2, also involved in stress metabolism, were created but flanked by attb Gateway sites. These were transferred to pDONR207 vectors by BP reaction, and then to pCUT6 gateway by LR reaction. These were then transformed into Agrobacterium, and the floral dip transformation method was utilized to transform col-0 plants. Seeds will be collected from dipped plants, grown, and selected for by Basta spray. Seeds will be collected from transgenic plants for further testing.

John Hernandez, Thomas Detchemendy, Dr. Shahid Mukhtar

GABAB Receptors Increase the Inhibitory Postsynaptic Current in Dentate Gyrus Cells
Our abstract was to summarize the paper by Dr. Wadiche and discuss the effects of various neurotransmitter blockers and how they effected inhibitory postsynaptic current in the brain

Ben Cockrell; Samuel Stowe; Eleanor Lee; Karthik Reddy

Business, Financial, and International Studies:

The New American: Second Generation Immigrants as Offenders
Post-1965 immigration to the United States and its relation to crime has remained the focus of many academic and social science research. This area of study has seen a resurgence in interest due to the political climate in the United States during the
2016 election period. Much of the research focused on modern immigration is centered around new entrant adults, however, very little concenters on second-generation immigrants (the native-born children of immigrants). Crime rates observed amongst second-generation immigrants highlight generational disparities between that of first-and-second generation immigrants as crime rates amongst the second generation similarly match that of their native-born counterparts; This similarity can be explained through modern assimilation that varies greatly from the experiences of their parents. Adding to existing knowledge regarding crime levels amongst immigrants, this research seeks to understand why second-generation immigrants are more apt to crime involvement than their foreign-born peers. A study of crime contributing factors as it relates to second-generation immigrants are analyzed and discussed.

Shanell Plante

Examining the Link between Sales Force Investments and Firm Financial Performance
The practice of sales has evolved drastically in the past few years from transaction focused to relationship focused. The importance of a competitive salesforce is growing more and more important for companies to remain competitive in their industries. Despite the significant investments firms make in the sales function, the effects of these investments on firm financial performance have yet to be empirically quantified. This study addresses the issue through an examination of the relationship between sales force investments and firm financial performance. The study utilizes a database of firms recognized by the publication Selling Power for their investments in sales force compensation, training, and advancement; and contrasts the financial performance of these firms against their industry mean. This study relies on the comparison of companies’ return on assets, profit margins, and revenue growth to their respected industry averages. This paper discusses the significance of the differences between these numbers and digs in to what is means for the firm in the bigger picture. This paper adds to the current literature by putting the significance of investing in a company’s salesforce empirically so that the rest of the company can understand it’s significance.

Caroline O’Brien

Colonial Influence in Africa: Environmental Degradation and Food Security
This study examines the relationship of imperial colonialism on the current day environmental situations and food security on African states. It attempts to determine if former African colonies suffer more environmental degradation and worse food security than the non-colonized African states. The study uses a comparative case study of two sets of countries; each set contains countries similar to each other in size, region, history, and in other aspects. Additionally, each set contains a country that was colonized and a country that is considered to not have been colonized. The first set includes Sierra Leone and Liberia, and the second set includes Tanzania and Ethiopia. The change in percentages of each countries’ area covered by forest and arable land by year, as well as the percentages of each countries’ populations malnourished by year were observed. This data was run in a regression model in order to determine if the input of colonialism caused a
significant difference in a country’s food security and environmental stability. Our findings suggest that, although colonial pasts may contribute to environmental degradation and food insecurity, having a non-colonial past does not guarantee that a country will fare better in these categories than its colonized counterpart. While Ethiopia was found to indeed have lower rates of deforestation than Tanzania and has had higher rates in diminishing malnutrition, Sierra Leone was found to have lower rates of deforestation and malnourished populations than Liberia.

John Stephen Hutchinson, Polina Komarova, Sabrina Bouriche, Lucy Iannarino

Readiness of Collat Students to Work in Team Environments
Being able to work on a team is a necessary skill that all prospective employees must possess when trying to enter the workforce. In most college courses, students are required to work in teams. Most times when students are set in teams for an assignment, there are those who will take the assignment seriously and those who are not as motivated to do well on the assignment. It has been observed that there is “a serious gap between” what is expected of recent graduates in terms of working in a team and what they are able to produce (Okamoto, Takashi, et al. 2017). This further indicates that there are much needed improvements to be made in the curriculum concerning team-based work. In this research study, I will examine the readiness of students in the Collat School of Business’s ability to work on a team and examine past research done on this topic as well as the need for further study in team-based learning courses.

Alana Baumann

The Effects of The Universal Background Check on Gun Violence
Gun violence has been a long standing, debatable and important topic in the United States and researchers have been trying to find a solution. In my research, I used secondary and combined data from 1990-2013 to examine the effect of the universal background check on gun homicides and suicides across the United States. I used the effective and operative date of state statutes as the main independent variable to test the universal background check law and added additional independent control variables that could influence gun violence. The control variables are the number of accidental gun deaths per year, rate of per capita of alcohol consumption, percentage of male adults between 45-64, percentage of African Americans in the population, the urbanization rate and political control variables. I used a fixed effects panel regression model of four regressions for both homicides and suicides. Results indicate that the effective and operative dates are not statistically significant in determining gun homicides and neither are most of the other control variables. The only statistically significant control variable is being an adult male between 45-64. The effective rate is statistically significant on gun suicides when not controlling for other factors. The effective rate is insignificant with control variables, but the per capita rate of alcohol consumption is statistically significant. These results are helpful for future research to receive similar results to other gun control policies.

Melinda Mueller

THE CONTRIBUTION OF E-COMMERCE CAPABILITIES ON THE SUCCESS OF SMALL TO MEDIUM ENTERPRISES
While the growth of e-commerce has had a positive impact are large enterprises, the effect on small to medium enterprises has been unclear. This is important because our society is quickly shifting to a digital age. More and more people are shopping online rather than shopping in brick and mortar stores. The goal of this research was to learn how the rise of e-commerce has impacted small to medium enterprises. I sent a short survey to small to medium businesses. This questioned the businesses on their participation in e-commerce capabilities and the outcomes of using these capabilities. I relied on the literature on this subject to address what topics needed to be researched further. After reading the current literature and conducting my survey, I learned that the businesses who participated in more of the e-commerce capabilities had better outcomes. Overall, the growth of e-commerce is a positive thing. The businesses that are lagging behind in their transition to e-commerce are not experiencing all the positive impacts e-commerce can offer them due to the fact more customers are participating in e-commerce over a brick and mortar shopping experience. This project adds to the current knowledge because it goes into detail on how each e-commerce capability impacts different aspects of a business.

E-commerce will continue to grow as society becomes more concerned with convenience. Small to medium companies who want to succeed need to learn to grow with it.

Brooke Garrison

The Effect of Super Teams on Competitiveness in the NBA
Abstract This Essay uses certain NBA “super teams” from different eras to test the hypothesis of whether these teams have an adverse effect on competitiveness in the NBA. The paper will examine teams such as the Chicago Bulls of the 1990s, the Los Angeles Lakers of the early 2000s and modern day super teams such as the Miami Heat and Golden State Warriors. We measured the effect of super teams on league competitiveness by taking league wins and losses in the regular season from 1995 to the present day and calculating the standard deviation, idealized standard deviation, and Noll-Scully measure. To find sufficient data, we retrieved win/loss data for each team in the league from every season since 1995. This data was pulled from a basketball reference website, and a spreadsheet was constructed. For each season, the average standard deviation, idealized standard deviation, and Noll-Scully measure were calculated. The Noll-Scully measures for each year were represented visually in Figure 1. Additionally, we constructed a dummy variable to determine the effect of super teams on competitiveness in the league. Due to the fluctuations during years with and without super teams, it remains to be seen whether there is actually a correlation between super teams and league competitiveness. The debate still goes on whether or not these ultra-talented teams are good for the league, but as the data indicates league competitiveness is low even when super teams are not formed. The data support the formation of super teams because with or without them league competitiveness fluctuates.

Izaan Rizwan and Ankit Bansal

Undergraduate Enrollment and New Facilities Housing Collegiate Schools of Business
This study aims to find a relationship linking the construction and opening of new facilities housing collegiate schools of business and the enrollment growth of those schools. The school of focus is Loyola University Chicago’s Quinlan School of Business, which opened the Schreiber Center housing its school of business in 2015. Enrollment of the Quinlan School of Business is compared to enrollment of business schools at universities deemed peer institutions by Loyola University of Chicago. Comparison of undergraduate enrollment rates across these schools during the period that the Quinlan School of Business unveiled the Schreiber Center allows for analysis of the effect that opening a new facility housing a school of business has on that school’s student enrollment. This study finds that opening a new facility housing a school of business is of benefit to the student enrollment of that school. This topic is relevant given the recent opening of the new facility housing the Collat School of Business. The finding of this study may be of importance to administrators and other officials involved in the decision to pursue the construction of new academic facilities like the Collat School of Business Building.

Braxton Barnwell

IMPACT OF INNOVATION IN TECHNOLOGY IN SUSTAINABLE ECONOMIC GROWTH

This paper deals with the essential features determining the role of innovation in developing economies by examining the importance of research and development in technology for long-term economic growth. A country’s economic growth is powerfully connected to its innovation status. The purpose of this paper is to examine the significance of innovation in driving sustainable economic growth by improving human capital accumulation, competitiveness, and production efficiency in selected economies. In order to determine the interconnection among the variables of innovation, competitiveness, and economic growth, a measure of correlation among those variables were examined. The data were collected from both primary and secondary sources. The results suggest the importance of specific innovation indicators for prospective economic growth in the selected economies. Also, innovation depends on a developed research and development system which does not only improve GDP per capita but result in a higher degree of innovation performance in the selected countries. There is a positive feedback between key innovation indicators such as infrastructure, human capital (skills), innovation capability, product market, ease to do business, GDP per capita, GDP growth, GERD (Total gross expenditure on research and development as a percentage of GDP). Indeed, innovation is positively correlated to GDP per capita, human capital accumulation, competitiveness, and production efficiency in selected economies. The finding may help review the comparative advantage theory and help developing countries to use efficiently their available resources toward innovation for sustainable economic growth.

Beloa Gilles, Fidele NGuessan

The Effect of Self-Construal on Self-Efficacy and Performance Between Sales Managers and Salespeople

Salesperson performance is highly dependent upon the relationship between the salesperson and his/her sales manager, however little is known about the factors
that may affect this relationship. This study examines how congruency in self-construal traits between a sales manager and salesperson affect the salesperson’s self-efficacy and performance. Self-construal is particularly relevant in this context as it refers to how individuals view their relationship with others. While existing research of self-efficacy has been shown to be positively related to performance levels, few studies have examined the difference in self-construal traits relative to self-efficacy and performance. By understanding the differences in self-construal between sales managers and salespeople, we suggest the mismatch of interdependent self-construal traits and match of independent self-construal traits between sales managers and salespeople enhances performance of a self-efficacious salesperson. Matched data from 289 salespeople and sales managers from a Fortune 500 firm indicates that self-construal differences affect performance of self-efficacious salespeople. Specifically, regression results demonstrate significant interaction effects between self-construal differences and high or low self-efficacious salesperson on salesperson performance. The results, shown in the figures, illustrate that highly efficacious salespeople perform significantly better than low self-efficacious salespeople when there is a high interdependent self-construal mismatch between the salesperson and his/her manager. Conversely, the results show a similar performance pattern when there is a high dependent self-construal mismatch between the salesperson and his/her manager for higher, as compared to lower, self-efficacious salespeople.

Van Khong and Thomas DeCarlo

How the Big Five Personality Traits Affect Social Media Usage
In an age where digital media is becoming an integral part in everyday life, social media is at the forefront of communication advancement. So much so that businesses are now strategizing for how to incorporate social media into the business model. However, to understand how businesses as a whole use social media in their business models, we sought to understand how individuals affect social media use personally. By using Instagram and Twitter as our examples for social media we used information gathered by the Big Five personality test to analyze how different personality types affect social media use. We surveyed 44 UAB students and then used a stepwise regression to analyze the dependent variables, Instagram use and Twitter use. By doing so, we found that agreeableness and emotional stability are key measures in determining Instagram use. However, extraversion and emotional stability are key measures to determining Twitter use. The results of the survey suggests that certain personality traits not only affect social media use, but that plasticity and stability as metatraits can be used to explain the variance in the use of both social networks. The results of this research suggest that further relationships need to be explored between specific personality traits and metatraits to determine how personality impacts social media. In addition social media use can be further researched and used as a dependent variable for advancement in business strategies.

Justin Jackson, Paul Di Gangi

On the Application of Topological Data Analysis to Corporate Financial Data
Through the years corporate bankruptcy has been the subject of many studies; however, most of these recreate original studies and test the viability of the methods used on new data sets. With the advent of machine learning, new methods were introduced; however, the new studies continued to use the previous financial measures, which were limited to financial ratios. This has resulted in limited progress when it comes to a more generalized study of corporate bankruptcy. Recent studies in a variety of fields have applied statistics to topology, a practice known as topological data analysis (TDA), establishing a general method for studying the shape of data. Persistent homology, the specific topological method used in this study, assists in the identification of noise, periodicity, loops, and other features in data. Comparing the results of applying persistent homology to financial accounting line items, as opposed to financial ratios, of bankrupt and non-bankrupt corporations revealed, on average, non-bankrupt corporations experience more loops in their data than bankrupt corporations. Thus, the shape of financial data for bankrupt corporations is different from that of non-bankrupt corporations; meaning, as one line item changes, other line items react differently for bankrupt corporations than they do for non-bankrupt corporations. Further research into the micro-structures of financial data is needed to fully understand how line items react to one another.

Cameron C. Davis

Human Trafficking: Present-day Slavery Among Latin American Drug Cartels

Abstract In recent years, human trafficking has increased globally due to criminal organizations utilizing it as a lucrative source of income. In Latin America, such criminal organizations are usually drug cartels that supplement and expedite drug trafficking by exploiting (i.e. enslaving) vulnerable populations for their use as prostitutes, drug mules, manual laborers, and other forms of forced work. To investigate the possible reasons behind why drug cartels are increasingly turning toward the exploitation of people for monetary gain, we analyzed data from three Latin American countries: Mexico, Guatemala, and Colombia. Each of their levels of detected victims as well as the extent of their adherence with the Trafficking Victims Protection Act (TVPA) as determined by reports from the United States, United Nations, and various human trafficking organizations was compared with the severity and enforcement levels of their drug laws and economic impact of the War on Drugs. Additionally, it was compared with estimated corruption levels in each of the three countries using data from the Corruption Perceptions Index (CPI) and the Index for Public Integrity (IPI) along with data regarding socioeconomic stratification including rights and protections for women and children as well as salary data for women as compared with men. It appears from the data that high socioeconomic stratification, high corruption levels, and harsh drug laws all contribute to higher levels of human trafficking. Steps should be taken to reform policy accordingly so that societies can become more egalitarian, less corrupted, and adopt alternative approaches to drug laws.

Dustin Lykins, Alicia Guevara, Daniel Mendoza

Push Factors of Migration in Venezuela

The resource curse is often referenced to explain the paradoxical lack of development experienced by countries with an endowment of resources. The
common effects usually include slow overall economic growth, less democracy, and poor development. However, it is highly debated on how much blame resources should receive in explaining the cause of these effects. This study expands on this topic by examining the relationship between oil dependency, authoritarianism, and migration. Here we argue that resources alone cannot explain the poor development outcomes; instead, we assert that it is the combination of dependency of natural resources and authoritarian governments. Additionally, we make the claim that higher levels of oil dependency and authoritarianism lead to higher emigration. In this study, we focus on authoritarian countries whose economy is considerably reliant on oil and examine how these variables create conditions for emigration. We use a comparative case study approach that includes studying Venezuela and Ecuador in which we track both countries’ history on oil dependency and authoritarianism, and compare its respective migratory patterns. There is a strong emphasis on the era of Hugo Chávez of Venezuela and Rafael Correa of Ecuador as they offer importance to the hypothesis. Evidence suggests that higher levels of authoritarianism tend to lead to a mismanagement of the oil sector. Moreover, we demonstrate that the interaction between authoritarianism and oil dependency does lead to higher emigration.

Yona Andrews and Katie Cox

Education:

Kindergartners' Progression from Scribblers to Storytellers
Early childhood is a crucial time for children as they acquire the knowledge needed to become avid readers, researchers, and writers. The continuum that students follow, specifically in writing, allows them to progress at their own pace instead of being given the assigned work and being expected to complete it based on specific guidelines. This study followed a class of 16 kindergartners in a suburban school over the course of four months as they grew from scribblers to storytellers. These students were taught using the writing workshop model of instruction. This model includes: a mini-lesson with a specific skill that is taught such as capitalization, punctuation, or spacing between words; the use of a model text to demonstrate the targeted skill; workshop time for students to write about what they know in their daily lives at their own pace; and a debrief, which gives students an opportunity to share what they have written. This study showed that, over the four-month time span, students who were only scribbling or drawing shapes grew into writers who: wrote the first letters of the words they heard in their stories as a string of letters with meaning; wrote beginning and ending sounds specifying specific words; and, grew into writers who wrote sentences with illustrations to match the words on the pages. The growth in these students was influenced greatly by the writing workshop instruction, as well as individual conferences.

Amber Gravette

Physical & Mental Breaks from Instruction in the Elementary Classroom
Throughout elementary education classrooms today, children often struggle to pay attention during extended periods of instructional time. As future teachers, it is
important that we research and understand methods for improving student attention spans in order to optimize academic instruction. In an effort to improve student attention spans, incorporating physical activity as a small “brain break” from instruction can guide student attention spans in a positive direction. By allowing students to use brain breaks during structured times within instruction, students are able to relax from academics for a short period time. This time allows them to refocus their energy back on schoolwork at the conclusion of the brain break. In addition to working as a method for refocusing student attention spans, brain breaks can also serve as a method for student motivation and reward. Students enjoy brain breaks simply because they provide a short, enjoyable break from instruction. This allows teachers to use brain breaks as a source of motivating students to work hard to earn a brain break. As students strive to do their best to receive a brain break, behavioral problems will also decrease. Physical activity is also shown to improve brain function, which is very beneficial to the student during instructional time. Many teachers understand the importance of movement in the classroom as a way to reengage students which allows them to stay active throughout the day. Our research supports current publications on brain breaks and states that physical activity positively impacts students’ attention spans and engagement.

*Morgan Creech & Hunter McGarity*

**Do Students’ Personal Book Choices Affect Their Reading Volume?**
As a preservice teacher, I was interested in finding what benefits students’ choice of literature provided. I wondered how and if personal reading choice affects students’ reading engagement. I have observed classrooms that provide many opportunities for students to choose their independent reading literature as well as classrooms where these opportunities for choice were not provided. Through this research, my hopes are that I will gain personal knowledge of the best independent reading practices for the classroom. In my current preservice placement, I provided all the students the class with a reader’s notebook. I also conducted personal reading interviews with the students and kept anecdotal notes of their reading practices in the classroom. I relied on their notebook entries and interview responses as evidence of their engagement. What I hope to conclude from this research is how students’ personal reading choice affects their engagement and enjoyment of literature and if they are more likely to read when opportunities for choice are provided. There is existing research that suggests opportunities for student choice during reading instruction increases student engagement and comprehension of the reading. I hope to add my conclusions to the existing body of knowledge that choice can affect independent reading development for students.

*Katherine Ham*

**Transition Times and a Productive Environment inside an Inclusive Classroom**
The significance of my research aims to solve the way students respond and interact during transition times inside of the classroom. The question that I would like to pose for my research is; what effects if any, does a planned routine activity during transition time have on the productive environment in an inclusive classroom? With this research, the activity that I have for the students is a game called buzz. Within
this class, the students need help with their fluency within ten, and also their multiplication tables. This game will aim to help them with these skills, while helping to produce a more productive environment. What I would like to see happen when the students play the activity game is that the students will transition with less anxiety, they will work together to maintain a more productive environment while playing the game, and they will be mindful of their behavior, so there will be less prompting. The three sources of data used are surveys, anecdotal notes, and recorded behavior logs. These are used to see if the correlations from the activity game, and the clear instruction will help produce a more productive environment. I am looking to conclude from the research that it helped improve the overall behavior of the students within the classroom. That it will show more than half of the students develop a need for better structure within the classroom, and that prompting times will decrease with clear and direct instruction after a continuous period.

Paige Dodd

Number Talks: Developing Conceptual Understanding, Procedural Fluency, and Mathematical Reasoning

Number talks are discussions about how to solve specific mental math problems. Number talks attempt to solve the intellectual gap in one’s ability to have a conceptual and procedural understanding of mathematics, do mental math, and develop multiple strategies for solving mathematical problems. The purpose of this research is to use number talks to help my second-grade class develop multiple strategies to use when solving two-digit addition problems and defend their thinking because when asked how they got their answers they are not able to justify it. Not only do I want my students to have procedural fluency, I also want my students to have a conceptual understanding of why the procedures work. My research question is, in what ways can learning how to defend solutions to problems during number talks help with conceptual understanding, procedural fluency, and mathematical reasoning? This research was based on assessments, anecdotal notes, and strategies used during the number talks. The pre-assessment and post-assessments were paper tests that required them to solve the problems using strategies that they have learned. The results from the pre-assessments showed me that the students had a lack of conceptual understanding with counting on. The students showed great progress on their post-assessment compared to their pre-assessment. 87 percent of the students showed procedural fluency by using different strategies to add two-digit numbers. The other 13 percent were able to accurately show one strategy for solving two-digit addition problems.

Brandy Harris

Authentic Application and Assessment for Literacy Education in the Elementary Classroom

Abstract This study describes the growth of individual students and the classroom community through literacy experiences that facilitate authentic application and assessment. The following research question was addressed: To what extent do literacy experiences with authentic application and assessment support the learning needs of individual students and the classroom community? The study provided
students with literacy experiences that support learning needs through differentiation of instruction. The intention was to shift student perspectives to find their voice as a critical consumer of information. This study was conducted in fourth-grade classrooms in two different schools. The first setting of this study explored response journals as a formative assessment tool. The second setting explored the effects of the following: book recommendations from the teacher and students and setting the context to engage throughout the writing process. Sources of data included student interviews, anecdotal notes, and student artifacts. The following themes were identified across the data: purposeful communication, student autonomy, development of essential literacy strategies. Previous research has shown that when a teacher supports students’ intellectual and moral autonomy it results in positive long-term outcomes on student success. Practices that support this include self-reflection and self-assessment, reciprocal feedback, and student choice in the classroom. However, existing research lacks information regarding the process of identifying meaningful learning experiences for classroom communities that will support the learning needs of all students. This study addressed the process of identifying the academic and social needs of students to provide targeted literacy experiences designed for an individual classroom.

Alana Nelson

The Effects of Writing Workshop
Writing workshop is a powerful instructional technique that influences both literacy and writing development, and it is often overlooked. In an educational system that structures so much of children’s time, it is difficult to implement a workshop structure in which children are given choice and autonomy over their writing. This study took place during a four-week program and focused on eight children between the ages of three and seven. Every day the children were taught a short mini-lesson focusing on writer’s craft. Craft refers to specific and intentional things that authors do to enhance their writing. Then, the children were released to work on the independent writing of their choice. As the children worked, the teacher moved around and conferenced with each child. Discussions from conferences focused on the child’s writing and suggestions for how they could improve. The intentions of this study were to determine the effect that the workshop model of teaching had on each child’s writing development. To analyze the results, a developmental progression for writing development from Teaching Strategies GOLD was utilized. Each child’s first and last piece of writing was placed along the progression, and the results were compared. In just four weeks, each child moved ahead at least one level on the developmental progression, and some moved up as many as four levels. This research confirmed the effectiveness of writing workshop in supporting the writing development of young writers.

Alex Summerlin

Engineering:

Application of nitric oxide releasing nanomatrix gel to enhance arteriovenous fistula maturation
About 600,000 patients in the US suffer from end-stage renal disease (ESRD), and more than 75% of ESRD patients undergo dialysis. Vascular access dysfunction is a major cause of morbidity and hospitalization in dialysis patients. Arteriovenous fistulas (AVFs) are considered the gold standard of vascular access for dialysis. However, up to 60% of AVFs fail to mature sufficiently to allow dialysis because of early neointimal hyperplasia development, inadequate vasodilation, and adverse vascular wall remodeling. In this study, we propose the application of a nitric oxide (NO) releasing peptide amphiphile (PA) nanomatrix gel to promote AVF maturation. This NO delivery strategy was developed because NO inhibits smooth muscle cell proliferation and also act as a potent vasodilator. This nanomatrix gel has displayed sustained NO release over a one-month period, which could promote the vasodilation of the AVF and limits neointimal hyperplasia development. The NO releasing nanomatrix has displayed enhanced vessel dilation ex vivo and reduced neointimal hyperplasia development in an AVF created at the femoral artery and vein of rats. Additionally, the application of the NO releasing nanomatrix gel has displayed reduced inflammatory response at the AVF site. These results will pave the way for the next phase of this study which is to examine the efficacy of implanting the gel in a large animal (porcine) AVF, progressing toward the goal of hopefully bringing this solution forward for patient use.

Pratheek Bobba, Patrick TJ. Hwang, Maheshika Somarathna, Grant C. Alexander, Reid C. Millican, Brigitta C. Brott, Jennifer Pollock, Timmy Lee, and Ho-Wook Jun.

Titania-Coated Glass Microballoons and Cenospheres to Improve Water Purification

Glass microballoons (GMBs) and cenospheres have the potential to be used as substrates for titania in the photocatalyzed breakdown of impurities in water, improving current water purification methods for an overall positive environmental impact. Experiments to evaluate this potential involved SEM analysis of both cenospheres and GMBs and four solutions of Procion Red MX-5B dye either with or without titania-coated GMBs. The breakdown of the dye was afterward measured in a UV-vis spectrophotometer to compare the presence with lack of UV radiation and the presence with lack of titania-coated GMBs. SEM analysis showed GMBs to be best suited for titania coating, and spectrophotometry showed the presence of titania-coated GMBs to have far better breakdown of the dye than UV radiation alone. Due to these findings, GMBs show promise for future application in water purification.

Stephanie Mover, Alfredo Guzman, Luke Jaskowski

Health Sciences and Health Professions:

Prevalence and Epidemiological Effects Associated with Novel Psychedelic Use in the United States Adult Population

Novel psychedelics appear to approximate classic psychedelics, but unlike classic psychedelics, novel psychedelics have been used for a much shorter time period and are new to illicit and semi-licit markets. The prevalence of novel psychedelic use and
the associations of novel psychedelic use with mental health outcomes are therefore undetermined. We estimated the prevalence of self-reported, write-in lifetime novel psychedelic use and evaluated the associations of lifetime novel psychedelic use with psychosocial characteristics, past month psychological distress, and past year suicidality among over 350,000 respondents pooled from years 2008 through 2016 of the National Survey on Drug Use and Health. A fraction (0.12%) reported lifetime novel psychedelic use. This cohort tended to be younger, male, and White, have greater educational attainment but less income, be more likely to have never been married, engage in self-reported risky behavior, and report lifetime illicit use of other drugs, particularly classic psychedelics (96.9%). The phenethylamines 2C-B (30.01%), 2C-I (23.9%), and 2C-E (14.8%) accounted for the majority of lifetime novel psychedelic use. Although lifetime novel psychedelic use was not associated with psychological distress or suicidality compared to no lifetime novel psychedelic use or classic psychedelic use, relative to lifetime use of classic psychedelics but not novel psychedelics, lifetime novel psychedelic use was associated with a greater likelihood of past year suicidal thinking (aOR = 1.4 (1.1-1.9)) and past year suicidal planning (aOR = 1.6 (1.1-2.4)). Novel psychedelics may differ from classic psychedelics in meaningful ways, though additional, directed research is needed to address this matter.

James Sexton, M. Scott Crawford, Noah Wiles Sweat, Allyson Varley, Peter S. Hendricks

Foveal Contrast Sensitivity Function in Glaucoma
Glaucoma is associated with progressive loss of retinal ganglion cells and structural changes of remaining cells. The contrast sensitivity function can be used to assess the impact of glaucomatous damage on central pattern vision. The hypothesis that there would be anomalies in the shape of CSFs in the macular region of glaucomatous eyes was tested. The degree of contrast deficits was correlated with the macular retinal layer thickness. Two subject groups were recruited: patients with primary open-angle glaucoma (n=20) and age-matched normally-sighted individuals (n=16). CSFs were measured using a contrast-detection task using a sinusoidal grating. Contrast sensitivity was plotted as a function of spatial-frequency (CSF curve). Four parameters were estimated from the CSF curve: the peak contrast sensitivity, the peak spatial-frequency, the high spatial-frequency cutoff, and the area under logCSF (AULCSF) curve that represents the overall contrast sensitivity. To examine the structure-function relationship, the CSF data was correlated with the macular retinal layer thickness. The binocular AULCSF and Peak CS were significantly lower in the glaucoma group compared to normal controls. The monocular AULCSF, Peak CS, High SF-Cutoff, and Peak SF were significantly lower in the worse eye of glaucoma subjects than the worse eye in normal controls. Monocular RGC+ layer thickness was also shown to positively correlate with the monocular AULCSF in the glaucoma group. Foveal contrast sensitivity is impaired in glaucoma patients. A decrease in foveal contrast sensitivity appears to be associated with thinning of the macular RGC+ layer thickness

Hana Habchi, Alexander J. DeCubellis B.S., Rong Liu, PhD, MiYoung Kwon, PhD
Impact of Remote Monitoring on Hospitalizations of Patients with Heart Failure

Heart failure is one of the leading causes of hospitalizations in the United States. This disease affects approximately 5.7 million U.S. adults annually, and costs $30.7 billion to treat each year. Majority of the cost incurred from treating heart failure stems from the cost of hospitalizations. In recent years, physicians have attempted to manage heart failure and decrease hospitalizations by using remote monitoring, a subset of telehealth technologies. The goal of remote monitoring technologies is to supply healthcare providers with relevant patient data in hopes of improving and encouraging data-backed decision-making processes. These technologies can be used for the prediction, prevention, and potential treatment of chronic diseases. In the past, studies have reported conflicting conclusions as to whether or not remote monitoring is effective at decreasing hospitalizations. The aim of this literature review is to examine whether use of remote monitoring technologies has led to a decrease in hospitalizations for patients with heart failure from 2013-2018. Out of 12 studies, 5 reported that remote monitoring significantly decreases hospitalizations and 7 reported that remote monitoring does not significantly decrease hospitalizations.

Hira Munir

Promoting Proactive Flu Prevention Practices

Our Honors Seminar, How Do People Change, was designed to educate us on the importance of incorporating various health behavior theories and concepts into the advertisement and promotion of proactive medical practices. This semester we partnered with Occupational Medicine to assist them in the distribution of the flu shots they offer to the faculty and staff here at UAB. We conducted interviews, studied and practiced the health behavior concepts we learned, and even created advertisements we personally made to contribute to raising awareness for these free flu shots. Through this process of advertising, we were met with many obstacles that come with public relations. We had several ideas that were unusable because of rules and regulations set in place by the University. We could not place flyers on car windows and were even left unanswered when we asked for permission to place flyers in staff mailboxes. Our main form of communication for this project was through email, but this switched to personal contact as the project progressed. Our group members began attending the flu clinics to raise attention to people walking past and to bring them in to get their free shots. We used signs and prizes to motivate faculty and staff to get their flu shots in conjunction with another group’s Facebook page. The effort our class put into this campaign was mainly to increase the amount of faculty and staff here at UAB that received free flu shots in comparison to last year.

Madison Hughes, Ashleigh Johnson, Anna King, Kayla Lazarak, Haley Limbaugh

Notch-4 Expression Changes During Weight Cycling of Diet Induced Obese Mice

It is projected that by 2030, 85% of adults in the United States will be overweight or obese. Obesity is closely linked to an increased risk of diabetes and cardiovascular disease. Understanding mechanisms contributing to the development of obesity is a
priority for improving health outcomes. Fat deposition, which requires de novo adipogenesis, is a key step in obesity development. The Notch-4 receptor has been reported to regulate adipocyte development in a 3T3L1 pre-adipocyte cell line model and is most highly expressed in fat tissue. Little is known, however, about a role for Notch-4 and the Notch-regulated transcription factor Hes-1 during calorically induced weight loss or gain. Livers from diet induced obese (DIO) adult C57BL/6J mice were examined for the expression of Notch-4 and Hes-1 proteins during weight cycling by western blot analysis. Weight cycled DIO mice exhibited a 2.7-fold decrease in Notch-4 expression upon weight loss as compared to those remaining obese, while Hes-1 expression increased 1.6-fold. Notch-4 expression was increased 1.9-fold, while Hes-1 expression was decreased 9-fold in weight cycled DIO mice during weight regain as compared to obese mice. These data demonstrate changes in Notch-4 receptor expression during periods of calorically induced weight cycling. Our study is being expanded to examine Notch-4 and Hes-1 expression as a function of adipose (fat) depot mass, body composition, and adipocyte cell size in the DIO weight cycled mice.

Shannon G. Rice; Fred E. Bertrand

Hispaniola Sex Workers’ HIV Knowledge and Condom Use on the Border of Haiti and the Dominican Republic

Studies that examine behaviors of populations that live and work on a geographic border are scarce; yet, these studies are valuable because they can highlight the intersections of psychological and sociological factors and the influence on public health. The objective of this study is to examine HIV knowledge and condom use in sex-workers living and working on the border of the Dominican Republic (DR) and Haiti. Data for this study was from the 2015 Baseline Study on Sex Workers. To measure HIV knowledge, we constructed a scale based on a series of 11 questions that asked about HIV transmission routes and effective means of protecting against HIV. Bivariate analysis examined differences in HIV knowledge and condom use among sex-workers from the DR and Haiti. We found significant differences between Dominican and Haitian sex-workers. HIV knowledge was significantly higher among Dominican sex-workers, yet condom use was lower. About 81% of Haitian sex-workers used a condom every time they had sex with a client, compared to 61% of Dominican sex-workers. Condom use with coercive and regular partners were also significantly higher among Haitian sex-workers. Knowledge gaps persist in understanding the motivation-driving behaviors of sex-workers in general, and even less information is available on the behaviors of sex-workers in resource-limited settings. Further qualitative studies on why condom use comparatively lower on the DR side of the border could be informative to researchers and health professionals interested in the psychological and sociological forces on behaviors of border populations.


Lifetime Use of Multiple Classic Psychedelics is Associated with a Decreased Likelihood of Anxiety

Anxiety disorders account for over 50% of the global disease burden and are associated with a high risk of mortality. Recent clinical studies found that classic
psychedelic-facilitated psychotherapy can substantially decrease anxiety associated with end-of-life, suggesting potential effectiveness for other anxiety disorders. However, data are limited. For this study, we gathered data from the 2013 and 2014 National Survey on Drug Use and Health, which were the most recent years that asked about anxiety symptoms within the past year. 77,925 participants responded whether or not they had ever used a classic psychedelic (DMT, LSD, psilocybin, or mescaline) as well as if they had experienced anxiety within the past year. Individuals who reported using 1 or 2 different classic psychedelics in their lifetime did not have a significantly reduced odds of reporting anxiety in the past year, whereas individuals who reported using 3 or more different classic psychedelics in their lifetime had a significantly reduced odds of past year anxiety. These results might indicate that multiple administrations of a classic psychedelic (vs. a single administration) may provide symptom relief among those suffering with anxiety disorders.

Caroline V. Caudill, M. Scott Crawford, Peter S. Hendricks

Overview of Food Insecurity at UAB
This research set out to determine the prevalence of food insecurity on UAB’s campus and examine which groups of students are most vulnerable to food insecurity. The research was conducted using survey results gathered in Spring 2018 from the Food Access at UAB Survey which was taken by over 500 students across campus. The results were then analyzed using bivariate analysis and logistic regression models. The analysis of the survey results shows 36.1% of respondents experience food insecurity. The research found that students in minority groups were significantly more likely to experience food insecurity. Additionally, students who experience other economic vulnerabilities are more likely to experience food insecurity. In general, college students have a relatively high prevalence of food insecurity and these results confirm that to also be true on UAB’s campus. Moving forward, these results can be used by Blazer Kitchen and other campus and community partners to better target resources to support the students who experience food insecurity.

Erika Austin, AJ Brown, Katherine Higginbotham, Reed Linam, Shannon Lukens, Hannah Magnuson, Maca Martinez Ordenes, Ashlyn Murrell, Mary Anne Powell, Megan Richard, Destini Walker

Resiliency in Nurses: A Systematic Review
Background: As policies change the complexity in the healthcare field, burnout among nurses continues to increase, leading to turnover or leaving the profession. Resilience in healthcare has been increasingly studied to lower these negative impacts, decrease the turnover of healthcare staff, and ensure that at the organizational level, quality of patient care does not decrease. To date, no study has established an agreed upon definition of resilience or provided an instrument that encompasses all the components to measure resilience. Objectives: This study’s primary goal was to provide a comprehensive literature review to identify characteristics of the resilience in nurses and how effective the methods used to improve resilience in nurses were. Methods: A systematic review of literature between 2013 and 2018 was conducted using ABI/INFORM and PubMed. Of the 3202 articles found, 19 were determined to meet the inclusion criteria after
processing them through multiple screening phases. Results: A number of important components of resilience were identified across the literature. Common themes included a sense of meaning or purpose, awareness, positive relationships, psychological factors, and spiritual variables. Interventions to improve resilience were used in twelve of the nineteen articles. The interventions varied in their methods and goals. Discussion: There is a lack of empirical quantitative research describing how building resilience in nurses can decrease burnout. Some tools have been created, such as the SMART program and the Connor-Davidson Resilience Scale, and tended to focus primarily on measuring job satisfaction, burnout, stress, and anxiety levels. While these tools are useful, no study has been able to show if these programs encompass all aspects of resilience and help to measure resilience in providers.

Kyle Fuller, Lena Carter, Keytahnie Jones, Mackenzie Robinson

Effects of Hydrogen Peroxide and MitoQ on Oxidative Stress in Differentiated C2C12 Myotubes
Chronic diseases such as congestive heart failure, diabetes, and renal failure are all associated with skeletal muscle wasting or atrophy. Atrophy can be caused by a variety of different factors, one such causative factor is increased oxidative stress. Oxidative stress is caused by reactive oxygen species (ROS) being released and not properly broken down into a more stable form in the cell. ROS are produced as a by-product of cellular respiration in the mitochondria. Persistent elevated ROS levels, when present in skeletal muscle cells, have been proposed to cause muscle atrophy. We therefore sought to determine the contribution of oxidative stress on gene expression in skeletal muscle. We treated differentiated C2C12 myotubes with hydrogen peroxide (H2O2) to mimic elevated ROS and measured gene expression using qPCR. We observed an upregulation in genes associated with oxidative stress, autophagy, and mitophagy in myotubes treated with H2O2 in a dose dependent manner. We also tested the effect of MitoQ, a mitochondrial-targeted antioxidant, in differentiated C2C12 myotubes using an in vitro starvation atrophy model. qPCR analysis revealed an increase in expression of genes associated with oxidative stress with starvation. The induction of these genes was blunted with MitoQ treatment. Taken together these data suggests that elevated ROS levels in skeletal muscle induced oxidative stress and that treatment with MitoQ can inhibit the ROS in skeletal muscle.

Drue Benefield

Raising Awareness for Influenza Vaccines through Social Media
The UAB Occupational Medicine Program offers free influenza vaccinations at various locations for the university’s employees, but this resource has not been properly utilized, leading to the possibility of decreased funding for the influenza vaccine clinics. Based on the Health Belief Model, we predict that increasing awareness for the influenza clinics will increase the number of employees taking advantage of the program. To understand the issue, we conducted formative research using information from interviewing two employees. We discovered that employees may not be aware that this resource is available to them. To test our hypothesis, we then developed a Facebook social media campaign, asking faculty
and staff to post selfies of themselves after they received their flu shot for a chance to win a prize. To make the Facebook contest known and to address Health Belief Model constructs, we presented information at various staff meetings and attended the influenza vaccine clinics to inform the campus employees and to hand out flyers with the contest details. At the conclusion of the contest, 50 employees participated in the contest, and 1,720 influenza vaccines were given, making this year’s clinics the most successful thus far. In addition, a greater amount of vaccinations were given in a shorter time frame this year compared to prior years. As a result of this data, we believe social media platforms should be considered a viable method not only for future influenza vaccine clinics but also for other programs that seek to promote healthy behaviors.

Anna Robinson; Abigail Tarleton; Hunter Rains; Colton Patterson; Anna Ren

**Observance of Incidence Rate Trends in Neisseria gonorrhoeae in Metropolitan Statistical Areas by Gender, 2013-2017**

Previous studies of the incidence of Neisseria gonorrhoeae have only considered small populations and neglect to consider the effects of urbanization. The purpose of this study was to observe the impact of urbanization on the incidence rate of gonorrhea infections by gender. Data were sourced from the CDC case reports of notifiable diseases among 50 Metropolitan Statistical Areas (MSAs) from the years 2013-2017. A negative binomial regression was used to estimate rate ratios (RRs) and associated 95% confidence intervals (CIs) for annual five-year trends in the incidence per population of gonorrhea by gender and MSA. The incidence rate increased among males for every MSA observed, while only certain MSAs had significantly increasing rates for females. Of all of the MSAs, the highest increasing trends were observed for the MSA including Portland/Hillsboro/Vancouver, BC (RR 1.41, 95% CI 1.31-1.52) for females and Denver/Aurora/Lakewood (RR 1.32, 95% CI 1.27-1.37) for males. The largest discrepancy in the annual trends between genders was observed for Pittsburgh, PA (RR 1.23, 95% CI 1.19-1.27) and New York/Newark/Jersey City (RR 1.17, 95% CI 1.12-1.22). Interestingly, the rate is increasing quicker in females only in Portland/Hillsboro/Vancouver (RR 1.11, 95% CI 1.01-1.21). While gonorrhea infection rates are increasing quicker in Western MSAs, the discrepancy in annual trends between genders is higher for Northeastern MSAs. Future studies should also observe the rates of incidence by whole state and compare them to the rates by MSA to discern whether urbanization is truly a factor in the spread of gonorrhea.

Alana Colafrancesco, Bayley Hall, Mary Jackson, Cori Myers, Thomas Wright

**Comparison of Melanoma Incidence by Race and Region**

Most studies of melanoma have focused on UV exposure by age or regarding the White/Caucasian race. Research regarding non-White racial groups is limited and outdated. Here, we will examine national trends of melanoma incidence focusing on regional correlations and relating to non-White and White racial groups. Melanoma incidence rates were gathered using the United States Cancer Statistics curated by CDC Wonder from 1999-2015. Joinpoint regression models were constructed to analyze the relationship between racial groups and melanoma incidence based on their geographical location. Average annual percent changes (AAPCs) estimated from
the joinpoint regression models were compared between White, African-American, and Other racial groups. Other racial group classified those who were not White or African-American. From 1999-2015, melanoma incidence rates increased significantly for the White racial group (AAPC ~3.0%, p<0.0001) in all regions as expected. Unexpectedly, a notable change occurred for African Americans in the Northeast (AAPC 3.0%, p=0.049) from 1999-2015, and for Other racial groups in the Northeast (AAPC 2.8%, p=0.0029) and West (AAPC 1.2%, p=0.025) from 1999-2015. The current results suggest that the changes in incidence rates are correlated to specific regions for non-White racial groups. For the unexpected incidence trends for African Americans in the Northeast Other racial group in the Northeast and West, further research to prove validity may be necessary.

**Abbey Wicker, Emily Fu, Kiahna Beckwith, Lillie Blacksher, Madison Kroeger**

**Comparison of Syphilis Rates by Gender and Region**

Since 2006, the incidence rate of primary/secondary syphilis has been increasing. Previous studies have focused on rapidly increasing rates for men; however, rates more recently rates have increased for both sexes. We will examine whether this increase differs by region of the United States. Data were derived from the CDC’s Sexually Transmitted Disease Morbidity database for the years 1996-2014. Year was divided into four categories based on national trends in syphilis incidence. A negative binomial regression estimated rate ratios (RRs) for trends in incidence by gender and U.S. region. Despite the incidence rate of primary/secondary syphilis in males overall being six times higher than that of females, annual trends were notably differential by gender in the Western United States regions. For females in the Mountain region, incidence decreased by 27% per year in 2007-2011 (RR 0.73, p<0.0001), but then increased 66% annually in 2012-2014 (RR 1.66, p<0.0001). In the Pacific region, the incidence for females annually decreased 9% during 2007-2011 (RR 0.91, p=0.0471), but increased 55% per year from 2012-2014 (RR 1.55, p<0.0001). In the West North Central region, the incidence for females decreased 24% per year during 2007-2011 (RR 0.76, p=0.0001), but then doubled annually from 2012-2014 (RR 1.96, p<0.0001). These results could indicate an unusual outbreak of syphilis, failing sex education, or an unwillingness or inability to practice safe sex, which must be monitored in future studies.

**Natasha Brooks, Derek Dang, Bailey Echols, Jacob Hudson, Jinhee Son**

**Type 2 Diabetes Mortality Study**

Background: The prevalence rate of Type-II diabetes is greater in metropolitan areas versus non-metro areas and the annual incidence rate has consistently increased since 1999. Asian/Pacific Islander have historically had relatively lower incidence rates than Black and White races. This study is aimed at analyzing the variance of mortality rate with regards to urbanization and races by year. Methods: The Compressed Mortality File derived data from over 45 y/o citizens’ death certificates from U.S. states plus D.C from the years 1999-2016. Negative binomial regression compared rate ratios (RRs) and associated 95% confidence intervals for the comparison of annual mortality rate trends across urbanization levels for Type-II Diabetes Mellitus race. Results: The mortality rate increased in metro areas more rapidly than in non-metro areas, primarily for minorities. Specifically, for American
Indians/Alaskan Natives, there was a significant increasing trend in metropolitan areas (RR 1.03, p<0.0001) with a similar increase in African Americans (RR 1.02, p=0.0003). No difference in trends was reported across all urbanizations amongst Whites. Conclusions: Socioeconomic factors in urban areas have exacerbated mortality rates of minorities with Type-II diabetes. Minorities are often localized in inner-city areas lacking healthcare, produce, and vertical mobility.

Caleb Rowe, Lauren Thibault, Cole Wooten, Chris Adams, & Tessa Davison

Relationship Between Gender and Urbanization in Firearm Suicide Rates

Firearm suicide (FAS) is an increasing problem throughout the entirety of the United States. Studies have found that firearm suicide can be analyzed on the basis of how prevalent gun use and availability is within different regions. The objective behind this research is to analyze the differences in the rate of firearm suicides among urbanization, region, and gender. The data was collected from the National Compressed Mortality file (access using CDC WONDER) to show firearm suicide rates across the years of 1999-2016 within urbanization, region, and genders. A negative binomial regression estimated rate ratios (RRs) for the association between urbanization and FAS by gender and region. Though overall the FAS was higher for males, the rates increased relatively more rapidly for females than males. In particular, the rate flipped from a decreasing trend for females in 2005-2010 (RR 0.92, p=0.0078) followed by a 12% per-year increase from 2011-2016 (RR 1.12, p=0.0001) in large central metro regions. In addition, females in medium sized metro areas saw no annual change in FAS from 2005-2010 (RR 0.9992, p=0.98), but a sharp increase to 32% per-year from 2011-2016 (RR 1.3202, p=0.0001). Based on the observed increase in FAS among women, future research should look into the reasons behind the sharp increases in the rate of FAS by women across the United States, particularly in more urban areas.

Dr. Russell Griffin, Elizabeth Snyder, Anna Grace Murphy, Lakin Luckie, Drew Crenshaw, Andrew Waldrep

Tea Consumption, but not Coffee or Alcohol Intake, is Associated with Glycemic Control of Adults Living with HIV

Despite increased lifespan with antiretroviral therapy, people living with HIV (PLWH) bear a 3.8% higher prevalence of diabetes compared to the general adult population. Intake of coffee, tea, and alcohol is associated with diabetes control in the general population. Therefore, our objective was to evaluate the association of these beverages with diabetes-related health outcomes of PLWH age ≥ 50. We recruited 60 PLWH age ≥ 50. All participants completed 24-hour diet recalls on three separate days with staff using ASA-24 Automated Recall System. Coffee, tea, and alcohol consumed, along with complimentary condiments, were converted into standard serving sizes. Glucose levels were measured using the Stanbio SIRRUS analyzer, hemoglobin A1c using the Siemens DCA Vantage system, and triglyceride levels using a lipid panel. Wilcoxin-Rank Sum Test and Spearman Correlations were used to investigate the association of beverage intake with laboratory values (blood glucose, hemoglobin A1c, and triglyceride levels). Median age was 54.5 years (range 50-68); median BMI was 26.9 kg/m2 (range 17.8-42.5). Overall diet quality was poor with a median fiber intake of 16 gm/day, and only 21% of participants consuming
recommended dietary protein levels. Twelve participants were diabetic (20%), 23 consumed coffee (38%), 27 consumed tea (45%), and 13 consumed alcohol (22%). Median blood glucose level was 92 (range 61-224); median hemoglobin a1c level was 5.8 (range 4.2-9.3); median triglyceride level was 142.5 (range 48-776). Greater tea intake was associated with lower hemoglobin a1c (p = 0.04). Median total sugar serving was 5.1 (range 0-28.3). Once total sugar servings were controlled for, no additional trend was observed between the beverages studied and laboratory values. Pre-existing diabetic conditions did not influence the effect of tea, coffee, and alcohol intake on diabetic control. Despite a small sample size, tea intake was associated with lower hemoglobin a1c. The significant amount of sugar added to these beverages possibly negates the health benefits of consumption. Nutrition counseling on appropriate condiments for these beverages could benefit PLWH. Further studies with larger sample sizes are needed to examine the impact of coffee, tea, and alcohol on glycemic control.

**Yang, Leila; Overton, E. Turner; Willig, Amanda L.**

**Physical and Applied Sciences:**

**2-D PEROVSKITES EFFICIENCY IN SOLAR CELL USE**

In recent years, 3-D perovskites have become a subject of much acclaim within solar cell research. 2-D perovskites have been largely ignored in these discussions, despite extensive similarities between the two. By testing different thicknesses of 2-D perovskites response when exposed to light and current, researchers were able to determine that 2-D perovskites are in fact very efficient when used in solar cells. The conclusion found was that 2-D perovskites may even be more efficient in solar cell use than 3-D perovskites. Potential next experiments could include a direct comparison of 3-D and 2-D perovskites or testing 2-D perovskites when used in real world solar cells.

**Thomas McCutcheon, Emily Johnson, Jas Foksinski**

**Comparison of Single Point Raman and IR Spectra of Microparticles and Exosomes**

Microparticles and exosomes are two extracellular vesicles that are released from cells during stress and in the case of red blood cells, hemolysis. Microparticles are derived from the plasma membrane of the cell and are typically 200 to 1200 nm. Exosomes are byproducts of exocytosis and typically 30 to 150 nm. The production of these extracellular vesicles in blood stored for transfusions are “associated with adverse effects and potentially immunosuppression in blood transfusion recipients” (1). Being able to differentiate the two is relevant because exosomes are related to having more toxic byproduct effects. Two of the methods we are using to differentiate between these extracellular vesicles are single point Raman spectroscopy and single point IR spectroscopy. One of the major differences between IR and Raman spectroscopy is that Raman requires a change in polarizability of the molecule while IR requires a dipole moment change. Both spectroscopy techniques are utilized to compare the spectra and determine whether
the different spectroscopy methods provide different information in distinguishing microparticles from exosomes.

John Kim, Christian Skinner, Shaiju Nazeer, Amareshwari Konutham

Silica-aided formation of vanadium oxide nanofibers
Silica-aided formation of vanadium oxide nanofibers Amanda Duplain, Andrei Stanishevsky University of Alabama at Birmingham Vanadium (V) oxide (vanadia) is an interesting material for catalyst reactions, gas sensing, and thermal imaging. The amount of surface area of a material can affect the performance of chemical devices, and vanadia is a brittle material that normally exists as a powder. Powder can pack down on itself decreasing surface area or it can be swept away decreasing amount of material present. Preparing vanadia as nanofibers can increase the surface area of accessible material while combining vanadia with silicon dioxide (silica) can increase the mechanical integrity of the nanofibers. Vanadia/silica nanofibers were produced from viscous precursors containing vanadia and silica precursors, a compatible polymer, and ethanol as a solvent. The fibers were fabricated via AC-electrospinning with AC voltages up to 36kV RMS. Collected fibers were annealed at temperatures between 450°C and 600°C. Fourier-Transform Infrared spectroscopy, X-Ray diffraction, and Scanning Electron Microscopy (SEM) were used to analyze the calcined fibers. Observed in SEM images on and inside the nanofibers were rod and needle-like vanadia crystal structures. Vanadia crystals’ morphologies, bonding, and oxidation states depend on the vanadia/silica ratio and annealing temperature. AC-electrospun vanadia/silica composite nanofibers exhibit fixed vanadia crystals on a strong, flexible silica matrix that may have catalyst, gas sensing, and thermal imaging applications.

Amanda Duplain, Andrei Stanishevsky

Service-Learning:

abstract
Over the course of the semester, our English 101 service learning class has studied the effects of technology over multiple generations. Through a variety of sources such as sherry turkle’s Alone, Together and Cyber Seniors, we were able to see how the youth is more fluent than older generations when using technology. Turkle explains how the youth uses technology in nearly every aspect of their lives. From research to social interaction, Turkle believes that the youth has become dependent on technology, due to its evolution over their lifetime. Although this difference has divided generations in the past, through cyber seniors we were able to connect both baby boomers and millennials. Cyber Seniors connects the two generations through a program that allows senior citizens to interact with younger students who can help them become more literate with technology. Although the students in the program are not experts, because of technology’s role in their everyday lives they’re still able to assist older generations in the cyber seniors program. The program tries to keep a consistent pairing between student and senior, so a relationship can form between the two and the senior can ask any questions needed. Despite having a different senior each week, students were still able to educate any senior at any skill level.
Through our own experiences and research, we found that technology holds the potential to positively affect people’s lives across generations. At any skill level technology can not only be used for texting and social media but as a gateway to the rest of the world.

Anthony Riggans, Davis Street, Rachel Day, Laura Bullock, Tommy Bishop

Understanding Food Insecurity Through Blazer Kitchen
Food insecurity is a widespread problem resulting in times of hunger for the majority of people worldwide, often times in developing countries. Even amongst developed countries, we can find individuals who are food insecure. Many of those individuals who are overlooked when thinking about food insecurity are college students, employees, and faculty. Here at UAB there is a community of people that suffer from the same predicament as many people around the country and across the world. In attempting to combat the rise of food insecurity amongst our own colleagues and staff, an on-campus food pantry was formed known as Blazer kitchen. Supplied with nutritious fresh, frozen, and nonperishable food, as well as personal hygiene items. The organization focuses primarily on combatting food insecurity within the community, as most the stock consists of food items. The personal hygiene items that are available are smaller in quantity but still help the cause in aiding those in need. Blazer kitchen aims to increase food security among the UAB community by providing an open pantry to those at risk. Since its establishment, Blazer Kitchen has provided over 100,000 meals to 855 students and employees at risk for food insecurity. As volunteers at Blazer Kitchen, we were able to assist in the day to day operation of the program be a part of the effort to increase food security in the UAB community. Our duties included stocking shelves, assisting shoppers with their needs, and bagging the items that were chosen by the shoppers.

Dustin Acreman, Luke Vise, John McDonald, Samer Assad, Deontae Davis

Connecting Generations
The volunteering program that we worked under was the Cyber Seniors program. Our group had two tasks to do since there were some scheduling issues, but nonetheless, the different tasks expanded our experience in volunteering. With the first group, they worked with senior citizens and assisted them with their technological needs and questions. The other group, on the other hand, volunteered to communicate with donators and thanking them for their contributions for the Collat Jewish Senior Center. The experience with teaching the seniors was exhilarating. At first we did not know what to expect from this involvement, and we were curious on how much of a difference the interaction with technology between us and the elderly would be. The first couple of lessons were a bit of stressful because we had to learn to be patient with the elderly, but we ended up enjoying the experience. Our time with the seniors eventually came to a close and by the end of the volunteering, we connected generational gaps through the use of technology. During the other group’s volunteering, they interacted with callers who have donated to the Collat Jewish Senior Center. Throughout their time, they had to thank those people for making such a generous contribution and had to maintain an
upbeat attitude. By the end of their volunteering, this group had honed their communication skills, through the various caller interactions, and achieved a more positive outlook on the world. Our time throughout this volunteering journey has taught us to be more understanding and patient with people and grateful for the kind acts that people do, whether it be big or small.

Andrew Le, Jack Sewell, Hastin Crosby, Ty Davis

Birmingham’s Toxic Secret

Founded in 2009, the Greater Birmingham Alliance to Stop Pollution (G.A.S.P) is a nonprofit organization that aims to reduce air pollution in Birmingham, Alabama. They advocate for all Alabamians’ right to breathe clean, healthy air. Students in PUH 333 partnered with G.A.S.P. to compare air quality at the University of Alabama at Birmingham to the ABC Coke Facility located in Birmingham, Alabama. This location was chosen because ABC Coke has been known to be a huge contributor to air pollution in the Birmingham area. The research done was focused on measuring the magnitude of the problem and how it compares to the air that UAB students breathe on a day-to-day basis. It was found that the pollution that ABC Coke is emitting is unhealthy and toxic to the community around the facility. Not only did the students help G.A.S.P. in measuring air quality, but they also helped the organization in tabling and outreach events. At these events, some people would instantly associate the organization’s work with politics. However, G.A.S.P. tries to stay as politics-free as possible and advocate for the overarching issue, the fight for clean air for everyone.

Megan Richard, AJ Brown, Brandy Crawford, Daniel Hannigan, Diamanise Sldberry

Technology’s Effect on Our Lives and Ability to Form Meaningful Connections

Technology has become increasingly integrated into our daily lives. Younger generations have become separated from other generations by the advances in technology. Cyber Seniors is a community outreach program through Collat Jewish Family Services (CJFS). The goal of Cyber Seniors is to bridge the gap between younger generations and older generations by making technological connections. Cyber Seniors pairs younger people with elders to teach them how to use simple technologies based on individual skill sets and interests. Throughout the experience we would write discussion post about our weekly volunteering, read books, and write essays about the effects of technology on individuals. Between volunteering and writing essays, we as individual students learned not only how to become better writers but better versions of ourselves. We formed real connections and gained new insight into both our own life and our paired senior. Not only were they patient with us, but we had to be just as patient with them. It showed us how to be gentle and not be as quick to aggravation. Overall, it gave us a sense of admiration and respect for the seniors who took the time to come out and learn, and the relationships we formed allowed for a greater understanding of the course writing assignments, which were focused around technology.

Angus Black, Ty Blakely, Tia Brown, Sarah Green, Katie Vass
**Magic City’s Fight Against Food Insecurity**
Food security is the state of being without a reliable source of food or going periods of time without consistent access to nutritious food due to lack of resources. While there is still a great need to close the gap for food security among UAB’s campus, the goal is to provide healthy, sustainable food and resources to UAB employees, students, patients, and their families. Our mission was to take part in a hands-on approach in service learning to understand food security, its importance and what UAB does to help. The key points to fight food security is food availability, accessibility, acceptability, adequacy, and taking action. Volunteers provide fresh non-perishable foods and education to the food insecure population. The help of community resources like monetary donations and food continues to increase food security in the UAB community. A challenge that was faced is food is distributed by way of donations which limited amounts can be given.

*Jaden Metts, Latasha Banks, Raddae Chew, Oumou Diabate, Kyra Williamson*

**Bush Middle School Book Drive**
Literacy is one of the most important skills when it comes to personal growth and education development. Based on the data provided by the Literacy Council in central Alabama, there are about 93,000 illiterate adults in Alabama. The data showed that low literacy skills have a direct impact on crime, recidivism, poverty, teenage pregnancy and substance abuse. Therefore, literacy level among teenage students are crucial in their future. In order to target illiteracy in impoverished areas of Birmingham, we partnered with Bush Middle School and – with the help of 38 private donors – collected books related to science, technology, writing, and test preparation in a large scale book drive. A survey was conducted on 34 willing donors in order to gain insight into they types of books received, and to ensure that a wide variety of book genres were represented in our donation pool. A survey was also conducted on 31 underserved middle schoolers in order to gauge the need for certain types of books.

*Zahrah Abdulrauf, Lan Wang, Abbi Long*

**Planning and Hosting UAB’s Middle School Math Tournament**
Once again, under the leadership of Science and Technology student, the UAB Middle School Math Tournament took place on November 10, 2018. The goals for this year’s tournament were to maintain a healthy amount of competition, bring in new schools, and introduce the new “8th Grade Advanced” category while continuing the tournament’s initiative of spreading the love for mathematics. The road towards a successful tournament started in the Spring 2018 semester with brainstorming and designation of roles to facilitate tasks with ease. Having partitioned the workload out, we started the planning process during the summer, and concluded midway that a spring tournament would be ideal, and eased off the gas pedal; however, after reconvening in the fall semester and consulting teachers from participating schools of their opinion, we determined that a fall tournament would have a greater turn-out, and put the pedal to the metal, so to speak. The planning process occurred over a four-month period in which both teacher and sponsors were contacted, tests were written and edited, and materials, funds, and volunteers were gathered. The day of the tournament, we received 304 of the 312
anticipated participants, provided the teachers with refreshments, and the volunteers were given a t-shirt, and breakfast or lunch, depending on the shift. Success and improvements were measured through a survey given before the award ceremony and compared to the previous year’s. Overall, through the leftover funds and growing success, the tournament will be supported and become another part of UAB’s legacy.

Adam Aldaher, Katie Dietz, Alice Kim, Dhruv Singh, Reed Smith, Saikrishna Sriram

GASPing for Clean Air
The air we breathe in fuels our cells to help us function and produce energy for our day to day lives. Good outdoor air quality is fundamental to our well-being. Pollutants in the air can affect not just breathing. This can interfere with drinking water and some pollutant have been found to make its way into houses and crops. Having unclean air can hinder young children from proper development and can also contribute to neurological conditions, damage to the cardiovascular system, and can take a toll on the respiratory system. Without air, there would be no life. Therefore, having clean air is imperative for humans so we can continue to live healthy lives. Sadly, it has been found that some areas have better air quality than others. It has also been found that the areas with bad air quality have less income and are mostly urban areas. Our group decided to see exactly which area had better air quality. What were the similarities and differences? Who were the people living there? With this project, we were able to test air quality throughout the different areas in Birmingham, AL. We initially started out with getting our air quality statistics with ABC Coke in Tarrant, AL. We later received air quality statistics from Homewood, Vestavia Hills, and Leeds. Per the result we found that the air in Tarrant, AL proves to be of lesser quality than the air in the Birmingham areas that were tested.

Dorian Alexander, Kenisha Thrower, Prital Patel, Zakez Jones

UHP Group #4: Red Mountain Stories: A Glimpse of Redmont Park
For our project, we are designing a pamphlet about Redmont Park and highlighting a few important houses known for their historical architecture and retelling personal stories of present and past residents to illustrate the rich history of this neighborhood. One of our biggest resources has been a woman named Cathy Adams who donated the book she wrote on Redmont Park to our research group. Because of this huge resource and the fascinating stories we found within, one of our main goals has been to make the information in this book more accessible to people across Birmingham. Understanding the building of Redmont means understanding the construction of Birmingham itself. Upon our research, we found many influential individuals who greatly impacted the history of Birmingham, so by highlighting these people and their lives we hope to provide our audience with a greater appreciation and understanding of the city’s history. In order to complete our project, we contacted Redmonts neighborhood association, attended the neighborhood fall party, contacted homeowners via social media to encourage them to submit stories about their houses, utilized public records from the Birmingham Public Library Archives, and dug deep into Cathy Adams’ book. Our research revealed a history of this neighborhood that ranges from the mundane to the extraordinary. This history
is not lost on the current residents of Redmont Park; in fact many residents believe this appreciation for their neighborhood’s rich history should be mandatory in future owners. By selecting only a handful of the multitude of homes in Redmont Park, we were able to create a more focused, detailed tour of each home that we wanted to bring to life. These homes encapsulate the charm and significance of Redmont Park, and we hope to make our compilation of stories and findings accessible to residents from all over Birmingham so that this neighborhood’s history is remembered.

Kenley Bradshaw, Norah Madden-Lunsford, Daniel Picard, Leopold Nkengbeza, Garrett Carter, Meghana Jamched

Improving Water Quality on the Coosa River
For this service learning project, our group set out to assist Coosa Riverkeepers in their day-to-day operations and their goal to further assess water quality on the river. This is important because many people who live on the Coosa River rely on it for food which can be dangerous because of the pollution. Our work with Coosa Riverkeepers attempted to help them collect data and gain community support. While we completed various projects for the organization, our main project was to create Secchi disks which would then be sent out to residents on the river to test water clarity on a weekly basis. Through our work, we learned of the importance of community partnerships between the nonprofit organization and the residents they serve, since it would be nearly impossible for Coosa Riverkeepers to collect all the data without the help of residents. We also learned of the importance of Coosa Riverkeepers since their work aims to improve water quality and as a result, improve the quality of the fish which are a major food source for many people living on the river.

Katherine Higginbotham, Hannah Magnuson, Sherwin Marashinia, Wilnadia Murrell, Julia Rowe, Hassan Sadruddin, Olivia Scogin

UHPGroup9: The Complicated Nature of Helping
Crestline is a quiet, residential neighborhood spotted with restaurants and parks and is located in Birmingham, AL between Mountain Brook and Irondale. Throughout this affluent neighborhood, there are several churches spread throughout the area and a mini-park that is only accessible by foot. For all the community members we contacted, we used carefully planned scripts to introduce ourselves and tell the community we were willing to volunteer with them. If the community members were unavailable, we left a message and followed up 2 days afterwards with another phone call. We initially attempted contacting the Crestline neighborhood association and several churches, libraries, and a school. Our attempts to contact the neighborhood association and the school were to no avail; however, we succeeded in getting in contact with several churches and the library. Sadly, our plans to help the churches do canned food drives and a short day-care like program for children one evening to allow the parents to take some time off both failed as the churches already had canned food drives and we lacked the medical experience to watch over the children for one evening. Finally, the library claimed that they were too small of an organization to conduct neighborhood activities. In conclusion, we were unable to help the community in a meaningful way, as there were no pre-set projects and it was difficult to get in touch with several people. However, we learned several
important lessons while attempting this project, including valuable communication and trust-building skills.

Bhavana Bathina, Johnathan Roth, Hemant Srivastava, Sydney McGowan, Victoria Nicoll, Anthony Knighton

UHPGroup#3: Highland Park Surveying
The purpose of this project is to identify and document the problem areas found in the Highland Park Neighborhood in Birmingham, Alabama. A questionnaire was distributed to the members of the neighborhood. A paper copy of this survey was distributed their November Neighborhood Association Meeting and an online copy of this survey was distributed via email to other members of the neighborhood association. The members of the neighborhood were asked to specifically list problem areas they saw that had any dilapidated houses, graffiti, or sidewalks. These three types of problem areas were chosen after attending the October Neighborhood Association Meeting and hearing the concerns of those who attended the meeting. Once the data was collected from the surveys, it was compiled into an excel spreadsheet. Photographs were taken of the problem areas the members of the neighborhood listed. A virtual map was created of the neighborhood with the problem areas referenced. The problem areas can be clicked on and a photograph of the area will be shown. This viable resource, along with the excel spreadsheet and actual survey, will be presented and handed over to the Highland Park Neighborhood Association at their December Neighborhood Association Meeting.

Meghan Liskey, Ahmed Farrukh, Chris Anderson, Madhuri Molleti, Kaylie Adcox

How Technology Shapes the Identity of Different Generations
Participating in Cyber Seniors, a program in which adolescents educate seniors on how to work their electronic devices, has allowed us to understand the significant influence technology has on society, specifically adolescents. Younger generations tend to rely on their phones to communicate with others through texting and social media; this constant connection to others has made it more difficult for people to develop their own identities because they try to mimic what they see in the media. Because the seniors did not grow up with technology, they find it hard to understand the necessity of it for communication and the development of adolescents’ identities. Technology is vital to stay in touch with the news, family, and the world, and seeing how it benefits adolescents makes the seniors want to learn more about technology. The seniors primarily wanted to learn the communication aspect of technology in order to interact with their families more efficiently. While we taught the seniors how to use technology, we also formed relationships with them that helped each of us understand each other’s generation better. Our ultimate goal consists of demonstrating how Cyber Seniors has helped us understand technology’s influence on different generations, especially when it comes to our development, and how this influence projects onto our writing.

Bresia Boyd, Moricea Knop, Spencer Tidwell, Tuba Khan, Udit Shah
Prevalence of Common Morbidities Among the Homeless Men in the City of Birmingham, Alabama

Introduction: More than 5 million people are homeless in the United States, and roughly 54% of the homeless population does not have access to healthcare. The firehouse shelter in Birmingham, Alabama provides healthcare screening services to homeless men living in the area. Methods: A total of 255 homeless men were seen in a period of 18 months. Data were collated and analyzed for the prevalence of common morbidities, which include vision problems, substance abuse, mental illness, diabetes, hyperlipidemia, hypertension, and gastrointestinal issues Results: 30.6% of the homeless men population had vision problems. The prevalence of mental illness was 50.5% (7.8% for anxiety only; 11.4% for depression only; 31.4% for both anxiety and depression). 36.0% of the population reported having substance abuse problems. 9.0% of the homeless men had diabetes based on glucose levels. However, 17.3 % of the homeless men had diabetes based on HbA1C levels. 75.3% were diagnosed with hyperlipidemia and 75.3% with hypertension. For gastrointestinal issues, 19.6% reported stool inconsistencies and 8.3% reported nausea. Conclusions: The prevalence of common morbidities is high in the local homeless men. Many of the health complications faced by these homeless men could be prevented by providing an improved healthcare service.

Mark Jeon, Courtney Carraway, Gyusik Park, Stephanie Diel

Money Does Not Mean Healthy: A Comparison of Early Care and Education Center Diet Quality Between Groups of Differing Income Status

Children from low-income families have increased risk for obesity potentially due to limited access to high diet quality foods. Fifty-five percent of 3-5 year olds attend Early Care and Education (ECE) where most of their daily intake occurs. Thus, obesity prevention strategies focus on ECE diet quality. Studies identified family income status as a predictor of diet quality of the ECE; however, income status was defined by maternal employment and education, which may not best depict income status. The purpose of this study assessed whether diet quality differed among low and high-income ECEs, using median household income. Researchers recorded food items and amount consumed during lunch for 3 randomly selected children in 34 ECEs. Menus were collected from this day. Healthy Eating Index (HEI) scores were calculated for both consumed and menu data. HEI scores range from 0-100 and indicate diet quality. ECE directors estimated the median income of the families. Non-parametric t-tests compared HEI scores between income groups. Percentages were reported for income group ECEs that met the cutoff (≥50 HEI score). Menu and consumed HEI scores did not differ among income status. A larger percent of high-income ECE met the cutoff for foods/beverages listed on the menus (92% high-income; 75% low-income). However, larger percentages of low-income ECEs met the cutoff for what was consumed (25% high-income; 60% low-income). As low-income children may receive most of their food at the ECE, research should explore consumption among the entire day to understand if diet quality differs among income status.

Rachael Hildebrand, Molly Dixon, Samantha Baghal, Kaile Allen, Elizabeth Kroeger, MS, RDN, Brenda Bertrand, PhD, RDN
UHPGroup20: Exploring Five Points South: The Anderson District

The community living on 15th avenue south is very different than most streets surrounding UAB, due to mostly owned rather than leased properties. The community wants to highlight that it’s possible and even preferable to live and own homes down town. The area immediately surrounding UAB does not have the reputation as the ideal place to raise a family and the community wants to combat that reputation. The event was advertised through the neighborhood Facebook page and it was ticketed with prizes from local sponsors given throughout. The community would like to use the funds to buy an entrance sign for their street highlighting its historical nature. Our group plans to assist in the planning and facilitation of a Five Points South Community Day/Fall Festival. The community day will consist of guided home tours, a pumpkin carving competition, and children’s activities. The community has sought out sponsors from local businesses such as restaurants in Five Point South, Regions, Alabama Art Supply, etc. The results support the idea that hosting a community-based event such as the Five Points South Community Day/Fall Festival can increase the sense of community for people who live in the area. The event showcased many historic houses in the Five Point South community. By increasing recognition of home owned houses, the Five Point South community highlights the significance of community-based events in increasing sense of community in their neighborhoods. The success of this event may be an example for other neighborhoods in the surrounding areas.

Rana Haggag, Alex Mueller, Kristina Skinner, Henry Kendrick, Wendy Chen

Bridging the Generational Gap

Technology has become an immense part of our daily lives. In our English 101 course, we focused on the theme of technology and how it affects our identity. We, as college students, grew up with technology ingrained in our lives, and using smartphones and the Internet felt like muscle memory. Through our service learning project with Cyber Seniors, we were able to apply our knowledge of technology by teaching older citizens how to use their smart phones and other technological devices. We met weekly with our Cyber Seniors groups for one month to teach them about technology and answer any questions they may have had. Communicating and explaining this technology to someone who did not grow up with it allowed us to realize the impact technology has had in shaping our identities. Learning to communicate this feeling aided not only our lives but our writing as well. Throughout the semester, we wrote several papers discussing various aspects of technology and the immense impact it has on us. Through our writing, we focused on analyzing various aspects of technology and determining how it affects people’s identity. Our Cyber Seniors group allowed us to see just how much the prevalence of technology has changed the way we think, and it helped our writing to be more in depth and effective. Through this experience, we were able to bring two different generations together as one through technology and improve our writing as well.

Lilly Peete, Holli Traffanstedt, Tykendria Lee, Anna Grace Murphy, and Carmen Williams

Blazer Kitchen
The Birmingham area is overrun with individuals that struggle with food security, meaning they lack access to healthy and nutritious food. Blazer Kitchen is a program funded by the Benevolent Fund that seeks to reduce levels of food insecurity amongst UAB’s faculty, staff, and student body. Blazer Kitchen provides free, healthy food to those who have signed up for the program, enabling its shoppers to not have to worry about where their next meal is coming from. Blazer Kitchen relies largely on volunteers as a source of their labor; volunteering serves to tighten the bond of the UAB community as volunteers help the fight against food insecurity by refine each individual shopper’s experience with Blazer Kitchen. Our collaboration with Blazer Kitchen largely entailed helping stock shelves, helping customers shop, and checking customers out. We found that going to a food bank can be an intimidating experience for first time customers, and being able to be welcoming and helpful to the Kitchen’s shoppers improved their experience at Blazer Kitchen. Ultimately, our time at Blazer Kitchen gave us insight into the lives of those struggling with food security and we were able to aid the shoppers with reducing their own levels of food insecurity.

Camila Garcia, Brenna Urbanski, Tia Wells, Lowrey Young

Blazer Kitchen: A Food Resource for Everyone
The PUH 333 Food, Water, and Air class taught by Professor Heather Lee participated in a service learning project through Blazer Kitchen. Blazer Kitchen is an on-campus food pantry sponsored by the Benevolent Fund that serves students and faculty. Each participant was required to volunteer a minimum of 20 hours. Tasks included food delivery, stocking shelves, and engaging with shoppers. Volunteering through Blazer Kitchen gave insight to food insecurity on campus and brought deeper understanding to strategies that combat food insecurity in a non-stigmatizing way. We learned to treat clients with dignity and respect and to provide them with an experience as close to that of shopping in an actual grocery store, in order to avoid the stigma associated with getting supplies from a food pantry. We found that Blazer Kitchen relies heavily on donated items. We also found that Blazer Kitchen provides an authentic grocery shopping experience just like any other grocery store, except shoppers do not have to pay. Our findings suggest that food insecurity does not have to come with shame. Through providing an environment where clients know they are welcome and not judged, we can increase food stability for our UAB community. This in turn increases overall health for those who may be struggling to afford food that provides them with adequate nutrition. Students and employees who come to class or work properly nourished are better equipped to be more successful.

Jennifer Borba-Lindsey, Sarah Franklin, Kennan Gawlowicz, Retsat Kromtit, Jennifer Lopez, Pierre Messanh, Sloan Oliver,

Reading for Renewal: Prison Library Revitalization
AIM, Aid to Inmate Mothers, is an Alabama non-profit committed to implementing inmate personal growth opportunities and strengthening the bonds between incarcerated women in Alabama prisons and their children. In conjunction with their prison education initiatives, AIM plays a large role in providing both fiction and practical literature to prison libraries across the state. A multidisciplinary team of students in criminal justice, psychology, and social work worked with an AIM
representative to inspect, rehabilitate, and categorize over 1500 donated books. Marking the books for different correctional facilities required careful consideration of inmate and facility needs. After categorizing and sorting the books marked for three Alabama correctional facilities, the student team was able to accompany an AIM representative on a visit to Birmingham Women’s Community Based Facility and Community Work Center to tour the facility and deliver the books. Prior to the team’s visit, the inmates in this facility had not received new reading material for more than a year. The books delivered will be used as leisure reading and as resources for multiple classes, such as parenting and GED courses. Students were able to see firsthand the importance of development programs in correctional facilities, in addition to creating a needed impact in Alabama prisons.

**Camille Elmore, Nicholas Gish, Chase Pilgrim, Noah Holly**

**Inmate Mothers Need for Children's Books**

Our project outlines the importance of literature availability within community correctional facilities. Many correctional facilities within the United States do not have a sufficient collection of reading materials. Our goal with this project was to provide books of all genres to the women at Birmingham Work Release and Julia Tutwiler Prison for Women. We met with a community figure, who works with Aid to Inmate Mothers, and we organized books donated from local libraries and churches. Over the course of four weeks, we met as a group and cataloged several hundred books, sorted them into categories, and labeled them. The last time we met to organize books we also worked on refurbishing children’s books by removing any unnecessary labels and making the books look as new as possible. Once we had all of the books ready, we were fortunate enough to deliver the books personally to Birmingham Work Release. We had a chance to tour the facility and briefly interact with the women inside. Our poster focuses mainly on the need for children’s books in correctional facilities and how programs such as AIM contribute. We provide information about other organizations that work toward providing books for mothers to share with their children during visitations and we were able to get direct feedback from the inmates on receiving these books. This project has taught us about the importance of inmate mothers maintaining a connection with their children and how these books sustain that connection.

**Meghan Ballard, Alex Higginbottom, Makenzie Hall**

**Serving Meals and Great Feels: Blazer Kitchen**

The World Food Program defines food security as, "having availability and adequate access at all times to sufficient, safe, nutritious food to maintain a healthy and active life." It can be difficult to recognize when individuals and families might be dealing with food insecurity. Unexpected life events can lead an individual to food insecurity, and they may not know where their next meal will be coming from. In 2012, Alabama had the fourth lowest food security rate in the United States, with 18.2% of Alabamians experiencing low or very low food security. In Birmingham, about 40% of residents live in a defined food desert or state of food imbalance. Blazer Kitchen aims to increase the rates of food security among the UAB community. It does this by providing UAB students, employees, and patients with access to nutritious foods in a welcoming environment. In our service learning project, we were able to help
contribute to Blazer Kitchen’s effort. We unboxed and organized items on the shelves, and scanned and bagged items for shoppers. We also helped with other tasks around the facility by recording inventory and assembling meal packages. As of September 2018, Blazer Kitchen served over 113,997 meals. It provided resources for about 378 students and 477 individual employees. We found that not only does Blazer Kitchen provide necessary food and resources for many, but it also helps to create a strong sense of community among UAB affiliates.

Rozhan Ghanbari, Shalisa Hardnett, Shreya Pokhrel, Destini Walker, Camila Garcia, Holland Nguyen, Shweta Chawla

“UHPGroup#14: Starting Small and Dreaming Big: Increasing Access to Education and Service-Based Resources in Ensley With the Goal of Improving Health and Well-being in the Community”

As a practical application of the University Honors Program’s (UHP) annual theme, “Neighborhoods and Communities,” honors students were divided into groups of six to interact with Birmingham’s neighborhoods and to then develop a relevant service resource in a neighborhood. Group 14 chose Ensley, a large and formerly independent city neighborhood that was annexed into Birmingham in 1910 through “Greater Birmingham” legislation. Ensley once experienced economic and industrial success through the Tennessee Coal, Iron and Railroad Company (TLC). However, its decline as a community started when U.S. Steel bought TLC in 1907 and relocated out of Ensley, causing a major loss in population and economic activity. Today, Ensley’s many businesses remain abandoned and Ensley faces economic unrest. Group 14 began its involvement with Ensley through JCCEO St. Joseph Head Start Center. The daycare’s faculty expressed their need for better educational opportunities for local parents to learn about nutrition, overall health, and emergency preparedness (in cases of severe weather or neighborhood violence). Through workshops for parents associated with the JCCEO St. Joseph Daycare, social workers at the daycare hope to improve the overall health and well-being of children in the home setting. Group 14 decided to design two workshops for the daycare. The first workshop will be on “Health” and will offer suggestions on how families can be healthier through exercise, diet changes, reduction of drug usage, and managing mental health. The second workshop is on “Emergency Preparedness” and families will be informed on what they must do in dangerous scenarios.

Simona Shirley, Alice Grissom, Olivia Oh, Sam Shields, Vaishnavi Mantraratnam, Michaela Slocum

Make Prisoners Humane Again

According to New York Times in 2016, 60% of women incarcerated in state prisons have children under the age of 18. In an effort to keep female inmates connected with their children and families, we assisted Aid to Inmate Mothers (AIM) in helping the inmates in making holiday greeting videos to send to their family members. AIM provides services to incarcerated women with emphasis on enhancing personal growth as well as their relationships with their children. While spending time with these inmates, we were given a reminder that inmates share the same emotional depth that we experience. Imprisonment makes one seem less humane to an outsider. Through filming these videos, we were able to observe their mannerisms and expressions while they spoke to their families. By understanding these prisoners,
we will better understand the interactions between the inmates and their family members.

Carley Blankenship, Lexi Stover, Maria Granados, Alana Murphy, Melanie Garcia

**Mother's Matters**
The U.S. is the only country that incarcerates more women than any other country. Many women in prison are mothers and take up most of the prison population. These mothers are often the primary caregivers to their children which leaves the child to suffer as well. Their children grow up having to look to someone else for motherly needs. The students of UAB and AIM have partnered with the Birmingham Work Release to make sure that these mothers can still communicate with their families and let their children know they are loved. The experience bridged the gap between society and incarcerated women. Our mission was to help the women make meaningful videos for their family members. We filmed appx. 28 women of Birmingham work release. In those videos, the women shared their feelings and how they were to see their families. The videos gave them the ability to reach out to their families and be able to share an experience for the holidays. We edited the videos to the best of our abilities to send off to their family members. The films helped the women reconnect with family members that are not able to visit them. The women of Birmingham work release, UAB, AIM, and the women family members were all able to receive a great impact from this experience. We all were impacted by the intimacy from the films that were recorded of the women at Birmingham work release.

Kay Williams, Ma'Hogany Lee, Ebony L. Ellis

**Connections in Corrections**
The purpose of this project was to help prisoners maintain healthy relationships with their families while incarcerated. Prior literature has demonstrated the importance of support from families and helps the inmates maintain ties with society. We partnered with the non-profit organization Aid to Inmate Mothers Inc. and video recorded forty-five women inmates giving their families personal greeting messages. The video recordings were the only form of communication some inmates had with their families. Giving the inmates the opportunity to send personal videos to their loved ones uplifted their spirits after recording. The videos were burned to DVDs and then mailed to the families in the community. There was a noticed change in their attitude when they were finished filming. It was apparent that the inmates wanted to have strong connections with their children even though they were separated by incarceration. We personally were impacted by the transparency that they displayed while recording. Their openness to display their emotions showed us how these inmates are humans and have the same feelings as those who are not incarcerated.

Kenya Harris, Alexis Reese, Anissa Carpenter

**Mothers Need a Friend Indeed**
According to the Prison Policy Initiative report, more than 80% of women in jails are mothers and are the primarily caretakers of their children. With the help of Aid to Inmate Mothers (AIM) and Birmingham Work Release we were able to connect these women to their families in time for the upcoming holidays. As students of University
of Alabama at Birmingham majoring in Criminal Justice, we were thrilled to be a part of such an influential service learning project. At Birmingham Work Release, we filmed approximately 28 home videos, they were all edited, burned and mailed to the inmates’ families. After completing this service, our perception on inmates, especially females' inmates, was changed. We developed a sense of empathy and understanding of all the women we encountered during this experience. We experienced the inmates becoming vulnerable for the stake of their children.

**China Lawrence, Kim Davis, Jamie Flowers, and Sade Dumas**

**Understanding Women who are Incarcerated**

The nation’s increasing prison and jail population has raised important questions about the effects of incarceration on children and families. It is clear that incarceration disrupts positive and nurturing relationships between many parents, especially mothers. This service learning project highlights an organization that focuses on such; as well as how we, the students, supported this program and our reflections from the experience. We recorded video messages for the inmates to send to their children and families and supplied materials for handwritten cards for them to make. We formalized these videos and prepared the packages to be sent off to the families of the incarcerated. Research suggests that maintaining and strengthening family connections with incarcerated parents can produce positive societal outcomes such as reduced recidivism and healthy child development. We hope by doing this service learning project, we have helped impact these women in a positive way by keeping them connected to their families and over time reduce recidivism. Our experience interacting with the inmates helped solidify our reasons why we have chosen a moral career path.

**Mercedes Davis, Brittany LeSerra, Qiandra Johnson**

**United Ability: Enhancing the G.I.G Program**

This poster will be on the non-profit organization United Ability, which is a program that assists people with disabilities. This poster will be focusing on how we design methods to better support the GIG program and address issues with the volunteer experience.

**Wilnadia Murrell, Ty White, Justin Griffis, Alyse Scotland, Hunter Brown**

**Facing Ambiguity Across Cultures with Culture Partners**

Our short-term goal was to foster cooperation, effective communication, and interpersonal relationships as well as understanding of each other’s cultures between each of the four Culture Partners. We originally planned to determine if having a theoretical background in the principles of intercultural communication would ease communication across cultural and linguistic barriers. To overcome false conceptions of other cultures, one must practice intercultural communication. While as an observational goal this did not entirely fulfill itself due to the fact that we could not provide a comparison or control, and this was not so much an experiment as a service learning partnership, we did find that some of the cultural skills outlined in such resources as Oxford’s (2013) framework did indeed apply themselves to our cooperation. The most applicable cultural skill was cultural adaptability; in times when cultural features surprised or disconcerted us, especially in terms of
communication styles, tolerance in ambiguity as a function of cultural adaptability was crucial. With all our anxieties, we had to be comfortable with the certainty of ambiguity of culture and custom in order to move forward. To sustain our project, we will partner with INTO. Each month, we will have one person present their culture and home customs including notes about daily greetings, kinship systems, celebrations, history, and conflicts. Our long-term personal goals are to use our new foundation in intercultural competency and dialogue for future projects and education, as well as to maintain our newfound connections with our culture partners.

**Jacqui Adan, Peng Sun, Hashim Al Abdullah, and Sam St. John**

**Team Phoenix - United Ability**
In the nonprofit sector, the motivation of the organization is mission/vision based. The standard statement of a mission defines the purpose of the organization and attracts potential sources of assistance. Nonprofits suffer from recurring hardships, such as lacking volunteers and raising funds for the organization. Unfortunately, the absence of support can disrupt the revenue balance and abandon those in need with no assistance. United Ability, nonprofit organization, works with people with disabilities “to provide innovative services connecting the disabled to their communities and empowering individuals to live full and meaningful lives”. By helping the organization restructure their volunteer program, we are contributing the participation of youth volunteers in normalizing disabilities. There is a discrepancy in the volunteer process because candidates are not completely aware of the program responsibilities. In honesty, dealing with disabled patients can be a workload individuals do not expect. Volunteers not only have to be compassionate and understanding but also careful in handling small children. Thinking strategically, how can the organization convince these volunteers that the program is the best fit and not a waste of time? The team project addresses immediate needs that transform into long term solutions. Volunteers are scarce, but application adjustments in recruiting volunteer personnel can prevent unreliable participants. Each year these solutions can be revised and conformed to suit the needs of the year.

**Kandice Baldwin | Brianna Brown | Felicia Coats | Adah Dale | Jarek Murdock | Sarah Roberts | Jay Rucks**

**The Well-being Innovation Team**
Students at UAB are advancing in every aspect of college life except for keeping up with their Well-being. This gap in knowledge of self-health or Well-being was thought to be present due to a lack of student involvement and this needed to be improved. To best accomplish this goal, a series of personal student focus groups and a final seminar were completed. These focus groups and the seminar provided a chance for student engagement as well as the opportunity for students to realize how similar their problems can be. In conclusion, the focus groups and seminar served as a means for learning how Well-being at UAB can be improved by the faculty and students. The knowledge from this Well-being Innovation Team Project will continue to be used to provide students with tools that they need to improve their Well-being. As a result of the project, students in the future at UAB will be able
to make connections with other students and faculty on the basis of Well-being. Those who need help will truly find it very accessible and informative as the Well-being Innovation Team continues to present information to fill student-indicated gaps as well as improve student Well-being involvement.

**Morgan Kurowsky, Everett Fucci, and Paras Ahuja**

**UAB Dance Marathon**

UAB Dance Marathon is an organization on campus that raises funds and awareness for Children’s Miracle Network Hospitals, specifically Children’s of Alabama. Throughout the year, UABDM hosts events, volunteers at Ronald McDonald House, and plans for the large Dance Marathon event in the spring. Our specific project focuses on two factors that contribute to a successful Dance Marathon: amount of money fundraised and member participation. The goal was to increase funds and active member retention rates in order to establish UABDM as an effective organization both on campus and in the community. In order to fundraise more money for Children’s of Alabama, monthly tabling events were held, and all additional fundraising opportunities were taken. In order to increase member participation, initial interest meetings were conducted, committee heads gave specific tasks to their members, and monthly volunteering was done at Ronald McDonald House (RMH). To track the progress of this project, biweekly data was taken on UABDM’s funds and member count on Engage. From August 15th to November 15th, member count increased from 0 to 80, and funds raised increased from $1300 to $2300. It was found that selling buttons was the best fundraising tabling event, doing promotional tabling was the best member recruitment event, and volunteering at RMH monthly was the best way to raise awareness about UABDM within the community. This knowledge can be applied to the spring semester, as UABDM continues to fundraise and plan for the big Dance Marathon event in February.

**Kristine Farag, Annabel King, Reagan Merritt, Aneesh Pathak, Natalie Presedo, Karen Wang**

**Technology and English Collide**

Throughout the EH 101 course, we have been tasked with writing various types of papers, helping our peers by analyzing their papers, and researching articles. In addition to these in-class activities, we have taken the course out of the classroom by partnering up with Collat Jewish Service Learning in order to reach out to the elderly in our community and teach them about modern technology. The collaboration with Service Learning, along with researching articles, has given our class an exclusive opportunity to directly observe how technology has impacted our lives, and overall changed the way we write.

**Darrick LaFrance, John, Christian, Joe**

**United Ability: Giving Is Good Program**

Originally called Spastic Aid, this organization was formally established in 1948. It was recently renamed United Ability to better reflect its service to persons with all types of disability and all ages. They offer a full spectrum of services not found statewide. United Ability decided to partner with us in hopes to restructure their
annual GIG Program (Giving is Good). My team and I used the TOWS Analysis to help in the restructuring of this program. Our TOWS will provide a strategic plan for this organization as well as to help aid in the GIG projects success. It includes suggestions on programs and processes to implement such as surveys, restructuring the website, incentives, and connecting with the locals in order to take this program to the next level.

Sarah Allison, Liranda Coleman, Aidan Ryan, Meagan Tally, Kimberly Thomas, Taj Warren

L.O.L: Learning On Line with Senior Citizens
Cyber Seniors is a program where senior citizens can learn about technology from teenagers and how to better utilize it in their lives. Not only to the seniors learn from the teens, but the teens can learn a lot from the seniors. Although the seniors can have expansive knowledge about many things, the majority of retired citizens don't have a clue on how to even text on a phone. This program gives an upfront look into the ever-present age gap and incomprehension between the elderly and the youth about technology. We can educate our seniors while forming a friendship along the way.

Kaitlyn Avery, Cael Barragan, Destiny Woods, Cailynn Postma

UHPGroup15Smithfield
The goal of this project was to highlight the historical significance of Smithfield and its role in black upward mobility. We investigated the progression of African American social status in the community over time and how this impacted this neighborhood and ones surrounding it as well using the public library archives and many other resources available to us. In addition to tracing the establishment of class distinctions for African Americans, we looked at the impacts of this upward mobility on neighborhood development. We talked with Dr. Pam King who is very knowledgeable of the Smithfield neighborhood, and attended a neighborhood meeting to get a better insight of not only the past of Smithfield but also the present of Smithfield. Our approach to this project was less about making a direct change in the community, and more of a way to improve individual pride for the members of the neighborhood. The overall impact of our pamphlet is to showcase the significance of Smithfield and give the members of Smithfield a sense of pride in their community and the many important people that come from that neighborhood.

Annisha Borah, Georgia Terwilleger, Hamad Muhammad, Christian Puzzo, Morgan Bryars, Cand aroline Niedergeses

Group 13: Over the River and through the Woods - Exploring Woodlawn
As millennials move into their lives as adults, the push to move into more urban, downtown neighborhoods has drastically increased. This is especially true in Birmingham, AL where there has been a complete revitalization downtown and some of the surrounding neighborhoods. Not only does this create a toll on some communities that are already in a financial hardship, but it breaks emotional ties that many of the original residents have with their homes. Due to the influx of people demanding to move back downtown to be located closer to their jobs, entertainment, and leisure, original community members are forced out. Woodlawn,
a community located in Northeast Birmingham, is one of many neighborhoods that has been affected by this sudden effort to revitalize the existing communities in the downtown area. However, many efforts have been instilled to prevent Woodlawn from becoming gentrified and rather remodeled. This allows the existing community to remain in their preexisting standing with their neighborhood while allowing new forms of industry into the community that will benefit the existing members. Various partners were collaborated with in this project to understand their role in the community of Woodlawn and how they have made an educational, economic, or any positive impact on the community of Woodlawn and its residents. Project members were questioned on why they decided to locate in the community of Woodlawn and how they have felt moving into a neighborhood that strives so hard to not become gentrified.

**Tyler Huang, Trina Lin, Emily Magda, Racquel McCrary, Mira Walker**

**Giving is Good Volunteer Program Management**
Each summer United Ability, through their Giving is Good (GIG) teen volunteer program, engages teens in the surrounding community to volunteer their time to work with the children in their Hand in Hand Early Learning Program. While this is a valued service opportunity for the teens and an exciting experience for the Hand in Hand participants, it remains a cumbersome process to coordinate the program. Our class has partnered with Lee Thrash, the volunteer coordinator, and United Ability to understand and craft a plan to address the issues within the GIG program to create a more efficient and engaging program. Ultimately, our project from United Ability as it was presented to us, was to create a better strategic plan for Lee Thrash for managing volunteer application and scheduling and increase volunteer quality and engagement-- all within a small budget. After researching the issues, our recommendations included volunteer management software, increased volunteer engagement opportunities, and partnering with another NPO. These recommendations led us to volunteer management software that incorporates application, scheduling, communication, and ongoing engagement. Additionally, through research and speaking with prior volunteers, we determined several recommendations to increase teen ownership in the GIG program that we believe will lead to higher quality volunteer recruitment and deeper engagement. Our recommendation for partnership is YouthServe, an organization whose goal is to facilitate youth leadership through community service. We believe there will be additional benefit from this partnership of a greater community awareness of both programs and their benefits.

**Amanda Boggan, Morgan Enloe, Ashley Headley, James Johannsen, Beau Keel, Aubre Martin, & Abigail Whitson**

**The STEM Excellence Program: Expanding Alabama High School STEM Engagement**
According to 2017 ACT surveys and scores, 52% of Alabama students indicate an interest in science, technology, engineering, and mathematics (STEM) majors and/or careers. However, 11% meet the requirement for STEM college readiness. Birmingham city school system’s non-charter schools are rated an average of 4.6/100 in college readiness. This leads many students who would otherwise excel in science
to fall below the curve and never experience what true science is and can be. The STEM Excellence Program was a week-long, scholarship-based program designed for high school students in the Birmingham area. The camp was held at the Southern Research learning lab in July of 2018. The aim of the program was to encourage primarily underserved and underrepresented high school students to pursue college majors and careers in STEM. This program was divided into three components. First, students engaged in hands-on laboratory experiments related to engineering, forensics, sciences, and biology. Secondly, scientists and engineers presented their fields to the students. Lastly, a novel aspect of this program was that the students were encouraged to talk with their undergraduate mentors. By pre and post surveys, it was assessed that students favored hands-on activities over lectures and mentoring. However, each approach was favored by some students.

Byron Cote, Julia Homola, Shriya Meesala, Lauren Moradi, Natalie Simpkins

Health Behavior Theories on Flu Shot Campaign

This project involved using the Health Belief Model (HBM) in order to create a successful flu shot campaign targeting the faculty and staff of UAB. The goal was to raise the number of flu shots administered in 2018 by the Occupational Health and Safety department at clinics. This was done by first reviewing the literature concerning flu shots as well as the HBM, interviewing the target population, and writing formal reports on what was learned in order to guide the campaign. Upon analysis of the results, it became clear that a perceived lack of time and or convenience of the shot was a major obstacle to those considering the shot. Strategies to raise the self-efficacy of the target population were then implemented, including group presentations at faculty and staff meetings, cues to action posted in specific areas around campus, and being present at various flu clinics. The results of this campaign illustrate that the utilization of behavioral science theories can, in fact, change negative health behavior in the general public.

Savanna Harlow, Ashley Frith, Lindsey Daniel, Elliott Hernandez, Marley Dunn

Simple Substitutions or Detriment to Diet Quality? The Impact of Lunch Menu Substitutions on Diet Quality in Early Care and Education Centers

Children ages 3-5 years old consume over half of their daily intake at Early Care and Education Centers (ECE). Studies have shown that these children are not meeting maximum Healthy Eating Index (HEI) scores, which represents how closely dietary guidelines are met. This could indicate poor diet quality (DQ). Understanding how to improve DQ in ECE centers is imperative due to its known relationship with childhood obesity. One study reported that 46% of lunches had menu substitutions, meaning items listed on menus were replaced, typically with lower DQ foods. It is unclear whether centers without substitutions served higher DQ meals and why substitutions were made. The purpose of this study was to assess DQ between centers that make substitutions (SUB) versus those without substitutions (NOSUB), and why substitutions were made. Trained researchers recorded the food items and amount served for lunch among 3 randomly chosen children from each of 34 ECE centers. Center directors self-identified if substitutions were made that day. Mean HEI scores were calculated for both SUB and NOSUB and t-tests were used to determine if differences existed with significance set at p<0.05. Overall, 21% of
ECE made substitutions, mainly due to lack of food accessibility, special occasions, or unforeseen circumstances. SUB was significantly higher than NOSUB among fatty acids, refined grains, greens and beans, and total HEI component scores. Future studies should also account for menu and served DQ differences, to better understand the DQ impact of substitutions.

Rabisa J Khan, Carol Y Lin, Leena B Patel, Sarai R Robertson, Whitney B Wilson, Elizabeth Kroeger MS RDN, Brenda Bertrand PhD RDN

UAB International Rescue Committee Chapter on UAB Student Opinion of Refugees

The International Rescue Committee at UAB is an organization that focuses on helping people whose lives are affected by conflict and disaster to survive, recover, and gain control of their future. Our aim is to spread awareness of the current refugee crisis and provide aid to those displaced by war, persecution, or natural disaster in the form of money and educational supplies. During the summer of this year, we chose to aid an orphanage with around 348 refugee children in Irbid, Jordan. Around $2,745 was raised in a month by creating a GoFundMe page that was shared through social media. The money was transported to Irbid by the president of the IRC at UAB and used to buy 350 schoolbags that were filled with basic educational supplies. The money left over was donated to the Green Crescent Charity, which runs the orphanage. This semester, we created a survey in order to gather faculty and students’ opinions on refugees in the Birmingham community. We received 71 responses with varying answers. Next semester, we plan on hosting a 5k run by UNRWA USA in order to raise funds for refugee children in Gaza affected by PTSD or other psychological trauma.

Jenna Alkhatib, Hanh Huynh

UHP Group 12: Gauging Public Awareness in the Overton Community of Mercury in Lake Purdy Fish

Mercury is a pollutant created by certain factory processes that often infiltrates surrounding bodies of water. Once in the water the chemical can contaminate inhabiting fish, making them unsafe for human consumption. The Alabama Department of Health routinely assesses the prevalence of pollution in fish populations, and issues yearly Fish Consumption Advisories that outline what fish pose health concerns and how often it is safe to eat them. The 2018 Advisory states that there is mercury present in the Large Mouth Bass of Lake Purdy in Birmingham. They recommend consuming only one meal, defined as 6 ounces of cooked fish per person, a month. This poses a potential danger to the Overton community, the neighborhood that surrounds Lake Purdy. Our group worked with Justinn Overton (Coosa Riverkeeper), Myra Crawford, Sean Crawford (Cahaba Riverkeeper), and Beth Stewart (Cahaba River Society) to create a survey that would gauge fishing habits in Lake Purdy and the Cahaba River that feeds into it. The results show a reasonable percentage of individuals who are unaware of the current fishing advisories. The survey was also used to accumulate suggestions on how to more effectively distribute advisories. Social media was the most common method suggested. Using our newfound knowledge of local fishing habits, agencies can utilize new modes of dispersal, like social media, to increase the awareness of the Fish Consumption
Advisories. Justinn Overton also hopes to use the results of this survey to inform future legislation concerning the Fish Consumption Advisories.

Mary Anne Powell, Troy Shirley, Michaella Freitag, Kelly Kim, Myra Rana

Communication Difficulties with the Crestwood South Neighborhood
We set out to collaborate with the Crestwood South Neighborhood Leaders to create a project that could benefit the community for a short or long period of time. Some of the ideas we proposed were leading a program on affordable sustainability, leading a destress art program, or creating a sidewalk library. The Crestwood South Neighborhood Leaders suggested that our group help out with a Voter Information booth for the upcoming Midterms where we would give directions to the voting site and pass out brochures about the Crestwood South Neighborhood Association. However, the Voting Information booth was cancelled due to a change in voting location. We sent many follow-up emails with more project ideas, such as creating an informational brochure about Crestwood South or helping with the Greater Crestwood website. Our emails were unanswered for the remainder of the semester. From this experience, we have learned that it can be incredibly difficult to collaborate and communicate with neighborhood leaders.

Michelle Cheng, Fiona Heffernan, Abraham Okunbor, Carmen Ross, Garrett Tinch

Technology: The Good, The Bad, & The Ugly
When it comes to technology, many people have differing views on how we, as a society, use it. For example we can take a look at our involvement through service learning with Cyber Seniors. We spent 4 weeks meeting with an assigned senior citizen at the Independent Presbyterian Church, thanks to the Jewish Collat Center, teaching the seniors about the different ways that technology can be used in helpful ways. Technology can be a very helpful and useful source to people when it comes to getting in touch with loved ones, old friends, and just connecting with the world. We were assigned to read an excerpt on the way that technology influences a younger generation and then analyze it and add in our own beliefs. Like Turkle, the author of the excerpt we read, some may say that technology controls our lives and that all we do is use it, but we would have to disagree. Sherry Turkle believes that people today are extremely dependent on technology and it is a danger to, mainly, children and young adults- but also, society as a whole. Turkle believes that teenagers are not as independent as they used to be in past generations because of them being "tethered" to their parents by their cell phones. Turkle also believes that people's dependence on technology keeps them from having a sense of privacy. During this semester, we were assigned to write essays telling how technology has an impact on the identity of a person. Overall, both events enabled us to become better writers and have a better understanding on technology because it showed us both sides of the argument and help form our own opinions on said topic.

Kalei Valle, Brittany Bentley, Kelcie Kite

UHP Group 2: Community Enrichment in Central City, Birmingham
Brittany Crown, Malik El Husari, Grayson Gilliland, Elise Guthrie, Shannan Jones, and Nikita Udayakumar
Oh The Ways We Learn
We never understand how big a generational gap there is until we actually sit down with senior citizens to help them understand the ways of technology. This semester we had the privilege of spending part of our class time working with the Collat Jewish Family Services by helping the elderly have a better understanding of technology. Technology as a whole can serve many different purposes for many different people. The internet, specifically, allows people to have different ways of communication without the need for face-to-face interaction. Spending part of our class time volunteering proved beneficial to the class because we were able to use this experience in our writing, especially since the theme for our essays this semester was on different aspects of technology. All together, we wrote three essays that had to do with technology in some way. The first was a rhetorical analysis on a chapter of a book written by Sherry Turkle, the other was a visual analysis of a commercial of our choice that advertised some sort of technology, and our final essay was a comparative analysis on two articles we chose based on an issue with technology that needs to be corrected. Overall, English 101 with service learning was able to provide something that other English courses could not provide: experience that could be applied to our writing.

Savannah Ridgeway, Tristan Smith, Elizabeth Tortorici

Net Fish and Grill: A Modern Guide to Catfishing, Toxicity, and Eating Bass in Alabama
With 132,000+ miles of rivers and streams, Alabama thrives on utilizing it’s vast waterway system for fishing, agriculture, and power. Toxic waste from booming industry in the early 1900s to present day jeopardizes the consumable integrity of water and marine life by allowing pollutants like methylmercury, polychlorinated biphenyl (PCB), and pesticides to contaminate river systems, contributing to health defects in Alabama residents and fishing enthusiasts alike. The Coosa Riverkeepers and the Alabama Rivers Alliance advocate for empowering the people through education and improved food management strategies while fighting to protect the local bodies of water from pollution and misuse through policy and independent data collection. We partnered with Coosa Riverkeepers to advance education through attractive updated infographic posters emphasizing current hazards and stylized cooking videos for improved preparation strategies and safe fish consumption. Our goal is to create a more health-conscious and informed consumer through streamlined and accessible multimedia platforms that promote utilization of our resources while reducing chronic health risks. If successful, our hope is to encourage closer cooperation between state and federal agencies with the Alabama Rivers Alliance to make public health the number one priority.

Coosa Riverkeepers, water pollution, fish consumption advisory, service learning, public health

Society’s Relationship to Technology
Technology has affected every part of our lives in this society. We have become so dependent on technology in every aspect of our lives. Whether it’s connecting with our friends through texting and social media or simply checking the weather to see what outfit to wear, we are constantly on our phones, and if it’s not our phones,
then it’s some other form of technology. In this English class, we took a closer look at our relationship with technology and how it affects our relationships with others. We read through a book by Gerald Graff and Cathy Birkenstein called They Say/I Say, which talked about how high schools had it wrong when teaching students not to use ‘I’ when writing papers. We partnered with Collat Jewish Family Services to help the elderly in the community better understand different forms of technology. Every Friday several groups went to a church near campus to participate in the Cyber Seniors program. They tried to pair us with the same senior each week, though our seniors weren’t always able to make it. We were there, as students, to help them with everyday needs, and also to help them with any questions they had concerning technology, such as how to friend someone on Facebook or how to upload a video to Youtube. The students who weren’t able to make it on Fridays either joined a group that volunteered on Thursdays or joined a group that volunteered in the CJFS offices, doing odd jobs and helping wherever they were needed.

Clay Ferrill, Kaylee Varney, Michael McMillan Elijah Quinones

Healthy Happy Kids (HHK) Train-the-Trainer Project
Childhood obesity is an epidemic. In 2014, about one in six children in the United States ages two to nineteen were considered to have obesity. The negative consequences of obesity range from government healthcare expenditure to deprived qualities of life. In Birmingham, our city plagued by food deserts, access to nutrition education or resources is not prioritized; hence, the problem is exacerbated among youth, diminishing their physical and emotional well being for life. Through PHYTE, our group seeks to face this challenge by partnering with Healthy Happy Kids (HHK). Our team members are creating a Train-the-Trainer guide on nutrition and exercise content for trainers across Alabama to teach children. In the guide, we outline lesson plans detailing various food groups in the food pyramid in addition to exercises and activities to implement a “hands-on” learning experience. Our target group will be elementary school aged children because educating them also brings knowledge to their homes, where they could affect their caretakers as well. In addition to creating the Train-the-Trainer, PHYTE will also volunteer with HHK’s program in the Spring. PHYTE is working to educate the next generation because they are the future.

Katelin Baird, Edward Huang, Amy Jasani, Wendy Jiang, Alyssa Klop, Filip Krutul, Eunice Lim

Foward Motion
The group is creating a business strategy for the non-profit, United Ability, for their GIG program. They needed help improving the outdated system of how they recruited, scheduled, and kept track of all the volunteers. Throughout the years, they have faced dilemma regarding its summer volunteer program and Lee Thrash, the program organizer, asked the class to design new ways to help her improve the outdated system. The objective of this project was to improve systems they had in place in an effort to attract more volunteers, improve efficiency, and increase volunteer satisfaction. To fully understand the issue at task, we needed to evaluate the goal and mission of United Ability as well as the current systems and methods that were being used. We researched and learned more about the program through Lee. Using this information, we looked at what other NPOs were using and doing for
their own programs and structured a proposal to fix appeal, communication, and efficiency. What we found was that, they had the ability to capitalize on its mission, but we just needed a clear way to do so.

Daneka Pettaway, Sophia Ngo, Lola Diaz, Paul Duke, Elisha Mulkey, Haley Gilliam

Social and Behavioral Sciences:

DEMOCRACY’S ROLE IN THE MIDDLE EAST: HOW CULTURE AND HISTORY DICTATE DEMOCRACY AND ITS EFFECTS

The purpose of our research is to close the information gap of exactly how culture dictates whether or not a country’s government will take on an authoritarian system. More specifically, this research focuses on the countries covering the Arab world in the Middle East. Professor Geert Hofstede created a theory and algorithm that measures a country’s culture which is broken down categorically by explaining how that culture’s composition determines its society’s morals and values system. This research was conducted in order to deduce whether Professor Hofstede’s algorithm could be applied to forecasting the probability of a country taking to an authoritarian political system. In this research, we took six different Middle Eastern countries and applied the Hofstede algorithm to tease out the cultural aspects of each. The algorithm produced results that broke each countries culture down into six dimensions that helped generate graphs that depict strength comparisons of each dimension along with an ethnographic summary of each dimension. Cross-examination of each countries current government system and the results produced was necessary to determine whether or not Professor Hofstede’s algorithm is applicable to predicting the political adaptation of an authoritarian government by a country.

Megan Stubbs, Matthew Palmer, Zedrik Pitts, Jordan Waterman

Driving after Simulated Right Foot Injury: Can we drive with our Left Foot Instead?

When a patient has an injury or surgery involving their right foot, they often are advised by their doctor to stop driving. The inability to drive can impact quality of life, productivity, and personal income due to lost time at work. Little scientific evidence exists to inform clinical decision-making, especially with regard to the opportunity for patients to drive with their left foot when needed. This study investigated differences in driving performance between left and right foot pedal operation in a driving simulator among healthy (non-injured) individuals. The study enrolled 20 participants ages 22 to 62. Inclusion criteria included being an “active” driver (i.e., having driven in the past 7 days) with no prior lower extremity injuries or surgeries. Participants drove a one-mile practice drive and a four-mile test drive in a driving simulator. Results revealed participants exceeded the posted speed limit less often when driving with their left than right foot (d = 3.12, p < .001). Participants also tended to take longer to release the throttle with their left compared to their right
foot when a hazard appeared (d =0.58, p = .066). These findings showed that although participants exhibited more cautionary speed when left foot driving, hazard reaction was weakened. Findings may inform orthopedic physicians on how permitting left foot driving after injury or surgery might affect driving ability. Although further investigation is needed, it appears that recommending left foot driving might lead to slower drivers who react slower to hazards.

Brittani McGinnis, Tyler Bell, Despina Stavrinos, and Michael Johnson

Is it Genocide?
My research focused on the act of genocide and how the United States of America has committed that against African Americans. Most of my research was found while reading different texts and experts on America’s history during different eras. I combined that with proof of the intent by the general public, local governments, and federal governments. The main scope of my research was to establish motive and proof of this genocide. From this research, I learned a lot of forgotten or ignored history. This led me to conclude that there has been an explicit ignorance and denial of the genocide. The idea that the acts have been ignored and covered up leaves the implication that there has been an act committed. The fact that it has been hidden and ignored follows America’s History when handing tragic events that the country has benefited from. My body of work adds to the body of existing knowledge by starting the conversation and spread awareness of the blood on America's hands.

Celeste Cohill

Examining Predictors of Hepatitis C in Opioid Users
The use of prescription and non-prescription opioids has increased dramatically over the past decade in the US, resulting in countless overdoses and posing as a huge public health crisis. Alongside opioid use, the prevalence of Hepatitis C (HCV) has risen through the years. One of the major risk factors for HCV is injection drug use. Thus, the rise in HCV may be linked to the rise in opioid use since heroin is typically administered via injection. Examination of the demographics of opioid users with HCV can be useful to determine if a specific population is at a higher risk of contracting HCV. Participants were 371 opioid users recruited from inpatient and outpatient treatment facilities. The participants completed a questionnaire regarding medical and drug use history, and demographic information. Chi-square analyses were conducted to determine whether individuals with and without HCV differ in terms of demographic factors. Of the demographic variables examined, gender (X2 = 8.80, p = .002), race (X2 = 9.46, p = .009), and employment status (X2 = 16.31, p = .006) differed significantly between the groups. The results indicated that opioid users who are unemployed, female, or white are more likely to have HCV than when compared to opioid users who do not fit these demographics. The findings of this study highlight disparities present within the opioid user population. Tailored interventions can be created to target these specific populations to address the issues of opioid use and higher rates of HCV.

Shreya Pokhrel, Michelle Sisson, M.A., & Karen Cropsey, Psy.D.

The Effect of the Weather on Pain and Fatigue in Women with Chronic Fatigue Syndrome
Individuals with chronic pain and fatigue disorders often report that their symptoms fluctuate with changing weather. Previous studies have indeed found relationships between weather patterns and changes of disease severity in multiple sclerosis, osteoarthritis, and fibromyalgia. Chronic Fatigue Syndrome (CFS) is a condition that affects as many as 2.5 million Americans and involves debilitating fatigue that can change unpredictably in severity from day to day. In order to help explain why CFS fatigue frequently changes, we examined the relationship between fatigue and weather patterns longitudinally in a group of 56 women with CFS. Daily fatigue severity (reported on a scale from 0 to 100) was tested for associations with weather data from the NOAA and the EPA. A linear mixed model approach was used to determine associations over time. The analysis revealed significant associations between fatigue and several weather variables, including carbon monoxide levels, sulfur dioxide levels, levels of particulate matter less than 10 micrometers, ground level ozone, maximum temperature, and atmospheric pressure. Daily self-reported pain was also associated with several weather variables, including ground level ozone, the Air Quality Index, carbon monoxide levels, minimum temperature, and average temperature. These results are the first to show a relationship between CFS symptom severity and weather.

**Gregory Lashley, Alexis E. Lambert, Alexandra Otto, Levi Parker, Kate Wesson Sides B.S., Jarred Younger Ph.D.**

**Virtual reality gaming intervention for maladaptive fear of movement in chronic low back pain**

With 80% of individuals experiencing low back pain (LBP) at least once in their lifetime, LBP is the 2nd leading cause of physician visits, 3rd leading cause for surgical procedure, and 5th leading cause for hospitalization within the United States. Remission is common in acute LBP, however, chronic pain conditions characterized by long-term pain, disability, and resource cost occurs in up to 10% of individuals who experience LBP. Research finds that poor LBP outcomes may be due to maladaptive pain beliefs (e.g., pain-related fear) and physical activity avoidance. The current study examined the effectiveness of an interactive virtual reality (VR) cognitive-behavioral intervention system designed to challenge pain-related fear and gradually promote physical activity. Thirty-four individuals (17 female; mean age 46.2yrs) with chronic LBP (lasting &gt;3 months) and high pain-related fear completed a physician screening. Prior to and following a 3-day laboratory-based intervention protocol, each participant responded to standard measures of pain, pain-related fear, and disability. Repeated-measures analyses indicated that LBP disability scores did not significantly decrease (F=1.95, p=0.169), nor did pain ratings (F=3.393, p=0.074). However, there were significant decreases reported for pain-related fear (F=15.76, p&lt;0.001), pain catastrophizing (F=9.122, p=0.005), and present pain intensity (F=5.05, p=0.032) Findings support the safety and effectiveness of a VR intervention system designed for cognitive-behavioral treatment of individuals suffering from chronic LBP and pain-related fear by promoting physical activity and lowering physical activity avoidance. The tested model represents a prototype, which is ultimately intended to provide clinical and home settings with a flexible interactive intervention platform.
Caroline Spigner, Deanna Rumble, PhD, Lucie Mitchell, DO, Timothy Ness, MD, PhD, Zina Trost, PhD

Fan-Celebrity Relationships and Interactions in the Age of Social Media
Celebrities and fans share unique and meaningful relationships, and with the advent of social media, they can interact and connect with one another easier than ever. However, these relationships and interactions are mostly conditional with celebrities yielding the power of interaction with the fan. These conditions between the celebrity and fan can be analyzed by social scientists to understand the incentive and meaning behind fans’ dedication to the celebrity, and in return can reflect how social status is processed and understood. For the month of June 2018, a total of 1,381 Tweets were collected from five celebrity Twitter accounts. For each celebrity Tweet approximately 5 fan replies to the Tweet were collected, analyzed, and coded, bringing the total amount of Tweets collected to 4,788. Using inductive grounded theory, celebrity Tweets were analyzed for content into three categories: Personal, Career, and Political/Social. Fan replies were coded into three categories including In Support Of (ISO), Without Support Of (WSO), and Neutral (N). The results show that a majority of celebrity Tweets are career-oriented (54.1%) and a majority of fan replies to celebrities are ISO. The content of the fan replies indicate that many fans utilize Twitter to interact and connect with celebrities, but the tone of the fan replies can vary depending on the celebrity. This small-scale research on social media activity between fans and celebrities reflects the progressively diminishing gap of status barriers and connection. With advancement in technology, individuals can engage in relationships with celebrities who were previously unattainable.

Savannah Bigbie

Women in Government in Relation to Women's Public Health
In this research, we will explore women in the US federal and state government and their relation to women’s public health. The principle of investigating the correlation between the lack of healthcare policies protecting the lives of women and the lack of female representation within the U.S. legislative system is to prove recurring trends and lack of comprehensive data for women’s public health. The areas in which were being examined are contraception, maternal mortality rates, and maternity leave. These areas exclusively apply to the women’s US healthcare system. The data that is gathered will be achieved by looking at the introduction of women in both federal and state legislative positions and comparing whether there was an increase or decrease of women to effective (like the Affordable Care Act’s effect toward contraception usage) or non-effective (like Texas’ move to shut down women’s health clinics leading to higher Maternal Mortality Rates) policies that were introduced that same year. This will help determine if there is a correlation between the number of women in legislative positions to the introduction of influential healthcare policies for women’s public health.

Cammie Cornett, Elizabeth Jaimes, Kara Rhodes, Ana Nguyen

Authoritarian Governments: Regime Type and Repression
This research examines how mass and selective repression, as well as regime type, affect the tenure of different kinds of authoritarian governments and their
leadership. The study examines countries who have either personalist regimes or single-party regimes as well as whether they implement either mass or selective repression or both. The goal of this research was to come to a definitive answer on whether the type of authoritarian regime paired with a specific kind of repression, in turn, causes longer tenures of power or changes of leadership within the regime. Our studies attempt to argue that personalist regimes paired with mass repression cause longer tenures in power, compared to single-party regimes implementing selective repression causing shorter tenures in power.

Hayley White; Cassidy Jimerson; Kaliyah Lewis; Jackson Burrow

The Change in Community Health Behavior: Flu Vaccines

In November of 2016, Occupational Medicine failed to receive the proper response to their free flu clinics for faculty and staff, 2000+ shots left unused. This year Occupational Medicine suggested that a better public relations campaign and correction of misconceptions will increase the number of vaccines given to prevent the spread of the influenza virus. Various theories were considered to develop strategies to encourage people to get the flu vaccine such as the theory of Diffusion of Innovations; the Health Behavior Model; and the Theory of Planned Behavior. Formative research included interviews with UAB faculty and staff to understand what previous knowledge the interviewee had about the flu vaccines, and why he or she did/ did not receive the flu vaccine. The results indicated that the low turnout rate was related to lack of communication regarding information about the time, date, and location of the clinics. Therefore, flyers and posters were designed to spread awareness regarding the flu clinics. Additionally, we attended staff meetings to provide quick information about the flu virus itself and hand out flyers with details of the flu clinics. Furthermore, a selfie-based contest on Facebook was used to encourage people to get the flu shots. Various team members attended flu clinics to help faculty and staff take and upload a picture with the flu shot sticker for a chance to win a prize. The identification of the barriers in the community health behavior change project helped Occupation Medicine: Last updated, October 17th 2018, only 468 flu vaccines remain.

Brian Nguyen, Kelly Nguyen

The Other Path: How Veteran’s Court helps Veterans

The United States court system is often considered to be a "one-size fits all" solution for offenders. However, this is often not the case, as there are many groups of offenders that may require special attention. Our focus for this poster will be a group that many here may have connections with; veterans and how veteran’s court addresses these issues. Veterans come back from tours of duty with PTSD, traumatic brain injuries, and drug/alcohol addictions from their experiences. Veteran’s court brings these factors common within the veteran community to develop solutions for veteran offenders that go beyond simple incarceration.

Hayden Barbazette, Justin Anderson, and Taylor Wiley.

Reliability and Validity of the Motor Activity Log as a Measure of Arm Use in TBI patients

Past research on rehabilitation after neurological injury suggests that tests of motor capacity tend to overestimate spontaneous use of the affected upper extremity. The
Motor Activity Log (MAL) was developed to assess spontaneous use of the impaired limb in daily activities of stroke patients outside the clinical setting. This study aimed to establish the MAL as a reliable and valid measure of arm use in hemiparetic TBI patients. Participants were part of a larger study measuring motor improvements in TBI patients who received Constraint-Induced Movement therapy (N=19) or a comparison treatment (N=21). Participants completed the MAL before and after intervention. In this interview, participants rate how well they used their more affected arm in a series of daily tasks. Participants wore accelerometers on each wrist for 3 days before and after intervention as an objective measure of arm movement. We found that the correlation between MAL scores from pre- and post-treatment testing occasions in the comparison group was .69, \( p<.001 \). After excluding questionable accelerometry data, the correlation between pretreatment MAL scores and corresponding accelerometer counts was .10, \( p=.638 \). Neither test-retest reliability, nor convergent validity of the MAL for measuring arm use in adults with TBI was supported. Further research should explore discrepancies from previous research on adults with stroke, in which the MAL was found to be reliable and valid. Differences may be due to invalid accelerometry data and lack of a true control group in the present study.

Caitlyn Strope

Tutwiler Connections

Visitation experiences are a key aspect in maintaining outside support while incarcerated. Scholarly work, such as Prison Visitation and Recidivism, has concluded that an increase in visitation for inmates can reduce their chances of recidivism upon release. In order to gain further insight on these findings, our group visited Tutwiler Prison to assist on a service learning project to allow inmates to send video messages to their loved ones for the holidays. In the process, we were able to experience firsthand the struggles that these women face on a daily basis and how they overcome these obstacles. Allowing these women to connect with their families while incarcerated increased their optimism about their release and opened the door to a prospective future in the free world once they are able to make parole or released altogether. Our efforts to give these women an opportunity of communication also allowed us to be personally involved in reducing recidivism rates among inmates and being able to experience the same situations as the scholarly works we studied. When inmates feel connected to those they love and are able to communicate with them regularly, they are less likely to re-offend once they are reacclimated into our society.

Jaqueline Duran, Danielle Cook, Madelyn Cantu


Pre Exposure Prophylaxis (PrEP) is a HIV prevention tool for individuals who are at a higher risk of HIV. It is a once a day oral pill which was FDA approved in 2012. The Deep South has a high HIV burden but a relatively low rate of PrEP usage. Our study looked to identify some of the barriers and facilitators among the potential and current users. Participants were recruited using flyers and word of mouth in community settings. A total of 44 participants completed one on one interviews
regarding their attitudes about PrEP. Trained qualitative analysts coded the interviews to generate themes using patient-centered access to care framework to examine the perception of PrEP access. Participants were 32 years old on average, 66% Black, 82% gay, lesbian, bi-sexual or pansexual, 70% male, and 66% single. The following barriers to PrEP access were identified: lack of PrEP awareness and advertisement; sexuality-related stigma; time and resource constraints; and concerns about the adequacy and technical quality of PrEP services. Meanwhile the perceived facilitators to PrEP accessibility were: PreP-related information gathering and sharing; increased dialogue and visibility around PrEP; social, programmatic, and clinical support; and, self-preservation, personal motivation, and treatment self-efficacy. While PrEP is an effective tool for HIV prevention, there are significant perceived barriers to PrEP access. Current and potential PrEP users also identify meaningful facilitators to PrEP access. Overall, additional research is needed to address complex barriers to provide equitable access to those who need PrEP.

Gopiann Shah; Urmee Podder; Whitney S. Rice; Kristi L. Stringer; Maira Sohail; Kaylee B. Crockett; Ghislaine C. Atkins; Kachina Kudroff; D. Scott Batey; Joshua Hicks; Janet M. Turan; Michael J. Mugavero; Bulent Turan

Hyperhomocysteinemia and Cognitive Functioning
Elevated homocysteine (tHcy), an excitatory amino acid, is associated with lower global cognition in nondemented older adults, those with mild cognitive impairment (MCI), and Alzheimer’s Disease (AD) patients. Higher baseline tHcy is also associated with increased risk of progression of MCI to dementia. The connection between tHcy and AD has several proposed mechanisms of action, as tHcy is implicated in endothelial dysfunction, promotion of amyloidosis, elevation of tau phosphorylation, and changes in hippocampal signaling and synaptic plasticity. The objective of this study was to further examine the association between tHcy and cognition using a battery of tests sensitive to impairment in multiple cognitive domains 40 participants (M=69.73; SD=9.03) seeking prevention or treatment of cognitive issues through a private brain health clinic received: 1) full neuropsychological testing; 2) comprehensive blood work; and 3) psychomelical assessment. Baseline tHcy was significantly inversely correlated with a global measure of cognition (WMS-IV BCSE), in addition to tests sensitive to memory (Rey Long Delay Free Recall [DFR]; CVLT-II Trial 5, CVLT-II Short DFR, and CVLT-II LDFR), verbal fluency (FAS; Animal Fluency), processing speed (Trails A), and executive functions (Trails B; WCST). Results provide support that high tHcy is associated with lower performance in multiple cognitive domains. The addition of targeted blood work to full neurobehavioral assessments may show promise in further honing skilled early identification and differential diagnosis of those with cognitive complaints. Preliminary data highlight the potential role of tHcy in the management and treatment of cognitive dysfunction, given the prevalence of hyperhomocysteinemia in the population and known methods for targeted treatment. Future intervention studies are warranted to further clarify this association.

J.G. Springer, C.P. Parker, J. McMinn, K. Lokken

Help for our Veterans
Historically the United States court system has applied one method to treat a variety of offenders. However, there are many offenders that require more specialized treatment. This poster will focus on a specific group of individuals that are in desperate need for a specialized treatment plan, our military veterans. Veterans come back from war with PTSD, brain injuries, and drug/alcohol addictions as a result of the experiences they’ve had. Veterans court acknowledges these issues and develops alternative solutions to rehabilitate these men and women that isn’t just incarcerating them.

**Britt Davis, Chasity Showell, Bre Webster, John Thomas Statterfield**

**Works in Progress:**

**Use of Tabletop Simulation to Educate Health Providers about the Opioid Epidemic**

Stemming from an excessive distribution of opioids since the 1970s, the United States has suffered from repercussive health concerns leading to widespread opioid addiction, a fueled illegal drug market, and death resulted from inappropriate and overuse of drugs. It has been recognized today that those affected by the crisis have been made vulnerable to other drug addictions, and whether directly caused by the prescribed opioids or not, thousands die resulting in accidental drug overdose and opioid abuse to be the fourth leading cause of the death in the US. Healthcare, being one of the crisis’s main attributors, has sought to change different practices, policies, and perspectives on opioid usages. A drafted method from many different training programs, tabletop simulations have been an innovative, mobile, and an inexpensive method to which many healthcare institutions have found useful in preparing and observing actionable effects of various circumstances and scenarios. Made to be a table-based exercise, tabletops require no training, and enable for participants to bring up discussions, observe a broad perspective of all cause-and-effects, and be more aware of their actions’ repercussions. Through an understanding of the effectiveness of tabletop simulations in other healthcare themes, it’s projected that by utilizing this simulation medium, healthcare providers can be perceptive of their contribution to the opioid crisis, and in the long run, through preparation, observation, and discussion spurred by tabletop simulations,

**Kush Patel, Diego Pascual, Faith Turner, Joshua Romualdo, Felicia Gordon**

**A Look at Learning and Memory Behavioral Tests NOL and SA in Mice Model and Their Reproducibility**

Learning and memory are two of the most studied and important subjects in neuroscience. Understanding the mechanisms behind learning and long-term memory formation would further elucidate the research for neurodegenerative diseases affecting learning and memory such as Alzheimer’s Disease and Parkinson’s Disease. An animal model is widely used to understand the basic neurobiology behind these mechanisms and to test certain drugs that cannot be tested in human subjects yet. There are two mice-model behavioral tests are widely known in neuroscience research to study the mechanisms of long-term memory formation.
Novel object location (NOL) and T-maze spontaneous alteration (SA) were two mice-model behavioral tests used in the experiment to examine learning and memory. These two tests use a mouse’s inherent behavior of exploring novelty which lessens the confounding and important factor of stress. This experiment tested the viability and reproducibility of these two behavioral tests in neuroscience mice-model research papers that used different approaches in their NOL and SA tests. The experiments were analyzed based on stress levels and learning abilities on n = 34 male and female mice with specific gene knockouts. The results indicated that the neuroscience mice-model research papers either had low reproducibility or stress was a stronger confounding variable than thought. The experiment is a work in progress on both the study of the behavioral tests and the effects of the circadian-rhythm on learning and memory.

Hanh Huynh, Jennifer Davis, Lacy Goode, Karen Gamble

Parks Rx
Parks Rx, a project of Birmingham REACH for Better Health, is an organization that promotes the use of parks and green spaces by the general public in an effort to reduce the occurrence of preventable chronic illness. This program aims to make parks, walking trails, and green spaces accessible to every individual. Currently, this is done through maintenance of a public parks database that contains pertinent information, such as hours of operation and amenities, about parks in the Birmingham area, allowing individuals to find the park that best suits their needs. Another major aspect of the Parks Rx program is to encourage healthcare providers to prescribe “parks” to their patients as part of a treatment plan. This directly encourages patients to get more active and enjoy the outdoors, which serves to decrease risk of chronic illness and improve mental health. Alabama is consistently ranked poorly in population health indicators, which prompted the desire to implement the Parks Rx program in Birmingham. Parks Rx works closely with many community partners within Jefferson County, such as the Jefferson County Health Department and the Freshwater Land Trust, to further implement the goals of the program. There is, however, little data to show the use and progress that the local community is making with Parks Rx in place and direct future efforts effectively. Thus, the goal of this project is to develop methods with the program partners to collect and use health outcome data on patients, further expand the Parks Rx program into the UAB health system, and increase overall park use.

Sarahn Summerlin, Zoey Duncan, Cassie LeSueur, Radhi Patel, Eunkyo Lee

The Impact of Proper Information Dissemination in Nuclear Medicine
Nuclear medicine as a field consists of a variety of studies that can be used to help identify a number of physiological conditions, including cardiac diseases, rare infections, and certain cancers. Despite this technology having a significant track record of improving patient outcomes, there has been a decline in the number of these studies ordered by practicing physicians to diagnose patients. The purpose of our research will be to determine if proper information given to key players within a healthcare team can influence the amount and type of studies being ordered. This would include, but not be limited to, patients and referring physicians. In a pilot experiment conducted at UAB, this question will be tested by handing out fliers and
Post-meal glucose, insulin, and C-peptide response in women with a history of gestational diabetes and their children.

Women who have had Gestational Diabetes Mellitus (GDM) in the past are susceptible to type 2 diabetes. Their children are also at risk for developing obesity or type 2 diabetes. Prior literature demonstrates an association between risk for type 2 diabetes and differences in the post-meal responses of glucose, insulin, and C-peptide (a marker of insulin secretion). The study’s objective was to test the hypotheses that women with history of GDM, and their children, will exhibit higher post-meal glucose and insulin concentrations and display different patterns of insulin secretion, as compared to women and children with no history of GDM. Mothers and children are being recruited to fill three groups based on characteristics of index pregnancy (N=30/group): (1) non-obese prior to pregnancy/ no GDM; (2) obese prior to pregnancy/ no GDM; (3) GDM. Concentrations of glucose, insulin, and C-Peptide are measured following a liquid meal. Mothers receive Ensure® (400 kcal) and children receive Carnation Instant Breakfast dosed at 1.75 g carbohydrate / kg of lean mass. To date, N=22 dyads have completed the liquid meal test (n=6, 9, 7 in each group). Initial data represent higher post-meal glucose for women with prior GDM, with a blunted post-meal insulin and C-Peptide curve in women and children with a history of GDM compared to those without. If the data continue to support the hypotheses, results will suggest that women with prior GDM and their children have an early deficit in insulin secretion that may contribute to future type 2 diabetes.

Moon, G; Callahan, ML; Rodgers, SL; Bowman, RR; Martin, SL; Bahorski, JS; Anger, CM; Baykal, AD; Lomax, RO; and Chandler-Laney, PC.

Establishing Family-Centered Nutrition Education in Early Childhood to Promote Lifelong Health

Previous research demonstrates that infants and toddlers do not consume sufficient amounts of fruits, vegetables, and whole grains to satisfy federal dietary guidelines. Inadequate consumption of these foods, coupled with overconsumption of refined carbohydrates and trans fats, can predispose children to chronic health risks in adulthood such as obesity, diabetes, and heart disease. Therefore, it is critical to implement nutrition education during early childhood in order to establish eating patterns that promote lifelong health. On average, children spend 30-40 hours a week in Early Care and Education (ECE) centers; therefore, ECE centers are the most appropriate targets for change. Previous research suggests that there are several initiatives in progress to instill healthy habits and enhance quality of foods served in ECE centers. Indeed, such changes could yield improved diet quality; however,
research also maintains that parents’ involvement in the process can have a greater impact on overall diet change. The objective of our project is to design an ECE curriculum called “The Traveling Chef” that incorporates and establishes healthier cooking and eating habits within the household setting. The “Traveling Chef” activity log will be provided to children ages 3-5 years, in which different recipes will guide families to establish healthy meal preparation skills and ingredient selections. Moreover, children will share their activity logs and learn kitchen and food vocabularies in class. In this ongoing project, we intend to adapt encouraging attitudes to families that preparing and consuming nutritional foods can be easy and appealing.

Grayson Meeks1, Gun Moon1, John Robert Moon1, Alyssa Layne1, Elizabeth Kroeger2, MS, RDN; Brenda Bertrand2, PhD, RDN 1Department of Clinical and Diagnostic Sciences; 2Department of Nutrition Sciences

Sex Ratio Produced in Kemp’s Ridley Recovery Program at the Padre Island National Seashore During the 2017 Nesting Season
Due to extensive conservation efforts by American and Mexican agencies, the fate of the world’s most endangered sea turtle, Lepidochelys kempii, the Kemp’s Ridley sea turtle, has grown more optimistic with every nesting season. However, the increasing impacts of global climate change has the potential to undermine this success. Kemp’s Ridley sea turtles have temperature-dependent sex determination in which higher incubation temperatures result in female hatchlings and cooler incubation temperatures result in male hatchlings. This study, which is a part of the Kemp’s Ridley Recovery Program, evaluates the sex ratios from sea turtle nests on Padre Island National Seashore using histological examination of dead hatchlings collected from nests during the 2017 nesting season. The current data indicates a significant female bias. This may be beneficial for the population, as increased numbers of females could potentially improve the rate of recovery for this population in future seasons. This data will be utilized by the National Park Service, and the many partners of the Kemp’s Ridley Recovery Program, to optimize their Kemp’s Ridley Recovery Program.

Elizabeth A. Bradley, Dr. Thane Wibbels,

Children’s Perspective on the Ideal Playground
Our research aims to identify the ideal playgrounds from the perspective of a child and close the gaps between an adult’s idea of a fun environment for children and a child’s idea of a fun environment for themselves. It is critical to get a child’s perspective; without it, children’s outdoor playgrounds fail to stimulate a child’s curiosity or to foster creativity. Our research team plans to visit local after-school YMCA programs and ask children 5 to 9 years old to describe and draw their ideal playgrounds. Based off of common themes in children’s responses, a set of playground design specifications will be developed for architects, community centers, and schools to use when constructing play spaces in the future. We hope this research will enhance children’s occupation of play by encompassing designs tailored to children’s imaginations.

Katie Kyle Austin Browner Kaytlin Peterson Claire Richardson Peyton Lancaster
The Role of Chronic Stress in the Development of Necrotizing Enterocolitis

Necrotizing enterocolitis (NEC) is a major cause of morbidity and mortality commonly seen in premature, formula-fed infants. It is characterized by variable damage to the intestinal tract, ranging from mucosal injury to full-thickness necrosis and perforation. The exact mechanism of pathogenesis is unknown, but it is believed to have multifactorial causes. We are investigating the role of maternal stress as an important variable in the development of NEC. Using a model of chronic unpredicted stress (CUS), wild type zebrafish were stressed twice a day for 10 days using randomly selected stressors. These included social crowding, isolation, low water level and varying tank temperature. The fish were bred the following week using combinations of stressed and unstressed fish. Cortisol levels of the embryos were measured using a salivary cortisol ELISA. The cortisol levels in all embryos were consistently higher than that of the controls. Embryos bred from only a stressed male had the highest cortisol levels. Embryos from a stressed female, and from both a stressed male and female, had similar cortisol levels lower than that of the stressed male. We have determined exposure to CUS prior to reproduction will yield embryos with significantly elevated cortisol levels. The observed effects of paternal stress on embryo cortisol levels suggests that an epigenetic factor caused by chronic stress could potentially impact progeny. Ongoing studies will be used to identify the exact mechanism by which chronic stress affects offspring, and to what extent it impacts their continued growth and development.

Jessica Graham, Mohamad Moughnyeh, Sophie Patterson, Venkata Yeramili, Stephen Watts, Colin Martin

Association of prior gestational diabetes with metabolic syndrome criteria in women and their children

Background: Metabolic syndrome is a cluster of symptoms that contribute to increase risk for cardiovascular disease and type 2 diabetes. Mothers with a history of gestational diabetes mellitus (GDM), and their children, have greater risk for MetS but it is not clear if this risk is attributable to maternal obesity versus GDM. In this ongoing study, we are testing the hypothesis that women with a history of GDM are more likely to meet the criteria for MetS, and their children will have a higher MetS risk score, as compared to women and children with a history of obesity but not diabetes during pregnancy. Methods: Mothers and children (aged 4-10 years) with pregnancy histories characterized as normal weight/no GDM (NW, N=21), obese/no GDM (OB, N=38), or obese/GDM (GDM, N=27) underwent a fasting blood, anthropometric and blood pressure measurements. Mothers were scored for MetS using the NHLBI website, and a children’s risk score was calculated using the IDEFIC’s criteria. Results: To date, 60% of women with a history of GDM meet the criteria for MetS, compared to 10% and 0% of women from the OB and NW groups, respectively. Among children, the mean MetS risk score was 67 for the children in the GDM group, compared with 50 and 47 in the OB and NW groups, respectively. Conclusion: If this pattern persists through the completion of this study, targeted interventions should be developed to prevent the early onset of metabolic disease in women and children with a history of GDM.
Rigor and Reproducibility in Cystic Fibrosis Drug Metabolism Research

Rigor and reproducibility are critical for producing research that is robust and unbiased as well as results that can be validated by others in the field. Lack of awareness in the scientific community for researchers to authenticate cell lines has caused an estimated 18% to 36% of cell lines to be misidentified or contaminated, a hindrance to the reproducibility of their research. Here we illustrate the importance of rigor and reproducibility in research involving cell lines by authenticating cell lines that are commonly utilized in the study of Cystic Fibrosis (CF) and drug metabolism: Hep G2, Calu-3, CFBE41o-, and 16HBE14o-. We are also investigating FRT and 3T3 cell lines, but there are currently no validated techniques to authenticate them as they are non-human. Cell lines were cultured to confluency by following established protocols. During cell culture we took brightfield images to assess and document cellular morphology to compare to previously published morphological characteristics. Once the cells reached confluency, they were dissociated from their flask and passaged. DNA was isolated, quantified, and submitted for Short Tandem Repeat (STR) profile analysis. Three out of the four cell lines that we investigated had matching STR profiles; we identified a discrepancy for two out of twenty-five allele markers interrogated for the CFBE41o- cell line. We are currently investigating what kind of implications this finding may have in our lab’s current research. We are also exploring what quality control measures we can develop or utilize to authenticate the non-human cell lines used in our lab.

Johnathan Bailey

Does inter-organizational collaboration affect the quality of care? A systematic literature review

Rationale: Centers for Medicare and Medicaid Services’ value-based programs are providing U.S. healthcare organizations with incentive payments for better quality care and coordination across healthcare settings. While there are multiple studies that explored the association between inter-organizational collaboration and quality of care, there is a need for a structured, comprehensive overview of the literature to determine if collaboration, in fact, improves quality of care. Methods: Searches were made by 5 students in Scopus, ABI/INFORM, PubMed and CINAHL with main search terms “collaboration,” “integration,” and “quality” for the period 2010-2018. After excluding the duplicate and unrelated studies, 22 studies were examined in the literature review. Results: According to a majority of the reviewed studies, collaboration does improve the quality of care. Implications: The Affordable Care Act has been pivotal in making organizations focus on improving the quality of care. A collaborative approach is one of the strategies that has been proposed to achieve high-quality care. Findings of this study will help healthcare organizations in making decisions.

Howard, Madison L., Lauterbach, Ryan J., Mocherla, Rishi T., Park, Dahye, Vera, Madelyn V., Borkowski, Nancy M., Davlyatov, Ganisher K., & Puro, Neeraj A.
Implementation of Health Behavior Theories at UAB
Throughout this semester we have taken an honors seminar which has taught us the psychological reasoning behind how people change. Throughout the course, we have learned about several different health behavior theories and we have experimented with implementing these strategies in real life situations. We chose to utilize the theories in implementing a campaign which encouraged UAB faculty and staff to get their free flu vaccine. Throughout the 2-month long flu campaign we employed several health behavior theories in order to encourage UAB employees to receive their flu shot. Throughout our campaign we discovered that certain strategies were more impactful than others, thus encouraging more employees to get their vaccine. We would like to present our findings at the undergraduate research expo in order to help further the understanding of health behavior theories, the impact of implementing such theories, and the psychology behind how people change.

Claire Ansburg, Laura Bullock, Seth Bruder, Sidney Brantley, Haley Byrd

Pathology of Macrophage Subpopulations in Human Failing Heart
Chronic heart failure is a progressive disease characterized by decreased left ventricle function, chamber dilation, and adverse remodeling of the heart. While there are currently therapies to help stop or slow progression of heart failure, there are no forms of treatment able to reverse this cardiac dysfunction and remodeling. Mouse model-based work in Dr. Prabhu’s lab has found an increase and persistence of pro-inflammatory macrophages after post-myocardial infarction injury resolution to be detrimental to myocardial function and remodeling. Based on these findings, this project aims to test the hypothesis that the presence of pro-inflammatory macrophages contributes to impaired function and adverse remodeling. Human heart failure LV samples obtained at the time of LVAD implantation were stained with antibodies that recognize markers on pro-inflammatory macrophages (CCR2), anti-inflammatory macrophages (CD163), and all macrophage subtypes (CD68), then observed using confocal microscopy. Future work will be done to correlate the differences in CD68+CCR2+ pro- and CD68+CD163+ anti-inflammatory macrophage populations compared to control hearts with the severity of heart failure, ejection fraction, LV end diastolic and end systolic diameter, fibrosis, and myocyte hypertrophy. This project, thus far, has determined that pro- or anti-inflammatory macrophages are increased in human failing hearts. Through future work, we hope to determine whether one of these subpopulations is predominant in heart failure, and whether the degree of increase correlates with individual indices of heart failure severity. Correlations between macrophage subtype and heart failure will provide strong support for targeting the specific macrophage population for therapeutic development to lessen or reverse the devastating impact of heart failure.

Scott Nguyen

Investigating the transcriptional effects of HP1 proteins in Drosophila melanogaster through molecular tethering
In eukaryotes, DNA is packaged into chromatin, a complex of DNA and protein that allows the genome to be compacted. Chromatin can be classified either as decondensed, gene-rich euchromatin or condensed, gene-poor heterochromatin. The Heterochromatin Protein 1 (HP1) family is a protein family that is conserved in
most eukaryotes and involved in regulating chromatin structure, gene expression, and DNA repair. In mammals, somatic mutations within HP1 genes are associated with various cancers, but little is known about the relevance of these mutations. Drosophila melanogaster is a promising model for understanding the role of HP1 proteins, given the high degree of homology between the human and Drosophila HP1 genes. In Drosophila, there are three HP1 homologs expressed in somatic cells: HP1a, HP1B, and HP1C. These HP1 proteins have a particularly complex role in gene regulation. Here, we construct lacI-HP1 fusion proteins for HP1a, HP1B and HP1C. These fusions will bind to lacO repeats in the promoter of a transgene reporter, mimicking HP1 binding activity at endogenous transcription start sites. This molecular tethering will allow us to dissect the effects of individual HP1 proteins binding to transcription start sites. Additionally, we identify conserved sites of cancer-associated mutations across human and D. melanogaster HP1 genes. Our molecular tethering assay can serve as a tool to test the functional consequences of these mutations. As HP1 is conserved across eukaryotes, gaining insight on the effect of HP1 proteins in Drosophila can broaden our overall understanding of the role of HP1 across species.

Feng, J.X., Schoelz, J., and Riddle, N.C.

Understanding Level I Fieldwork Rotations Within Occupational Therapy Education

Occupational therapists (OTs) work with people across a wide range of ages to accomplish their daily activities so that they can lead independent and productive lives. OTs achieve this by engaging people in activities to improve a person’s well-being. OTs are currently in high demand, meaning that sites for clinical rotations, an integral part of clinical education, are being burdened with a large influx of students. In addition, the Accreditation Council for Occupational Therapy Education (ACOTE) has put forward new standards that redefine the delivery of Level I fieldwork rotations. To better position the UAB Department of Occupational Therapy, the program is undertaking a study to understand current models used by OT programs for Level I fieldwork rotations. This information will guide curriculum development and position the department to meet the requirements of the new standards. After finalizing IRB approval, the department proposes to distribute a survey, using Survey Monkey, to all OT schools accredited by ACOTE to gain insight into alternative fieldwork experiences. The questions will capture data related to the type and number of experiences, hour requirements, when these experiences occur, structure of the experiences, challenges, and other variables. The expected results of this study should offer insight into the various models used for Level I fieldwork experience nationwide, which should aid in constructing a model to best fit UAB’s curriculum. From the feedback on the survey, UAB’s program will adjust the curriculum for its Level I fieldwork rotations to become more efficient.

Seema Abu-Khajeel, Mikaela Brock, Glory Akinduro, Morgan Cantrell

Personalized Medicine: The Pathway from Patient to “Pill”

The Precision Medicine Institute (PMI) is set up as a genetic research initiative. The goal is to provide precision medicine to all, no matter their condition or location. Personalized medicine is otherwise known as data driven medicine-using genetic
information. Since establishment in May of 2018, the patient registry has grown to include over 180 patients, of varied social backgrounds from all over the states and internationally. The PMI mission is to take individuals from diagnosis to therapeutic intervention through development of personalized research plans, illustrating an individual’s next steps. In our process the slogan patient to “pill” is used to loosely cover all potential therapeutic options from metabolic diets and drug repurposing, research-oriented assays and functional studies, or medical procedures. Once a genetic variant is identified, it is classified into one of four impact groups- gain of function, partial loss of function, total loss of function, or change of function. If the impact is unknown, then research will be performed for further categorization. Each portion of the algorithm is demonstrated through research of 7 different PMI case studies, containing ADCY5, SLC1A3, ZMIZ1, CHAMP1, DHX30, and PRDX1 variants. By following the algorithm for precision treatment, one can take any genetic mutation or condition, identify the current stage, and develop the according next steps toward therapeutics. Such streamlining of the precision medicine process to apply to multiple different disorders, illustrates a future application of personalized medicine within the general healthcare field.

Jordan Barham

Coins for Cancer: An Organization Offering Financial and Social Services to Patients and Families Afflicted with Cancer

Families in Birmingham, Alabama, specifically those with relatives undergoing chemotherapy treatment for cancer, are in need of financial and social support. We identified several alarming statistics which provided evidence that the population of Birmingham, Alabama is in need of additional aid. Cancer is the 2nd leading cause of death in Alabama. 29.4% of the population in Birmingham, Alabama live below the poverty line. Households in Birmingham have a median annual income of $32, 404. 28% of adults ages 18-64 report past-due medical debt. 1 in 5 working-age Americans with health insurance have trouble paying off their medical bills. Patients and families face mental health, emotional, and physical challenges associated with undergoing treatment and having family members in such a state of health. We strive to ease the burdens of cancer patients and their families in the city of Birmingham, Alabama by offering financial and social services. Coins for Cancer offers a comprehensive application that families may complete in Children’s Hospital or UAB Hospital. Patients and families are selected upon criteria such as household income, number of dependents in household, and type of cancer. The organization crafts a narrative to raise awareness of the patient’s condition and proceeds to begin fundraising efforts both through crowdfunding platforms and by means of student fundraising at UAB. Results from fundraising efforts were largely successful as Coins for Cancer raised well over $10,000 in a semester. The number of members increased drastically as well. The organization works to meet the personal needs of Birmingham, Alabama.

Raksha Ramdas, Scott Nguyen, Leanna Crafford, Sean Martin

Effect of Time-Restricted Feeding on Daily Adherence and Food Intake

Can changing the timing of meals lower the risk of obesity and cardiometabolic diseases? Time-restricted feeding (TRF) is a novel type of intermittent fasting that
involves eating in 3-10-hour daily period and fasting for 14-21 hours per day. In this clinical trial, we will enroll 86 adults with obesity to test whether TRF can enhance weight and fat loss and improve cardiometabolic risk factors. Participants who are dieting will be randomized to eat over a 12-hour or longer eating period (control group) or to practice TRF by eating between 7:00 AM-3:00 PM (8-hour eating period) for 14 weeks. In this portion of the study, we will examine adherence to the meal timing schedules and changes in food intake. Participants will complete daily surveys in which they document their start and end eating times on a daily basis. They will also use the remote food photography method (RPFM) and take before and after pictures using the SmartIntake app of all food they consume for three days. To date, 15 participants have started the study intervention. On average, the TRF group was 81% adherent to their eating schedule, while the control group was 93% adherent. The average start and stop eating times in the TRF group were 7:52 AM and 3:49 PM, respectively, and the average start and stop eating times in the control group were 7:49 AM and 7:58 PM, respectively. In sum, these data suggest that TRF may be feasible in the real-world.

Tulsi Patel