4-14-2016

2016 UAB Expo

University of Alabama at Birmingham

9TH UAB EXPO 2016

AN EXPOSITION OF UNDERGRADUATE RESEARCH

SCHEDULE OF EVENTS

ORAL PRESENTATIONS

APRIL 14TH, 2016 / 1-5 PM

POSTER PRESENTATIONS

APRIL 15TH, 2016 / 7AM-12:30PM

9th Annual UAB EXPO

An Exposition of Undergraduate Scholarship

Welcome

The University of Alabama at Birmingham and the Office of Service Learning and Undergraduate Research are proud to welcome you to the 9th Annual UAB EXPO: An Exposition of Undergraduate Scholarship. This year's EXPO promises to be the largest to date, with over 200 student presentations and approximately 500 student participants, represented by all academic disciplines. We have observed a significant growth expressed by the undergraduate student research with their creative and innovative ideals that have been under-represented in the past. Therefore, we are excited to showcase a vast diversity of student achievements who have put in their hard work and effort. By working with faculty, graduate students, peers, or individually, these aspiring and highly motivated students are an inspiration to the entire university. Our faculty continually seeks to encourage undergraduate students in quality research, discovery and creative endeavors that will define their academic experience. We would like to give a special thanks to all faculty members who have helped assist in mentoring student presenters, as well as, a hearty congratulations to all our student participants for their contribution and their impressive body of work presented today.

Through collaborative efforts of the EXPO Council, Undergraduate Research Ambassadors and Inquiro-Editorial Board, we would like to give a sincere thanks for their tireless efforts in planning and development.

We celebrate the established tradition of annually recognizing the research and creative accomplishments of our best and brightest undergraduate students.

Best Regards

Gareth Jones
Program Administrator for Service Learning and Undergraduate Research

Sofia Canlas & Kuheli Mitra
UAB EXPO 2016 Directors

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ORAL PRESENTATION — APRIL 14TH 2016

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11:45 AM - 12:30 PM	Award Ceremony	Hill Center Alumni Theater

Keynote Speaker

BECOMING CONFIDENT IN CURIOSITY: LIVE THE QUESTIONS

Josh Carpenter is the co-founder and president of Bama Covered, a non-profit public health education initiative. Due to its innovative approach in grassroots health education and student engagement, Bama Covered has been featured in the New York Times, NPR, and NBC news among other national and local publications. Founded in the winter of 2013, Bama Covered trained and mobilized nearly 700 college students to engage in 100,000 conversations in the communities that surrounded their campuses. Previously, Mr. Carpenter served as a White House intern and was a Teach for America corps member in Alabama's inaugural corps. He taught English and theater, and coached football and baseball in his home state of Alabama, where in 2012, he was named the state's "Golden Apple Teacher of the Year." A Rhodes Scholar, Mr. Carpenter earned his M.Sc. in comparative social policy and is currently studying for a D.Phil. in politics at Oxford University where he explores the intersections of the political engagement of low-income citizens and health policy. He also holds a B.S. in business from the University of Alabama at Birmingham where he graduated, Magna Cum Laude, was named the school's top business student, and received the President's award for outstanding campus leadership.

While in Oxford, Mr. Carpenter was selected as a Global Shaper by the World Economic Forum. In addition to actively participating in sports at Oriel College, he served as a founding board member of The Good Lad Workshops which aim to promote postive masculinity on college campuses. Mr. Carpenter currently resides in Birmingham with his wife, Nicole, where he serves on a number of advisory boards in the community.

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ARTS AND HUMANITIES

Back on the Clock

Rebecca Hyde

Stories from the Line was a documentary film and photography course which investigated inequality in our community that can often keep people living below or near the poverty line. The final course assignment was to create a photo essay or short documentary portrait film. This film explores the life and circumstances of Dorothy Turner, and employee enrolled in the Senior Community Service Employment Program (SCSEP) at the Jefferson County Office of Senior Citizens Services.

Bad Medicine

Zach Walker, Samantha Richardson, Heather Robinson, Stephen Stark, Raizel Coiman

Many regard heroin as a deadly, yet distant drug – an intangible threat far-removed from their own daily lives. However, studies have shown that 8 out of 10 heroin users developed an addiction by abusing household opiates, commonly in the form of prescription pain pills. Opiate/heroin addiction in the Birmingham area has risen dramatically in the last ten years. To combat this growing epidemic, UAB Digital Media and the U.S. Department of Justice, have created a heroin awareness/prevention campaign entitled KNOW DOPE. One of six public service announcements within this initiative, Bad Medicine, seeks to emphasize the link between prescription pain pill consumption and heroin in an engaging and buoyant manner. While a majority of the content within the KNOW DOPE campaign chronicles the stories of individuals personally affected by opiate/heroin abuse, Bad Medicine diverts away from that format in favor of a lighthearted infographic PSA, with a heavy reliance on animation and over the top, cartoony sound effects. With the implementation of contrasting animation and music styles, Bad Medicine communicates the grave realities of heroin's recent accessibility in a quick, exciting way, with an air of tasteful levity throughout.

Done Lost Too Much

Devin Lunsford

Done Lost Too Much is a photo essay focusing on meth addicts in recovery at the Foundry in Bessemer, AL. It was completed as a part of the class Stories from the Line. Stories from the Line was a documentary film and photography course which investigated inequality in our community that can often keep people living below or near the poverty line. The final course assignment was to create a photo essay or documentary film.

Exposing the Roots of Obesity

Shelly Choi, Mary Kopp, Caitlin Strother

We investigated the health disparities regarding obesity in Birmingham and found numerous causations that we want to depict through a children's book. This is an important issue because of the skyrocketing obesity rates in the United States. We conducted our own research on the subject and plan to conduct interviews to add first hand experiences to our work. We found accessibility and built environment as well as the need for encouragement and implementation of physical activity were some of the main causations for today's obesity epidemic. Overall, we found that obesity is not inevitable. Instead, the causations are much deeper than choosing an apple over a hamburger. Through putting this information into a children book, we are translating our findings into a simpler and easier to understand format.

Jim in Antarctica: Creating a Social Media Strategy for a Naturalist

Kayla McLaughlin, Raizel Coiman

Last semester, Dr. James McClintock, UAB's Endowed University Professor of Polar and Marine Biology, approached UAB Digital Media to to bolster his online presence via his Twitter account. Media Fellows Kayla McLaughlin and Raizel Coiman were given a unique opportunity to become Dr. McClintock's Twitter "publicists." After meeting with McClintock to talk about his goals, the team began planning strategies to gain engagement and followers through promoting his book A Naturalist Goes Fishing, released Nov. 27, 2015, engaging with his audience during talks, and emphasizing the environmental issues he supports. McClintock wanted Twitter to work as a promotional tool; but the team also identified that his knowledge and cause could set him apart as a thought leader in his circle of conversation. The team learned the importance of finding relevant environmental and conservation hashtags, utilizing graphics for events, book promotion, and educating the client on the social platform. Although Dr. McClintock requested the team to manage his account, McLaughlin and Coiman realized that it was equally important to teach him how to interact with his audience to provide a more authentic voice and allow him to sustain his account in the future.

KNOW DOPE Campaign

Sarah Buckelew, Anissa Latham-Brown, Matthew Henton, Brodie Foster, Heather Robinson, Heather Garner, Jonathan Niega, Kayla McLaughlin, Matt Drummond, Raizel Coiman, Samantha Richardson, Stephen Stark, Zach Walker

When UAB Digital Media began working with Attorney Joyce Vance and the U.S. Department of Justice in 2014 on the "Pills to Needles" initiative, the goal was clear – create a campaign to end prescription pill and heroin abuse amongst young adults. The team put together advertising strategies to develop the campaign now branded as KNOW DOPE. The team's goal was to share knowledge about opiates so that young adults could make more informed decisions about drug use. As a creative agency powered by students working on a campaign for an adolescent audience, it gave the team a unique opportunity to create content geared towards us. Creating public service announcements for younger audiences is often challenging because adolescents are not geared to listen to authority. The team had to work to create a campaign that presented information in an open and emotionally connective way so we could teach people without alienating our audience. Through intensive research and discussion, the team refined a plan to explore the heroin epidemic from several points of view. UAB Digital Media spent a year and a half creating six public service announcements and a short documentary using different genres to appeal to the emotions of young viewers. The team also created a website with activities and learning tools to be used in schools across Central Alabama. Going forward the team hopes the campaign has the versatility to help address future drug issues that may arise.

Learning Through Living

Kim Burleson

For my internship, I have been helping to teach French to students at Indian Springs School. I worked with 65 students across 6 different levels of French. The school believes in "Learning Through Living." This means that they believe that allowing students to make mistakes (socially, academically, etc.) is okay because then they can learn and understand what was wrong. For example, a student wearing a shirt that promotes misogyny to school and a teacher explaining to them how it is hurtful and to help them understand why it is hurtful. The school also believes in using the input hypothesis which is used in second language acquisition. The input hypothesis is when a student is given a more advanced level of language than their current level and they are nonetheless able to comprehend and progress their knowledge.

LEVEL UP, 2016 Birmingham AAF Awards

Zach Walker, Brodie Foster, Stephen Stark, Jonathan Niega, Samantha Richardson, Heather Garner

UAB Digital Media and Bloom Studios were invited to be agency of record for the 2016 American Advertising Awards by the Birmingham American Advertising Federation. The goal of the AAA competition is to recognize and reward the creative industry in Birmingham. This year's theme was "Level Up" which celebrated the growth of Birmingham's advertising community and young creative talent. The primary audience for this event is typically professionals working at ad agencies, within corporate marketing departments, at design firms, for a wide variety of production houses and other related businesses. This year, the client wanted to be more appealing to younger adults without doing anything to alienate our traditional audience. We referenced Birmingham's next level with the creation of the character, "Robot LUXE." Birmingham, as Robot LUXE, is the central figure in this campaign. Rich metallic colors and luminous shapes were used throughout all collateral and social media. As Robot LUXE, Birmingham creatives are called to LEVEL UP their own game for the coming AAF Awards.

Linguistic Landscape of Greensprings Highway

Meghan Ryan

Scores of unsigned, undated and unknown works await discovery. These unknown works, with little established information or written account, hold answers that may bridge gaps in art historical scholarship. This project analyzed an undated and unsigned oil painting of a landscape scene provided by a local Birmingham conservator. The goal of this research was to identify the location depicted in the piece and to determine an approximate date of creation for the work in order to associate this unknown composition with a specific artistic movement. Analysis of this work relied upon visual evidence provided by the painting (e.g. brushstrokes, technical approaches, etc.), contextual information (e.g. stylistic methods), and historical accounts of similar works.

Linguistic Landscape: Application in Places of Entertainment in Birmingham, AL

Brandon Schoening, Emma Schroer, Savannah Gress

This research study analyzes the visual presence of foreign languages in daily life in places of entertainment in Birmingham, Alabama, such as gyms, cinemas, etc., and examines the implications of the status of globalization based on the visual presence, or lack thereof, of foreign languages. Major areas of research are the languages that are present, the context of which those languages can be found, and possible explanations as to why certain languages are found in certain places/instances, and others are not. Another area of examination is the presence of spoken languages, and how many people that work in or visit these places utilize the capacity to engage in conversation in more than one language. The overarching goal of this project is to find out just how much foreign languages have been integrated into daily life in the Birmingham area, and to try and grasp a more firm understanding of what that means in the bigger picture of globalization and cultural diversity.

Linguistic Landscape: Visual Language Accommodations in Birmingham Hospitals

Nayivis Cunill, Nicole Lassiter, Samantha McDonald, Charli Tyree

The purpose of this study was to investigate how major hospitals cater to the linguistic needs of the diverse community in Birmingham, AL through linguistic landscape. Three hospitals (Brookwood Medical Center, UAB Hospital, and Grandview Medical Center) were selected for study from three areas of Birmingham (Mountain Brook, Downtown, and Homewood). In our collaborative group of four, each person will act as an investigator. The team studied the presence of signs and printed materials in different languages in the following five areas within the hospitals: cafeterias, religious centers, help desks, elevators, and hallways. It was determined that Brookwood Medical Center had not made many linguistic accommodations for non-English speakers until the population numbers began to shift drastically in 2000. We hypothesized that UAB Hospital and Grandview Medical Center have made more linguistic accommodations and preparations for non-English speakers. The changes in the number of non-English speakers that have moved to the area in the recent years suggest the need for further research on the linguistic landscape accommodations that have been made in these major healthcare facilities. This investigation will determine the facility or facilities that best accommodate non-English speaking patients as well as the manner in which they do so. The ultimate goal of this research is to demonstrate effective ways to accommodate non-English speakers in healthcare settings so that they are comfortable during hospital visits.

Make Your Mark

Samantha Richardson, Jonathan Niega, Terrence Wimberley, Zach Walker, Sarah Buckelew

The University of Alabama at Birmingham is known for its undergraduate research in both arts and sciences alike. A convergence of cultural diversity, Birmingham is historic and modern, southern and urban, organic and industrial. The goal of Make Your Mark was to feature the diverse range of creative research at UAB in the Department of Art and Art History. The video was produced completely by students and features student work within various areas of study within the department (painting, graphic design, photography, printmaking, sculpture, drawing, new media). Our team researched experimental techniques to implement for the video, including the use of stop motion animation and dreamy color correction. The video also called for a careful consideration of music to capture the hybrid nature of the Birmingham art scene. Make Your Mark challenge students to engage with the urban environment, to think conceptually about heir work, and to embrace their diversity as creative professionals.

Mr. Posey

Sarah Buckelew

Stories from the Line was a documentary film and photography course which investigated inequality in our community that can often keep people living below or near the poverty line. The final course assignment was to create a photo essay or short documentary portrait film. For my film project I was interested in looking at the unequal opportunities and struggles that people face in exiting the prison system. I was able to do a portrait piece on Mr. Lawrence Posey who works teaching classes to help provide people a smoother re-entry into society for people leaving the prison. Mr. Posey shared with me his personal journey of having been through the prison system and what he is able to do today.

Omani Students at UAB

Brodie Foster, Jonathan Niega, Matthew Drummond, Zach Walker

Omani Students at UAB is a recruitment video produced by UAB Digital Media aimed at undergraduate middle eastern students, particularly those from Oman. This video is an initiative to reach out to students where they are and let them know that their presence on this campus is wanted. The video follows a fairly traditional format for a recruitment video of showing students talking about their experiences and why they love being a student at this university with one important difference – the content is entirely in Arabic. The decision to have the three featured Omani students speak in Arabic came from a desire to speak to the intended audience in the most authentic way possible. Not only were the potential students the intended audience, but also the parents who may not speak English at all. The students answered prompts about their experiences as international students at UAB, recorded those answers in Arabic, and then provided our team with English translations. The language barrier prompted a change in the editing workflow involving constructing the dialogue of the video with the translated script and then pulling the corresponding clips in their original Arabic into the timeline. This project allowed the team to lay a foundation for working on videos not exclusively limited to English-speaking subjects. The goal moving forward is to make more videos like this, reaching out to international students in their own language to address the need for diversity in campus recruitment material.

Sex and Stigma: The Naked Truth

Myah Morton, Erica Webb

As a pair we will be performing a spoken word poem that addresses the myths and misconceptions involved in sexual education, especially regarding women. This work places an artistic, passionate spin on research to create awareness about the importance of accurate, comprehensive sexual education. Sex and the human body are surrounded by stigma and taboo which then leads to the creation of problematic health disparities, or the preventable differences in the burden of achieving optimal health, such as high teenage pregnancy and sexually transmitted disease rates. We will also be using a visual aid to demonstrate the popularity of common misconceptions. We plan to present information gathered through our research conducted throughout the semester, including a survey for assessing the reality of misconceptions by young adults. It is expected that our survey results will illustrate several sexual misconceptions due to inadequate education or misinformation, including stigmas, received during adolescence. Additionally, we also believe our audience will want to learn the truths about sex while understanding the importance of open communication on the topic of sexual health.

Shedding Light to the Deep-Rooted Secrecy: How Asian Cultural Expectations Affect Eating Disorder

Tina Yeom, Paul Peterson

In America, not many people know exactly how many Asian-Americans are suffering from eating disorders especially due to Asian-Americans' stubbornness to stay shut about their lives. Many Asian Americans suffer eating disorder due to the cultural expectations. The topic of how Asian cultural expectations affect eating disorder is important because it is important to raise awareness that they are not alone and help them come out and reach out for help to gain back their health. Unfortunately, it is hard to help or raise awareness to the issue because Asians or Asian Americans are very secretive. We did a survey to find out what Asian Americans think about what women's bodies should look like and what other ethnic groups think about how Asian American women should look and also if they are aware of the issue of eating disorders in Asian American culture. We also did a study to find out what the world is aware of and what the world expects Asian Americans to look like. We also used a primary source of including a personal story from Tina. We hypothesize that both Asian Americans and non-Asian cultural groups will both have similar expectations of what Asians should look like. Non-Asians will not realize how serious the issue of eating disorder is in Asian culture and Asian Americans will not admit that they have an eating disorder even when they do.

Show Them the Way

Charlotte Boles

Stories from the Line was a documentary film and photography course which investigated inequality in our community that can often keep people living below or near the poverty line. The final course assignment was to create a photo essay or short documentary portrait film. This film follows Tangela, a Workshops, Inc. employee who tells her story of experiencing both poverty and living with a disability.

Stay the Course

Kayla Gladney

Stories from the Line was a documentary film and photography course which investigated inequality in our community that can often keep people living below or near the poverty line. The final course assignment was to create a photo essay or short documentary portrait film. Specifically, Stay the Course is a short film by Kayla Gladney about Montgomery native Torian Hamilton. She shares her story of finding peace through the tragedy of losing a loved one.

Stories from the Line: College Debt and Poverty

Kashara Johnson

This Stories from the Line photo essay follows a young 20-something woman living near the poverty line as a result of mounting student loan debt and a dismal job market.

The Lost Image: Acknowledgement and Analysis of a Hudson River School Painting

Megan Blair, Leigh Anne Roach, Ph.D

Scores of unsigned, undated and unknown works await discovery. These unknown works, with little established information or written account, hold answers that may bridge gaps in art historical scholarship. This project analyzed an undated and unsigned oil painting of a landscape scene provided by a local Birmingham conservator. The goal of this research was to identify the location depicted in the piece and to determine an approximate date of creation for the work in order to associate this unknown composition with a specific artistic movement. Analysis of this work relied upon visual evidence provided by the painting (e.g. brushstrokes, technical approaches, etc.), contextual information (e.g. stylistic methods), and historical accounts of similar works. Geographic features of the depicted landscape strongly suggest the work portrays a northwest view from Trophy Point at West Point overlooking Storm King Mountain and the Hudson River. Evidence suggests the artist most likely chose this view because of its rich historical significance to the American identity. Technical aspects of paint manipulation and application along with the stylistic feature of the production of internal light from within the painting revealed the artistic movement was likely associated with that of the Hudson River School between 1843 and 1847. Since this movement is associated with the establishment of America's national identity and the importance of a unified state, these findings bolster the idea that this work created inspiration and motivation for the future of the United States of America.

Twin Tolerances: Secularism and the Rise of Political Islam in Turkey

Rebecca Hyde

Today Turkey has once again become a focal point in the region due to its placement between Europe and the Middle East. With its constant efforts to join the European Union pulling it westward and the increase in Islamic political influence pulling it eastward, Turkey's fundamental identity is currently in flux. Many in the Turkish public have shown disapproval of the possible turn back to the country's Islamic roots, and the situation with the Islamic State and other extremist movements has not eased the situation. However, the is also a significant amount of the Turkish population who believe it is time to take power back from the "secular elite" and put it back under a modern Islamic authority. Through researching the degree to which the current secular Kemalist ideology has affected the elected Justice and Development Party's Islamic ideology, a templet can be made as to the degree in which state sponsored Islam and secularism can coexist within Turkey with the hypothesis that despite efforts to hold true to their initial Islamic ideology, the Justice and Development Party has not been able to transform the secular policies in Turkey and instead have modified their own ideological stance to be accepted by the State.

UAB Digital Media Website Development and Design

Heather Robinson

As a creative agency powered by students, UAB Digital Media focuses on digital storytelling. One of the areas of focus for the team includes developing websites that accurately reflect the client – whether a department within the College of Arts and Sciences or an external client. All UAB websites are run on the Joomla platform, which creates some restrictions in terms of user experience and mobile friendly design. With websites, there are two perspectives: front end and back end. On the back end, there are restrictions within the platform you are working with where you have to implement coding, modules, and content. The front end is the culmination of the work on the back end and contributes to the user experience. Website development with UAB Digital Media is a collaboration between the internal design team and web team. The design team creates the look and feel of the site while the web team executes their creative vision. The web team formats their designs for each individual site to ensure the design creates an intuitive experience from any device. Moving forward with website design, the team is pushing for the modernization of UAB sites using extensions, such as Widgetkit, that have the capability to allow for more design freedom.

BIOLOGICAL AND LIFE SCIENCES

An Epigenetic Axis in Bone Formation

Laith Matalka, Katie Powers, Tanner Godfrey, Dr. Mohammad Hassan

Recently, we found that miR-23a cluster controls in-vitro bone formation by regulating Ezh2 (Enhancer Of Zeste Homolog 2), a subunit of Polycomb Repressive Complex 2 (PRC2). Therefore, our current objective is to test the hypothesis that the miR-23a cluster controls bone synthesis by regulating Runx2-dependent Ezh2 expression. To test this hypothesis, we analyzed the changes of physical, histomorphometric, and histochemical properties in WT, and miR-23aClZIP mice during skeletal maturity of 2-months. Next, we also measured differential expression of key chromatin factors using RNA-sequencing in WT, and 23aClZIPmouse. To study the in vivo role for this bone-regulating miRNA cluster, we created an inducible anti-miR-23a cluster (miR-23aClZIP) knockdown mouse model. Interestingly, our miR-23a cluster knockdown mice develop high cortical and trabecular bone. RNA sequencing from these mice displayed increased expression of Runx2, the master transcription factor essential for skeletogenesis, and decreased expression of Ezh2, a chromatin repressor also indispensable for skeletogenesis. Furthermore, we observed that Runx2 decreases the chromatin repressive activity of Ezh2 at promoters of bone essential genes for osteogenesis. Together, our findings strongly suggest that miR-23a cluster connection with tissue specific RUNX2–EZH2 function linked to bone homeostasis is a very unique regulatory mechanism. Together, our findings strongly suggest that miR-23a cluster connection with tissue specific RUNX2–EZH2 function linked to bone homeostasis is a very unique regulatory mechanism.

Analysis of a Potential Intronic Enhancer in the Zebrafish Tyrosinase Gene Using the CRISPR-Cas9 Technology

Raven Edwards, Rachel Rock, Tina Tian, Anil Challa

Tyrosinase is a highly conserved gene found across species and is involved in the development of pigmentation in the skin and eyes. Mutations in the tyrosinase gene are associated with human oculocutaneous albinism. Zebrafish (*Danio rerio*) is a powerful model system to explore different aspects of gene expression due to its relatively short reproductive cycle as well as the abundance of offspring. Studying tyrosinase gene expression and regulation in the zebrafish is advantageous owing to clear, observable phenotypic changes during the first five days of embryonic development. Our study focused on the potential role of a highly conserved non-coding sequence in the zebrafish tyrosinase gene and tested if that sequence acts as a regulatory element controlling gene expression. The experiment was designed to study a specific sequence located in intron 1 of the tyrosinase gene; this potential enhancer sequence is conserved in humans and mice as indicated by the ECR Browser. CRISPR-Cas9 technology has very recently been used to study the role of enhancers in gene expression by creating targeted deletions. We designed paired sgRNAs to excise 96 bps of the intronic sequence and also targeted exons 1 and 2 as controls. In vitro synthesized CRISPR/sgRNAs were co-injected with Cas9 protein into the one-cell stage of zebrafish embryos. Phenotypic analysis and preliminary genotypic analysis are in progress. Using CRISPR-Cas9 technology to study enhancers opens doors to the uncharted regions of the genome, potentially finding the functions of non-coding regions. Our study capitalizes on this direction of thought thus demonstrating how powerful this genomic editing tool is for future investigations into the genome's so-called "junk DNA."

Analysis of Magnetic Resonance Images of the Spinal Cord In a Patient with High Cervical Spinal Cord Injury Given CI Biofeedback Therapy to Train Functional Movement of an Originally Paralyzed Arm

Joshua Purvis, Brent Womble, B.S., Ameen Barghi, B.S., Thomas Denney, PhD, Edward Taub, PhD

Our laboratory has worked with a patient who has motor-complete tetraplegia following a spinal cord injury (SCI) 4 years ago. Beginning 3 years ago, Constraint-Induced Biofeedback Therapy (CIBT) has been used to retrain her to carry out some functional arm movement. In collaboration with Auburn University, the patient's brain and cervical spinal cord has been scanned using their high field strength (7 Tesla). To post-process these scans, we used Spinal Cord Toolbox (SCT), an analysis software for multimodal spinal cord magnetic resonance images, to generate probabilistic segmentations of gray and white matter tracts. SCT has not yet been used with individuals with SCI; therefore, we explored new methods by supplementing SCT with analyses in MATLAB. We analyzed the cross-sectional area of the spinal cord above and below the lesion, and on the the and left sides of the spinal cord. We established the methods using spinal cord images of healthy controls. The normal findings are consistent with existing anatomical papers from post-mortem dissections. There is considerable atrophy, and blurring of normal anatomical landmarks in the SCI patient. Given the anatomical status of the spinal cord, it is remarkable that it has been possible to reestablish some functional movements in the trained arm of this patient. We will use these methods to assess longitudinal changes in the spinal cord from a series of patients with SCI treated with CIBT.

ANK6 Dipeptide Improves Cognition in Alzheimer's Disease Transgenic Mouse Model

Emily Jennings, Inga Kadish, Ph.D., Dieter Willbold, Ph.D., Thomas van Groen, Ph.D.

Alzheimer's Disease is a neurodegenerative disease whose contributing factors are not well understood. It is thought that overproduction, decreased clearance, and increased deposition of amyloid beta (Aβ) leads to cognitive decline and other symptoms associated with Alzheimer's Disease. Our lab previously found that treatment with monomeric D3 peptide (an amyloid beta oligomer directed D-enantiomeric peptide) improves cognition and decreases levels of amyloid beta deposition and inflammation in a double transgenic mouse model for Alzheimer's Disease. This study tests the hypothesis that the ANK6 dipeptide (a D3 dimer) also causes a decrease in amyloid beta deposits in the brains of transgenic mice with the Swedish-Dutch-Iowa amyloid precursor protein mutation, and improves cognition. APPSwDI mice were treated with ANK6 dipeptide or a saline control, delivered via Alzet minipumps surgically inserted beneath the peritoneal layers, for four weeks. Behavioral tests including the open field test, the zero maze test, the object recognition test, the smell test, and the Morris water maze were performed in order to anxiety and study spatial learning and memory in the mice. Immunohistochemistry was performed to identify changes in levels of inflammation and amyloid beta deposition. We have concluded thus far that D3 dimers do not reduce amyloid beta deposits, however cognition was improved in the mice treated with the ANK6 peptide.

Assessing the Effects of Cannabis Oil on Breast Cancer Cells

Kayla Hazelwood, Zainab Suleiman

Medical marijuana and cannabis oil is a growing industry in the scientific world. Since the legalization of cannabis's medical use, research and experimentation has become the central focus of accessing the drug's effectiveness to heal or cure disease. Particularly looking at breast cancer cells, the effects of cannabis oil without THC is being accessed through assay applications. In the past, cannabis has been used and proven to relieve cancer symptoms as well as reverse side effects to current cancer treatment. Therefore, we propose and will test the hypothesis that cannabis oil that is devoid of the active ingredient, THC, will reduce cell viability and induce apoptosis in cancer cells. This hypothesis was tested in the breast cancer cell line MDA-MB231. The effects of cannabis oil on cell viability and apoptosis was tested by culturing cells at 10,000 cells per well in a 96 well plate; followed by treatment with cannabis oil at 0, 0.01, 0.05 and 0.01 % for 24 hours; followed by measurement of cell viability, toxicity, and apoptosis using the ApoTox-Glo Triple Assay. The effects of each treatment were compared between treated and non-treated samples using Analysis of Variance (ANOVA). Based on preliminary and current findings, cannabis oil reduced cell viability and induced apoptosis in the breast cancer cells MDA-MB231 cells. Further statistical analysis conclude that the treatment is effective. A p value < 0.05 will be considered significant data in support of the cannabis oil.

Assessing the Role of *Drosophila melanogaster* HP1B Protein in Aging

Andrew D. Thomas, Benjamin B. Mills, Nicole C. Riddle

Aging is marked by a gradual change in macromolecules that, over time, negatively affect biological processes such as gene expression and the maintenance of chromatin structure. Age-related aberrant gene expression can lead to a number of health complications, making age the single greatest risk factor for the development of many human diseases. Heterochromatin proteins play important roles in chromatin structure and gene regulation, suggesting a link to aging. To further investigate, we have chosen the *Drosophila melanogaster* protein HP1B, a member of the Heterochromatin Protein 1 (HP1) family of proteins. HP1 proteins are highly conserved across eukaryotes, playing a vital role in the formation and maintenance of heterochromatin. To probe for a connection between HP1B and aging, we assayed two HP1b null mutant strains for phenotypes related to aging. We measured longevity, as well as various forms of stress resistance. Our results show that fly strains lacking HP1B have both increased starvation and oxidative stress resistance. In addition, although they have shorter maximum lifespans compared to the wild type, they have a longer average lifespan. These results support a potential connection between chromatin proteins and aging and suggest that chromatin proteins should be evaluated as targets for future aging therapies.

Binocular Integration Across the Visual Field for Letter Recognition in Normal and Glaucomatous Vision

Lillian Chien, Rong Liu, Christopher A Girkin, MiYoung Kwon

Glaucoma is a leading cause of world blindness, associated with visual loss in locations across the visual field. Because clinical tests often measure visual loss separately in each eye, it is useful to determine a binocular summation model: a formula to predict how a person will combine images from each eye. Although previous studies tested summation of light sensitivity, it remains unclear how summation affects every day visual tasks, such as reading. The purpose of this study is to determine the best model for predicting visual field integration for letter recognition, the building blocks for reading. Subjects, with glaucomatous or normal vision, identified alphabet letters at thirteen predetermined locations across the visual field. Contrast threshold, the faintest contrast at which the subject could recognize letters, was measured for each eye separately and for both eyes together. Using thresholds from each eye, the binocular visual field sensitivity was predicted using three models: i) Best Eye; ii) Best Location; and iii) Quadratic Summation. The differences (Mean Squared Errors - MSE) between predicted and experimental binocular fields were calculated. The smallest MSE would indicate the best model. Our results showed that, for normal vision, Quadratic Summation best describes binocular summation. Similarly, for glaucomatous vision, in normal areas, Quadratic Summation is superior. However, in areas of visual loss, Best Eye or Best Location are better. This suggests a dual-approach to binocular visual field integration for glaucomatous vision, which may be useful for understanding everyday binocular function in glaucoma patients.

Early Lipid Changes in Acute Kidney Injury Using SWATH Lipidomics Coupled with MALDI Tissue Imaging

Sangeetha Rao, Kelly Walters, Landon Wilson, Alex Johnson, Bo Chen, David Graves, Subhashini Bolisetty, Stephen Barnes, Anupam Agarwal, Janusz Kabarowski

Acute kidney injury (AKI) is one of the leading causes of in hospital morbidity and mortality, particularly in critically ill patients. Although our understanding of AKI at the molecular level remains limited due to its complex pathophysiology, recent advances in both quantitative and spatial mass spectrometric approaches offer new opportunities to assess the significance of renal metabolomic changes in AKI models. In this study, we evaluated lipid changes in early ischemia reperfusion (IR) related acute kidney injury in mice by using SWATH mass spectrometry (MS) lipidomics. We found a significant increase in two abundant ether-linked phospholipids following IR at 6 hours post injury, a plasmanyl choline, phosphatidylcholine (PC) O-38:1 (O-18:0, 20:1) and a plasmalogen, phosphatidylethanolamine (PE) O-42:3 (O-20:1, 22:2). Both these lipids correlated with severity of AKI as measured by plasma creatinine. In addition to many more renal lipid changes associated with more severe AKI, PC O-38:1 elevations were maintained at 24 hours post-IR, while renal PE O-42:3 levels decreased. In order to further assess the significance of this early increase in PC O-38:1, we used matrix-assisted laser desorption ionization imaging mass spectrometry (MALDI-IMS) to determine whether it occurred in proximal tubules, a region of the kidney that is most prone to IR injury and also rich in the rate-limiting enzymes involved in ether-linked phospholipid biosynthesis. Use of SWATH MS lipidomics in conjunction with MALDI-IMS for lipid localization will help in elucidating the role of lipids in the pathobiology of AKI.

Effect of Microcurrent on ΔF508 CFTR

Andrew Van, Collin Nichols

Cystic fibrosis is a genetic disease affecting primarily the lungs. The bases of this disorder are genetic mutations in the gene for the cystic fibrosis transmembrane conductance regulator (CFTR) protein, a transmembrane Cl^- channel that transports chloride ions across epithelial apical cell membrane. These mutations have varying effects from premature stop codon, improper splicing, improper folding/trafficking, diminished gating, narrow channel, and decreased stability. Most common among these mutations is deletion of phenylalanine at residue 508 (ΔF-508 CFTR) which is present in most cystic fibrosis (CF) patients. Trafficking of CFTR to the membrane in epithelial cells of these patients is reduced to 5% compared with normal, but the 5% that is on the membrane is fully functional. Maneuvers that might increase trafficking of the ΔF-508 CFTR to the membrane may present potential treatments for CF. Studies in vitro and in vivo have shown that microcurrent can alter protein expression and localization. Therefore, we proposed and will test the hypothesis that microcurrent will increase trafficking of ΔF-508 CFTR to the apical membrane. This hypothesis will be tested in tracheal cells stably expressing WT-CFTR or ΔF-508 CFTR. Cells will be plated on cover slips and treated with 0, 77, or 1800 Hz for 0.5 or 24 hrs followed by protein detection using immunofluorescence and Western blot. The effect of each treatment on protein trafficking will be compared between treated and non-treated cells using Analysis of Variance (ANOVA). p values ≤ 0.05 will be considered significant. Based on preliminary studies using microcurrent, we anticipate that ΔF-508 CFTR trafficking to the membrane will be increased.

Effects of HP1b Mutation on Wing Morphology in *Drosophila melanogaster*

Michael Azar, Louis Watanabe, Nicole C. Riddle

The HP1 family of proteins is highly conserved from flies to humans. One member of the family, HP1B, is known to regulate transcription of heterochromatic and euchromatic genes, although the specific mechanisms by which it operates are unknown. Evidence of a notched-wing phenotype—that is, a partially missing portion of the wing along its edge—has previously been detected in fly lines where HP1B levels have been reduced by RNAi knockdown. An ectopic wing vein phenotype, characterized by the presence of an additional small vein on the wing, also was detected in these lines. Our lab has generated two HP1b mutant lines by imprecise P-element excision. The purpose of this study is to characterize the phenotypic effects of HP1b deletions on *Drosophila melanogaster* wing morphology. Five pairs of wings from 14-day old y-w-, HP1b16, and HP1b86 flies of both sexes were obtained (for a total of 20 wings per genotype), and images of the wings were captured using a high-resolution digital camera. Our results indicate that the presence of the ectopic wing phenotype differs significantly between y-w-, HP1b16 and HP1b86 flies, specifically, that it appears the most in the HP1b16 line. The notched-wing phenotype reported previously was not detected in any of the wings, indicating that the notched-wing phenotype may not be caused by the loss of HP1B. FIJIwings, a program that analyzes the structure of *Drosophila melanogaster* wings, will be used to visualize the vein structures of the wings.

ER Stress Signaling and Programmed Cell Death in the Model Plant *Arabidopsis thaliana*

Gail Hoffman

ER stress sensor protein IRE1 is involved in restoring ER homeostasis during mild ER stress, but promotes programmed cell death or PCD in extreme cases of ER stress. Both biotic and abiotic stress can cause programmed cell death in plants. Recent studies suggest that IRE1 is involved in this process. In order to enhance the understanding of IRE1's role in PCD, ire1a-2 mutants were crossed with plants mutated in NPR1, a regulator of the plant defense hormone salicylic acid signaling. The programmed cell death phenotype was measured in these mutants. The goals of this study were to produce viable double mutant offspring of ire1a-2 and npr1-1 mutants and to characterize ire1a npr1 double mutant in order to determine the role of ER stress and salicylic acid signaling in relation to programmed cell death. Crossing, or the deliberate interbreeding of plant individuals, was performed to produce double mutant offspring. After obtaining viable offspring, genotyping and qPCR were performed in order to confirm the genetic identity of the offspring produced. Pathogen and cell death assays were used to determine the involvement of different genes in programmed cell death. The crossing of ire1a-2 mutants and npr1-1 produced viable double mutants. Currently, the homozygous single and double mutants are growing and will be used for cell death analysis after heat shock and pathogen infection. The offspring of ire1a-2 mutants and npr1-1 are viable double mutants. These mutants can be used for experiments to enhance knowledge of salicylic acid signaling and ER stress interplay.

Evaluation of a Heterocyte Ratio to Determine the Long-Term Stress Response in *Malaclemys terrapin*

Jennifer Gelmis

Heterocyte ratios have long been used as a physiological indicator of stress in birds and reptiles. This research was a two part process which sought to characterize the leukocytes within the blood of the threatened *Malaclemys terrapin*, and to measure the heterocyte to lymphocyte ratio in captive turtles versus healthy, wild turtles. This is a minimally invasive procedure, requiring only a small amount of blood drawn from 17 specimens. The blood smear was stained with Wright's solution, and a hundred leukocytes were counted under oil-immersion. The results of this research are significant because they provide baseline ratios, and significant alterations may indicate a new stressor in the environment which may be manipulated through policy changes to aid in overall recovery efforts of the species.

Gastropod Dentistry: An Analysis of Teeth in Two Antarctic Species

Connor W. Stein, Julie B. Schram, James B. McClintock

Antarctica is a model environment for the study of the effects of anthropogenic climate warming and ocean acidification. Only a small number of studies have investigated the prospective effects of warming and acidification on shells of Antarctic gastropods, and to date there have been no studies on the radula, a key component of feeding anatomy. The purpose of the present study was to determine the prospective impacts of increased seawater temperature and decreased pH on radula tooth condition (evidence of dissolution, erosion, or breakage) of two common benthic Antarctic gastropods, the limpet *Nacella concinna* and the topshell snail *Margarella antarctica*. We exposed individuals of both species over a 6-week period to combinations of pH and temperature based on current ambient conditions (pH 8.0, 1. 5oC) and those predicted for 2100 (pH 7.8, 3.5oC). Following exposure, the radulae were dissected and mounted for observation using light microscopy and SEM. The docoglossate radular teeth of the limpet *N. concinna* showed no significant differences in tooth condition among the pH/temperature treatments. An evaluation of rhipidoglossan radulae of *M. antarctica* from the different treatments is currently underway. Our results to date indicate that the radula of the most common Antarctic limpet, *N. concinna*, is resistant to near-future pH and elevated temperature.

GBF1 and Plasma Membrane Protrusions

Akhil Kaushik, Theodore Busby, Elizabeth Sztul

Glioblastomas are known to be the most common and most aggressive brain tumors. They actively infiltrate the brain along the vasculature, in a process that relies on the production of protrusions to facilitate cellular movement. In Glioblastomas, GBF1, a member of the large, Sec7 domain-containing ARF Guanine Nucleotide Exchange Factor (GEF) family, is concentrated in the protrusions. Here, we wanted to study the possible requirement for GBF1 in the formation of Glioblastoma protrusions. To test our hypothesis, we generated GBF1 mutants (catalytically inactive GBF1-E794K-GFP and BFA-resistant GBF1-A795E-GFP) to assess the protrusions' dependence on GBF1. Using immunofluorescence assays, we show that endogenous and transfected Wild-Type GBF1 localize to the extensions in U87 Glioblastoma cells. We also show that the introduction of catalytically inactive GBF1-E794K-GFP causes the protrusions to retract, which causes the cells to adopt a more compact phenotype. Furthermore, we will assess the requirement for GBF1 by a cellular "replacement assay" in which cells are treated with a known GBF1 inhibitor, Brefeldin A (BFA), and introduction of BFA-resistant GBF1-A795E-GFP is expected to allow the transfected cells to form long extensions, while untransfected cells will be more compact and lose their extensions due to the inactivation of endogenous GBF1 in these cells. Our experiments will assess whether GBF1 is required for the formation of protrusions in Glioblastoma cells.

Generation of Synthetic Data to Test Sensitivity and Accuracy of Longitudinal Structural Analyses of Use-Dependent Structural Neuroplasticity

Joshua Purvis, Brent Womble, B.S., Mark Bolding, PhD, Edward Taub, PhD

Use-dependent structural neuroplasticity can arise from cellular mechanisms such as neurogenesis, increased dendritic arborization, synaptogenesis, gliogenesis, and/or angiogenesis. These changes can lead to an increase in thickness, volume, gyrification, or surface area of the cortex on the gross anatomical scale. Two main classes of longitudinal structural analyses, voxel-based morphometry (VBM) and surface-based morphometry (SBM), may be differentially sensitive to the different processes that could be responsible for neuroplastic changes. Using MATLAB, we created three longitudinal datasets with a single anatomical change made to each scan. The changes were either gross-anatomical (expansion or increased gyrification) or micro-anatomical (increased density). For the gross-anatomical changes, we used an existing 2-D moving least squares deformation algorithm and modified it to extend the changes into the third dimension. For the micro-anatomical change, the scans were first segmented using SPM12, then a spherical kernel masked to the gray matter was used to darken the image to represent increased density in the gyrus. After the changes were made, the scans were processed using Freesurfer 5.3, a SBM analysis pipeline. Freesurfer accurately reconstructed the grey and white matter surfaces for the anatomical changes (the volume expansion and the increased gyrification). However, Freesurfer did not detect the density change. It may be that VBM is more sensitive to density changes than SBM, since that is what was designed to do, while SBM can detect changes in surface area, volume, gyrification, or thickness. VBM analysis using SPM 8 and SPM 12 is currently being carried out.

Investigating the Regulation of Alpha-Synuclein Clearance by Alpha-Galactosidase-A in Parkinson Disease

Emily Milligan, Hailin Lu, Tonia Tse, Dr. John J. Shacka

Parkinson Disease (PD), the second most common neurodegenerative disease, affects 1% of Americans over the age of 65. PD pathology is characterized by dopaminergic neuron loss and accumulation of insoluble alpha-synuclein (αsyn) aggregates. Pre-clinical studies suggest that αsyn contributes to PD pathogenesis. Thus therapeutics promoting the high capacity clearance of αsyn, could be a valuable method for reducing αsyn pathology in PD. Our lab discovered that alpha-Galactosidase A (αGalA)-deficient mouse brains exhibit pathological accumulation of αsyn concomitant with ALP dysfunction. We also have preliminary data indicating significant reduction in αGalA enzymatic activity concomitant with an increase in αsyn in postmortem PD brains. These findings led us to hypothesize that increasing αGalA promotes αsyn clearance. The effects of pharmacologically increasing αGalA, by administration of Fabrazyme (Fz), a type of enzyme replacement therapy used to treat Fabry patients with αGalA deficiency were determined in M17 neuroblastoma cells. Effects of increased αGalA on basal levels of endogenous αsyn and on the clearance of over-expressed αsyn were measured by western blot. αGalA activity was measured by fluorescence-based activity assay. Fabrazyme increases levels and activity of αGalA in vitro. Administration of Doxycycline induces over-expression of αsyn in M17 cells, and decrease in αGalA activity. αsyn returns to basal levels by 72 hours after Doxycycline is removed. Increasing αGalA increases clearance of over-expressed αsyn in the first 48 hours after Doxycycline removal in M17 cells. These data provide preliminary validation for the study of αGalA as a therapeutic target for the clearance of αsyn in PD.

Involvement of IPX-750 in the Attenuation of Aggregation of Alpha Synuclein in Parkinson's Disease

Dr. Tino Unlap

Parkinson's disease (PD) is characterized by the formation of Lewy bodies that are formed as a result of neuronal death. This is attributed to aggregation of the protein alpha synuclein. Neuronal death in the substantia nigra leads to the symptoms, which include resting tremor, rigidity, bradykinesia, and postural instability, that are hallmark of PD. Work in our lab has generated a covalently modified form of dopamine, IPX-750, which can ameliorate PD symptoms in three animal models of PD. Therefore, we propose and will test the hypothesis that IPX-750 prevents alpha synuclein aggregation. This hypothesis will be tested in neuronal cell line expressing WT alpha synuclein and alpha synuclein containing one of the three single nucleotide polymorphisms, A30P, A53T, and E46K, which are associated with PD. Cells will be treated with IPX-750 at 0, 0.1, and 1 μM for 24hrs followed by protein detection using immunofluorescence and Western blot. The effect of each treatment on alpha synuclein aggregation will be compared between treated and non-treated cells using Analysis of Variance (ANOVA). We anticipate that IPX-750 will attenuate aggregation of alpha synuclein.

iPLA2β Inhibition in NOD Mice Reduces Type 1 Diabetes-Associated Factors

Alexander J. Nelson, Robert N. Bone, Ying Gai, Sasanka Ramanadham

Type 1 Diabetes (T1D) is the result of autoimmune-mediated destruction of pancreatic islet β-cells by activated autoreactive inflammatory cells. The calcium-independent phospholipase A2β (iPLA2β) has been observed in multiple biological processes and contributes to several pathologies, including T1D. The iPLA2β is activated by the diabetogenic stimuli pro-inflammatory cytokines and/or ER stress, leading to β-cell apoptosis, a major process of T1D evolution. Previously, we have found that iPLA2β inhibition at 10-days of age with FKGK18, a fluoroketone-based inhibitor highly selective for iPLA2β, significantly reduced the incidence of T1D in non-obese diabetic (NOD) mice, a model of spontaneous T1D. This was reflected by reduced islet infiltration by B-cells and CD4+ T-cells, higher circulating insulin, greater β-cell mass, and improved glucose homeostasis. Because 10-days of age is before diabetes onset, insulitis onset, and presence of autoantibodies, we sought to determine if iPLA2β inhibition at 8-weeks of age, before diabetes onset but after autoantibody detection and insulitis onset, is similarly effective against T1D incidence. Thusly, we found reduced, but not significant, incidence of diabetes, unchanged glucose tolerance, significantly reduced insulitis, significantly reduced insulitis CD4+ T-cell and B-cell populations, greater β-cell mass, and significantly higher circulating insulin. These data suggest that iPLA2β-derived lipid products are involved in T1D pathogenesis and are critical prior to the onset of T1D and potentially during initiation of insulitis. This work was supported by American Diabetes Association, Iacocca, Family Foundation, and NIH/NIDDK.

Measuring the Effects of Reactive Oxygen Species in Glioblastoma Multiforme

Lauren Hocevar, Kiera Walker, Anh Tran, Anita Hjelmeland, Ph.D.

Glioblastoma Multiforme (GBM) is the most common and the most aggressive malignant primary brain tumors in adults. It is highly invasive as it has a tendency to cross the midline of the brain to the opposite hemisphere. GBM is particularly deadly with the average survival being 14 months with the best currently available therapies, which include surgical resection if possible, followed by radiation and use of a chemotherapy agent called Temodar, also known as Temozolomide. About 2.9% of patients diagnosed with GBM live 5 years after their diagnosis. One of the current goals of the scientific community is to establish a treatment that will allow the death of the cancer cells, while preserving the function of normal human cells. To generate such a treatment, we seek to alter levels of reactive molecules containing Oxygen; called Reactive Oxygen Species (ROS). High levels of ROS can promote apoptosis, thereby causing cancer cell death. By using a novel combination of drugs that may lead to increased levels of the ROS superoxide, we hope to cause Glioblastoma cell death. This is important to the advancement of treatment in Glioblastoma and also important to the further development of Redox Therapies in cancer.

Occurrence and Distribution of Virulence Associated Genes in Clinical and Virulent Strains of *Vibrio vulnificus*

Savannah D. Russell, Joseph A. Hakim, Hyunmin Koo, Asim K. Bej

Vibrio vulnificus is a bacterium indigenous to warm, coastal waters which, upon infection of immunocompromised people, has a death rate of 50-60%. Infection occurs through either exposure of open wounds to these warm coastal waters or consumption of undercooked shellfish, and it results in septicemia, wound infections, and gastrointestinal illness. Previously, a survey of virulence associated genes vvhA, wza, hlyU, and rtxA1 were reported following the optimization and application of duplex PCR on both clinical and environmental strains of *V. vulnificus*. The study revealed that both strain types were found to contain virulence associated genes, suggesting warm waters and shellfish to be the primary reservoirs for infection-causing pathogenic strains in humans. This study will elaborate those findings, by including an additional set of previously established *V. vulnificus* virulent genes, to analyze the possible association between the presence of virulent genes and disease-causing clinical strains. To do this, PCR was performed using oligonucleotide primers designed for the PCR amplification of the virulence-associated genes smcR and vcgC. Template DNA of both clinical and environmental strains was purified, and the PCR parameters were optimized by adjusting reagent concentration to yield reproducible results. These results demonstrate a link between known virulent genes in environmental and clinical isolates, and provide insight into the distribution of smcR and vcgC within various *V. vulnificus* strains. This study promotes early diagnosis of clinically relevant *V. vulnificus* by targeting virulence-specific genes, thereby helping to reduce the disease incidence caused by this pathogen.

Predators Affect the Foraging Behavior of the Amphipod *Hyalella azteca*

Ciara Duncan, Ryan James, James McClintock

Predators have been widely demonstrated to alter the foraging behavior of prey species. Previous studies have shown that when given a choice the amphipod *Hyalella azteca* prefers to feed on the filamentous alga *Spirogyra* as opposed to the vascular macrophyte *Elodea*. In the present study, we examined how the presence of predatory sunfish chemical cues affected feeding preference of *H. azteca*. We used a pair-wise feeding choice assay to determine if sunfish cues influence the feeding preferences of amphipods for *Spirogyra* and *Elodea*. Three amphipods were placed in opaque bottles along with 25 mg wet wt of each food type. The bottles were capped with a fine screen and then inserted into a container and submerged in water that contained either sunfish cue or no-cue control water for a period of 24 hrs. The two food types were then recovered and their wet wt determined. Amphipods consumed significantly more of the *Spirogyra* than the *Elodea* in the predator treatment. Moreover, those in the predator fish-cue treatment, consumed significantly more of either food type than amphipods exposed to no-cue control water. Our findings suggest that amphipods may be under selective pressure to optimize food consumption under predator pressure.

REDCap: Utilizing a Secure Cloud-Based Ovarian Cancer Registry and Tumor Bank to Facilitate Translational Cancer Research Studies

Dylana Moore

Ovarian cancer is the fifth most common-cause of cancer related deaths in women. This year, it is estimated that over 14,000 women will die from ovarian cancer. To best address this problem we need more clinical studies that efficiently bank tissue and demographic information to design translational research studies that can potently make a difference in the treatment of ovarian cancer. At UAB, we recently implemented a secure, cloud-based, HIPPA compliant database called REDCap, that allows all demographic and patient information to be complied in a timely manner and analyzed easily through built in statistical software. All patients have consented to having their information utilized for research purposes and are under an IRB approved study. A variety of patient sample types are collected in the operating room during surgery. The patient's demographics (age, BMI, stage of disease, chemotherapy regimens, comorbidity, survival data etc.) are also collected. REDCap also allows us to maintain HIPAA compliance by de-identifying all patient samples. Here we present the most current database characteristics; we have 1,064 entries of demographics into the database. Currently, the median age of patients is 62 with ages ranging from 19-96. 155 patients have been diagnosed with diabetes. There are also 330 biospecimens in the database with the majority of those samples being tumor (288 samples). Overall, REDCap is an invaluable tool for managing patient information and being able to correlate this information with findings in lab to facilitate translational research.

Runx2 Mediated Osteoblasts Signaling Affects Immune Cells

Farah Jiwani, Mohamed Khass, Kayla King, Harun Rashid, Amjad Javed

The Runx2 transcription factor is well known for being an essential regulator of skeletogenesis as deletion of the Runx2 gene results in complete failure of bone formation. In the absence of Runx2, mesenchymal cells fail to differentiate into cartilage synthesizing chondrocytes and bone producing osteoblasts. In addition, Runx2 actively inhibit commitment of mesenchymal cells to other lineages such as myoblasts, and adipocytes. Bone resident osteoblasts and osteocytes secrete several factors that are known to regulate development of other cell types in the marrow, including hematopoietic and cells of the immune lineage. We have previously observed that Runx2 deficiency in mature osteoblasts affect expression of cell surface marker genes in B cells residing in the bone marrow. Here, we investigated the effect of Runx2 deficiency in osteoblasts on maturation of different subtypes of B cell population in the body to understand how mature osteoblasts regulate the development and maturation of immune cells. Development and distribution of immune cells in the peritoneal cavity, bone marrow, and spleen compartments of the wild type and Runx2 mutant mice were compared by FACS analysis. The Runx2 gene was deleted in immature osteoblasts (Collagen-1 driven Cre) and in mature osteoblasts (Osteocalcin driven Cre) by Cre-recombinase. We find that the deletion of Runx2 in osteoblasts does not affect embryonic bone development in mice. However, post-natal bone development is severely disrupted. The OC-Cre/Runx2 homozygous mutants showed rapid onset of osteoporosis, exhibited sign of premature aging, and died at 5 months of age. Interestingly, these mice showed enhanced fat deposition in the bone marrow suggesting impaired bone marrow microenvironment. We assessed if certain subsets of the B cell lineages are affected upon Runx2 deletion in osteoblasts. Bone marrow, spleen, and peritoneal cavity cells were harvested from 3 month old wild type and homozygous female littermates. Subset of B cells at various stages of maturation were analyzed and sorted based on surface marker expression using FACS. Interestingly, in mutant mice, total number of B cells were decreased by 20-60% when compared to its wild type littermate. The decrease in B cell was noted in specific subsets in the bone marrow (early B cells), spleen (transitional and follicular B cells), and peritoneal cavity (B1 population). Studies to further characterize changes in B cell development by stage-specific genes at mRNA and protein levels are currently underway. Runx2 deficiency in osteoblasts is associated with alteration in development and maturation of B cells.

Schwann Cells Require the Endosomal-Sorting Pathway for Peripheral Nerve Myelination

Tina Tian, Julie A. Wilson, Scott M. Wilson

Disruption of the endosomal-sorting pathway is associated with several neurodegenerative diseases. The endosome serves as a sorting station for internalized cell membrane proteins such as receptor tyrosine kinases, and defects in the sorting of these receptors can affect both the specificity and duration of the receptor tyrosine kinase signaling. Unfortunately, very little is known about endosomal sorting in cells of the nervous system. One neural cell type that is sensitive to endosomal dysfunction is the myelin-producing Schwann cell. The inability of Schwann cells to myelinate axons results in motor and sensory deficits due to impaired propagation of action potentials along the axon. Charcot-Marie-Tooth Disease (CMT) is one of the most commonly inherited neurological disorders and is associated with motor and sensory dysfunction due to loss of peripheral nerve myelination. While many of the mutations linked to CMT are suggested to impair endosomal sorting, a direct examination of endosomal sorting in Schwann cells has not been conducted. This study investigated the effects of disrupting a core component of the endosomal-sorting pathway in Schwann cells. The endosomal sorting complex required for transport (ESCRT) components function to sort endocytosed proteins through the endosomal compartment. To determine if endosomal sorting is required for peripheral nerve myelination, we disrupted the ESCRT component hepatocyte growth factor-regulated tyrosine kinase substrate (HGS) specifically in Schwann cells. While ESCRTs have traditionally been thought to be negative regulators of cell signaling, our data suggest that HGS is required for the maturation of Schwann cells to a myelinating state. To investigate if the expression of key myelin-inducing pathways is compromised in the HGS deficient mice, we isolated RNA from peripheral nerves and performed quantitative PCR. Our findings suggest that HGS is required for the suppression of several myelin gene repressors as well as for the induction of transcription factors that induce myelin gene expression. They also provide evidence that endosomal sorting is necessary for the developmental transition from a non-myelinating to a myelinating Schwann cell and that endosomal signaling is a positive regulator of myelin gene expression.

Structure-Function Analysis of Glyceraldehyde 3-Phosphate Dehydrogenase of Group B Streptococcus

Chapelle Ayres

Streptococcus agalactiae, also known as Group B Streptococcus (GBS), affects newborns globally and can lead to the onset of sepsis, meningitis, and/or pneumonia. In 2014, the CDC estimated that there were 0.46 deaths per 100,000 in the United States due to Group B Streptococcal infections. Thus, administering a vaccine to expecting mothers to protect neonates against GBS infection would be highly beneficial. In GBS, Glyceraldehyde 3-phosphate dehydrogenase (GAPDH) is a surface-associated virulence factor involved in bacterial colonization and immunomodulatory activities. Therefore, GBS GAPDH is a potential vaccine candidate. However, GAPDH is an evolutionarily conserved glycolytic enzyme and many organisms have both similar GAPDH primary sequences and similar overall three-dimensional structures. To design a safe and effective GBS GAPDH-based vaccine, it is critical to identify areas on the protein that are significantly different compared to its human counterpart and to examine the immunogenicity of these distinct epitopes. Moreover, since GAPDH is essential for the survival of the bacterium, selective inhibitors of GBS GAPDH may be potential therapeutic agents. We are therefore conducting a detailed structure-function analysis of GBS GAPDH. Currently, we have crystallized the protein in 3 enzymatic states: apo-enzyme, holo-enzyme bound to cofactor nicotinamide adenine dinucleotide, and a ternary complex with cofactor and substrate D-glyceraldehyde 3-phosphate. We discovered a region spanning amino acid residues 294-307 in GBS GAPDH that is significantly different in sequence and structure in comparison to other species of GAPDH. Analysis of this unique surface as a potential vaccine candidate is in progress.

Synergistic Effects Between Baclofen and Opioids in Mice

Aaron Landis, Remy Meir, Stacie K Totsch, Dr. Robert Sorge

GABA receptors are essential in the functioning of inhibitory synaptic transmission. These receptors can be divided into two types: GABAA and GABAB receptors. These receptors can be activated by GABA or by other binding molecules such as barbiturates, benzodiazepines, steroids, and picrotoxins. Baclofen is an agonist for the GABAB receptors. Due to the substantial increase in abuse of prescription opioids, we wished to determine whether we could enhance the analgesic effects of opioids while reducing the actual drug doses. This project is focused on pairing baclofen with opioids in order to see the potential interactive effects. Hot plate testing was performed with morphine and fentanyl and allowed for the pain response to be recorded. The maximum potential analgesic effect was determined and anteractions were assessed through the use of isobolographic analyses. Baclofen and fentanyl showed a synergistic, antinociceptive effect in the mice, similar to our findings with morphine. Baclofen and morphine were further tested for synergy through replication of the experiment in a different strain of mice (C57BL/6J) to assess generalizability of the effects. We are currently determining if baclofen can also help limit the rewarding effects of certain opioids. If so, we will have a combination of drugs that could be prescribed with high analgesic and low rewarding effects.

Targeting Zebrafish HID1b Gene and USH1Gb Gene Using CRISPR Cas9 Technology

Andrew Cash, Kristin Deneen, Sureena Monteiro-Pai

Ribosome profiling experiments are used to discover small open reading frames (smORFs), previously presumed to be noncoding pieces of DNA. Mackowiak (2015) reported a smORF database for zebrafish. Based on smORFs that were highly conserved across species and sufficiently long enough to indicate expressivity, one gene was selected. A sequence annotated as a smORF was identified to encode for a 91 amino acid peptide. Upon closer inspection, this sequence was found to be part of the HID1b gene and not a smORF. Upstream sequences predicted to be potential enhancers of this misannotated smORF were found to be part of the USH1Gb gene. The HID-1b gene codes for a protein involved in intracellular Golgi trafficking and is conserved across species; however, very little is known about this gene (Wang et al. 2011). Similarly, the neighboring USH1Gb gene has been connected to the development of Usher Syndrome, which causes partial blindness and complete deafness. This gene has been shown in zebrafish to have a similar function affecting the fish's hearing and balance (Phillips et al. 2015). The purpose of this experiment was to assess the effectiveness of designed CRISPR/sgRNAs and to observe genotypic and phenotypic changes resulting from HID-1b and USH1Gb knockout embryos. A cloning-free method was used to generate CRISPR/sgRNA templates, and in vitro transcribed sgRNA was injected with Cas9 protein into embryos. Analyzing the injected embryos provides insight into the effectiveness of CRISPR nucleases, the extent of genotypic and phenotypic variation, and the function of HID-1b and USH1Gb in zebrafish.

The Association of Mating Status and Longevity in *Drosophila melanogaster*

Abby Melton, Jessica Hoffman

Evolutionary theory predicts there is a large trade-off between reproduction and survival, and organisms must balance resource allocation between the two. This "cost of reproduction" is evident in both female and male *Drosophila melanogaster*. Frequent mating reduces female lifespan and future fecundity; as well as male lifespan is negatively affected by reproduction. While these costs of reproduction have been known for decades, it is unknown if genotypes of flies that are long-lived as virgins are also long-lived when mated. Here, we are attempting to determine the differences in longevity of mated and virgin flies across different genetic backgrounds. We are collecting different genotypes of fruit flies, and keeping them as virgins or allowing them to mate for different time intervals. We are then calculating the survival for each sex, genotype, and mating treatment combination. In addition to lifespan analysis, we are performing health assays on other subsets of flies to determine if mating affects different health parameters. Our results thus far suggest there is variation across genotypes in startle response. The results of our work will help determine the lifespan and healthspan consequences of mating across different genotypes of the fruit fly.

The Effect of Feed Rate on the Growth of Juvenile Zebrafish

Khaled Almansoob

The zebrafish (*Danio rerio*) has become a premier model for evaluation of human disease onset and progression. With the widespread use of the model it is important to understand the quantity of nutrients that are required for normal physiological function. Consequently, the lack of a standardized feeding protocol is a major concern. In this study, a defined formulated diet was used to investigate the relation of daily feed ration to growth demographics in juvenile zebrafish. Ca. 600 individuals were reared to juvenile stage (28 day post fertilization) and placed randomly in one of on six diet treatments. Wet weight was determined on a subset on fish and a formulated diet was fed at a feeding rate of 2, 4, 6, 8, 12, or 16% of total wet body weight per day. Weight gain was assessed at the end of 56 days (28 day growth period). Final weight was evaluated by a broken-line regression model of weight gain to feed ration and indicated that individuals grew optimally at 9.2% of body weight per day. Feed conversion ratio (FCR; g diet fed/g weight gain) was high at the low feed ration, decreased at 9.2% body weight/day, and increased further with increased ration. These data suggest that determination of weight gain and FCR can be used effectively to estimate optimal feeding parameters for zebrafish, even when direct measures of feed intake are not possible. Thus, animal husbandry can be improved in zebrafish facilities by reducing food waste and optimizing growth.

The Effect of Warming Ocean Temperature on the Growth of the Sea Urchin *Lytechinus variegatus*

May, S., Brothers, C.J., McClintock, J.

Global climate change is causing a rapid increase in seawater temperatures and has the potential to exacerbate the ecological and societal impacts of changes in biodiversity. Temperature has a dramatic effect on biological processes by influencing molecular kinetic energy. Studying how organisms may respond to rapid climate changes will provide a better understanding of an organism's ability to acclimate to such changes. The present study investigated the effects of predicted near-future ocean temperatures on growth in the sea urchin *Lytechinus variegatus*, a species that inhabits shallow seagrass beds and is particularly vulnerable to rapid increases in temperature. Sea urchins were exposed to experimental seawater temperatures representing current and near-future conditions, 26°C and 30°C respectively, over a period of 90 days. Wet weight, test diameter, and test height were measured in all individuals on days 0, 30, 60 and 90. At the end of the 90 day period, sea urchins were dissected and body components were ashed to determine organic content. Both temperature treatments displayed increased growth in both the mean test diameter and height over the 90 day experiment. In contrast, the mean wet weight of sea urchins in both temperature treatments did not increase over the course of the experiment. Although the sea urchins exhibited test growth during the experiment, the percentage of the test made up of inorganic material remained relatively high. These results suggest that *Lytechinus variegatus* has the ability to acclimate to some changes in temperature, which might lessen the near-future impacts of global climate change.

The Regulation of Breast Cancer Development via hTERT Through Combinatorial Treatment with Pterostilbene and Sulforaphane

Sydney Sheppard

Breast cancer is the second most common form of cancer among women. In 2015, the American Cancer Society estimated that about 232,000 women will be diagnosed with breast cancer, and ~40,000 women will die from it. Current treatment options (chemotherapy, surgery, radiation, and target therapy) can have serious side effects. To improve the quality of life, new preventative and alternative treatment methods are being studied, including those in the realm of epigenetics. Epigenetics has become a promising field, as it changes DNA expression without altering the DNA itself. This project's focus is hTERT, a transcriptional subunit that codes for telomerase, which is the enzyme that contributes to the longevity of the cell and ultimately leads to immortality. Cancer cells have been shown to be highly expressed with telomerase. We investigated the effects of sulforaphane and pterostilbene on hTERT expression and cell viability in the triple negative MD-MBA-231 breast cancer cell line. Sulforaphane (SFN) is an isothiocyanate commonly found in cruciferous vegetables (broccoli, brussels sprouts, and cabbage). SFN has been shown to inhibit hTERT in MCF-7 breast cancer cells by reducing DNMT activity, leading to demethylation of the hTERT exon 1 of CpG sites. Pterostilbene (PT) is a natural stilbenoid found in blueberries and *Pterocarpus marsupium* heartwood. PT has been shown to inhibit telomerase activity. This suggests that pterostilbene may also inhibit hTERT expression. We found that sulforaphane and pterostilbene induced a greater anti-proliferative effect than either alone. Overall, this combinatorial treatment may serve as a promising cancer prevention and treatment.

The Study of the Role of Magikarp-21 in the Zebrafish Genome and Related Small Open Reading Frames

James Sexton, Neil Goel, Gunnar Eastep, Dr. Anil Challa

Small open reading frames (smORFs) have recently been discovered to code for protein through the use of ribosomal profiling. Ribosomal profiling uses ribosome-binding messenger RNA to determine which RNA is actively being translated. This is an extraordinary breakthrough because these smORFs were originally thought to not code for proteins, or long non-coding RNA that played regulatory roles. Now they have been seen coding for small proteins/peptides involved in a variety developmental roles and cell physiology. We chose to focus on ribosomal profiling data obtained from the zebrafish to test the role of smORFs during development by targeted gene disruption; zebrafish offers many experimental advantages to study cell and molecular mechanisms underlying embryonic development. Various criteria were used to select a long non-coding RNA from the smORF dataset, which is conserved in multiple genomes. We named this smORF Magikarp-21. The ENSEMBL zebrafish genome browser has a previously annotated gene si:ch73-42p12.2 overlapping Magikarp-21. Using the bioinformatic tools we found that Magikarp-21 is encoded by two exons. We also identified another potential smORF in the intronic sequence. In order to understand the function of these two smORFs we aimed at creating mutations by using the CRISPR Cas9 technology. CRISPR-Cas9 is an RNA guided protein based system for creating double strand breaks that can be used to generate gene knockouts. CRISPR/sgRNAs were synthesized in vitro and injected with Cas9 protein. We will analyze the injected embryos for any phenotypic changes and for genetic lesions.

Toxicity of Intraventricular Genetically-Engineered Oncolytic Herpes Simplex Virus Injection

Tina Etminan, Li Nan, Blake P Moore, Eric K Ring, G Yancey Gillespie, Gregory K Friedman

Medulloblastoma (MB) is the most common malignant pediatric brain tumor. Outcomes are poor for a subset of patients, and patients who survive often suffer from damaging lifelong neurocognitive and neuroendocrine impairments resulting from standard of care treatments including surgery, radiation, and chemotherapy. Oncolytic herpes simplex virus therapy (oHSV) is a novel, promising approach for targeting pediatric MB. Through engineered mutations (e.g. gamma134.5 neurovirulence gene), the virus replicates in and kills cancer cells while sparing normal cells. We hypothesized that oHSV could be safely injected intraventricularly at low doses to target metastatic MB. HSV-sensitive CBA/J mice were injected intraventricularly with 5 microliters of saline or gamma134.5-deleted oHSV G207 at 1x107 or 1x106 plaque forming units (pfu). Mice were monitored for signs of toxicity, and their brains were examined by immunohistochemistry for evidence of infection and by routine H&E histopathology. None of the mice in the saline or 1x106 pfu groups developed toxicity whereas 33% of those in the 1x107 pfu group required euthanasia by day 4 after treatment. Ependymal architecture was disrupted by day 2, but repair of the ependymal lining was seen in mice that received 1x106 pfu by day 30, suggesting this dose is non-lethal. The next step is to determine if G207 can prolong survival without toxicity in mice bearing metastatic MB compared to an untreated control group. If this novel therapy is able to effectively target MB, pediatric patients may have a greater chance of survival without the long-term side effects associated with current chemotherapy and radiation.

Transforming Growth Factor Beta (TGF-β) Is a Muscle Biomarker of Disease Progression in ALS and Correlates with Smad Expression

Ying Si, Soojin Kim, Xiangqin Cui, Lei Zheng, Shin J. Oh, Tina Anderson, Mohammad AlSharabati, Mohamed Kazamel, Laura Volpicelli-Daley, Marcas M. Bamman, Shaohua Yu, Peter H. King

We recently identified Smads1, 5 and 8 as muscle biomarkers in human ALS. In the ALS mouse, these markers are elevated and track disease progression. Smads are signal transducers and become activated upon receptor engagement of ligands from the TGF-β superfamily. Here, we sought to characterize ligands linked to activation of Smads in ALS muscle and their role as biomarkers of disease progression. RNA sequencing data of ALS muscle samples were mined for TGF-β superfamily ligands. Candidate targets were validated by qRT-PCR in a large cohort of human ALS muscle biopsy samples and in the G93A SOD1 mouse. Protein expression was evaluated by Western blot, ELISA and immunohistochemistry. C2C12 muscle cells were used to assess Smad activation and induction. TGF-β1, 2 and 3 mRNAs were increased in ALS muscle samples compared to controls and correlated with muscle strength and Smads1, 2, 5 and 8. In the G93A SOD1 mouse, the temporal pattern of TGF-β expression paralleled the Smads and increased with disease progression. TGF-β1 immunoreactivity was detected in mononuclear cells surrounding muscle fibers in ALS samples. In muscle cells, TGF-β ligands were capable of activating Smads. In conclusion, TGF-β1, 2 and 3 are novel biomarkers of ALS in skeletal muscle. Their correlation with weakness in human ALS and their progressive increase with advancing disease in the ALS mouse suggest that they, as with the Smads, can track disease progression. These ligands are capable of upregulating and activating Smads and thus may contribute to the Smad signaling pathway in ALS muscle.

Using CRISPR/Cas9 Technology to Study the Deletion of Delta D Enhancers in Zebrafish

Lindsay Jenkins, Nisha Palanisamy, Delima Bhagat

When observing the development of zebrafish (*Danio rerio*), it is clear that one of the first visual signs of development is the formation of somites. Delta D (dld) is a gene involved in the somite development of zebrafish and was selected because of the visibility of somite growth during embryo development. Somites are the precursor to skeletal muscle and cartilage, which can be easily observed in zebrafish embryos. Our study focused on understanding the potential regulatory functions of three highly conserved noncoding sequences in the dld gene locus. The Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) Cas9 system was used to target specific sequences and delete potential enhancers. Using multiple bioinformatics tools, three regions that are highly conserved in both human and mouse genomes were chosen . Two CRISPR/sgRNA sequences were designed to delete each enhancer. Two more CRISPR/sgRNA sequences were designed to delete exon 2 as a control. In vitro synthesized sgRNA were injected along with Cas9 protein into 1-2 cell stage zebrafish embryos. Phenotypic and genotypic characterization are underway. Successful knockout of each of these enhancers could potentially inform the role that they have on Delta D gene expression in zebrafish. This could lead to further information on the function of enhancers and how they relate to gene function.

Using Structural Genomics to Determine Putative Functions for Novel Gene Products of *Corynebacterium* Phage, C3PO

Almansoob, K., Barra, A., Canlas, S., Chawla, N., Johnson, B., Kuhl, M., Lin, J., Patel, D., Reddy, A., Sobol, L., Solorzano Papili, D., Bilbeisi O., Matalka, L., Saleeby, D., Monti, DL.

Bacteriophages, viruses that infect bacteria, are the most abundant entities on earth. Each year, students in the HHMI-sponsored SEA-PHAGES (Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science) program isolate novel phage from bacteria hosts of the Order Actinomycetales. This fall, students in the UAB Phage Explorations program isolated a novel *Siphoviridae* phage infecting *Corynebacterium* from a Jefferson County, AL sewage effluent sample. Full genome sequencing of Phage C3PO revealed a 67,383bp genome with 111 unique features (107 putative genes, 4 tRNA). Close examination of the full genome sequence revealed a number of novel putative genes with low level sequence identity to genes published in GenBank. Moreover, many putative gene products did not have a defined function after BLAST and HHpred analysis. In this study, we used the in silico protein modeling program I-TASSER along with other online bioinformatics programs (Phamerator, MUSCLE) to study putative gene products with unknown function to determine whether structure prediction models can be used to assign putative function. We were able to tentatively assign function to 2/3 putative gene calls located in the left arm of the gene based on synteny and structural genomics analysis. This work shows proof-of-concept that structural modeling programs can be useful to guide predictions of function in truly novel genes, although wet-lab experiments are needed to confirm function predictions.

BUSINESS, FINANCIAL, AND INTERNATIONAL STUDIES

A Qualitative Study of B2B Salesperson Turnover: What to Do and What Not to Do

Spencer Herndon

Sales force turnover causes many problems in an organization, including the significant investment of money and time spent on training an individual and the potential business lost while finding a capable replacement for a specific territory. In sales, every day that your market share does not grow, your competitor's business strengthens. Therefore, the purpose of this study is to discover key themes that cause increased sales force turnover in order to identify and devise methods to prevent the instance of higher turnover. Of the studies on salesperson turnover, no study incorporates data solely gathered from sales reps that have already defected by the company that they left. The study takes a qualitative research approach to salesperson turnover. A large company in the high-tech industry carried out interviews with defector sales representatives that had already left their company. This study analyzes this data and identifies key themes that lead to poor job satisfaction, which causes higher turnover. According to the data, the key facts that lead to increased turnover include inadequate compensation, unclear roles and expectations, vague paths for advancement, antiquated operating systems/methods, and a contradicting organizational culture lead to decreased job satisfaction. Poor job satisfaction increases a sales representative's propensity to leave an organization, causing higher Salesforce turnover. Higher sales force turnover ultimately leads to the decrease of an organization's efficiency and effectiveness.

Exploring Links Between Transformational Leadership and Unethical Behavior

Steven W. Cole

The concept of transformational leadership is almost universally recognized as an altogether positive trait for any organizational leader to possess. However, not every style of transformational leadership is equal. Sometimes transformational leaders can bring about adverse effects, including severe and sometimes irreparable damage to the organizations that employ them. Typically, transformational leaders fail due to a perceived lapse in ethical judgment or altruistic values. Studies suggest that transformational leaders thrive largely due to perceived expertise and moral excellence by colleagues and subordinates. Followers observe and emulate the leader in an attempt to also realize the same types of success, so when the leader's actions do not reflect the wellbeing of the individual and organization as a whole, oftentimes neither will the followers'. Some others who recognize these lapses in judgment may choose not to emulate them, but to instead reject the ideas of the leader altogether. In order to further investigate these concepts, I am performing a case study of a group of professionals who were once under the command of a transformational leader. There was much controversy surrounding the reign of this leader, including legal actions and the loss of many valuable employees before the ordeal was over. This case study is meant to explore the subordinates' perception of the leader, including the ethical values conveyed by the actions of the leader, whether or not the leader was perceived as altruistic in nature, and exactly what type of effects these factors had on the ethical climate of the organization.

Factors That Influence the Ability of Students to Pay Back Student Loans

Austin Yost

Literature on the history of the student lending practices in the United States, what is known about student loan effects on post-graduation decisions, and the ability of students to pay back their student loans will be examined. There's a lack of data available on the non-education costs students spend their loans on, and there is conflicting research on whether debt-levels affect students' post-graduation decisions. Therefore, the hypotheses include: Do students spend capital from student loans on non-education costs, and if so, how much? Do students consider their debt-level when they pick a major? To test these hypotheses, an anonymous, twenty-one question survey was administered to anyone who used a loan to finance their education through Facebook, Twitter, LinkedIn, email, and manual entry on UAB campus. The survey is still open and has received 68 complete responses. The preliminary results of the responses show that when asked if they spent any of their student loan on non-education costs, over half of students said they spent more than ten percent on non-education costs. Also, about seventy percent of students said their debt-level did not influence their area of study. These findings help build on previous research about how students' debt levels affect their decisions and advance knowledge on student loans because there will be a dataset of what students are spending their student loans on.

Gender Perceptions in the Workplace: How Being Perceived as Feminine Negatively Affects Employer-Employee Dynamics

Rebecca Jurgens

Despite legislation outlawing workplace discrimination on the basis of gender, these illegal practices are still commonplace in American society. Considerable evidence suggests that negative perceptions of femininity are linked to gender discrimination in workplace environments. In order to address problems with adverse employer-employee dynamics, this research uses available information on the origins of patriarchy, gender schema theory, and cases of gender discrimination in an attempt to bridge the gap between why women mainly experience disadvantages in the workplace. By using the Bem Sex Role Inventory coupled with available measurements of employee engagement and job satisfaction, I was able to design a survey to measure what the effects of femininity/masculinity may have on women's perceptions in the workplace. By running multiple regressions on 3 factor models on the BSRI and 2 factor models on workplace engagement and satisfaction, I was able to find a relationship between femininity and employer-employee dynamics. My results varied with inconsistencies in correlations, possibly because of the androgynous answers given in the BSRI scales. This implication could mean that negative perceptions of women in the workplace do not stem from negative perceptions of femininity, but are the aftereffects of traditional gender roles perpetuated for centuries throughout our social constructs.

Hospital Quality of Care: Evaluation of Patient Satisfaction and Patient Safety Events to Financial Performance

Glynna L. Siegler

The purpose of this study is to begin defining a set of quality care measures that will not risk the provision of utility and profitability of healthcare services by comparing patient satisfaction and patient safety events to financial performance. This research used financial statements and quality of care data to test the hypotheses that positive results in patient perception does not positively impact operating financial results, namely operating income as does having adverse events or patient safety events. We postulated that while patient satisfaction might increase quality of care ratings, it will not significantly impact financial results. We postulated that patient safety events results in a greater loss, thus creating more impact to financial results. Financial statements were gathered from Medicare cost reports and quality of care data was extracted from Hospital Compare. Secondary data extracted and sorted with pivot tables in Excel software. Correlation analysis was conducted between six independent variables to determine overlap. Regression analysis was conducted using descriptive stats in Excel software and Stata 11 with robust clustering to test strength of relationships. The dependent variable assigned was operating income. Varying financial control variables, such as current ratio and debt ratio, were applied. Six independent variables were sorted into two groups: patient safety variables and patient satisfaction variables. Within patient safety there were two variables. Within patient satisfaction there were four variables. Results were in line with the stated hypotheses.

Housing Values in the Southern Black Belt

Hongji Liu, Stephanie R. Yates

This paper analyzes media housing values in all 50 states to determine if housing values are different in Black Belt states compared to others, and if so, what might be the cause of any such discrepancies. During the research, we find that the median housing value in the 11 Black Belt states is about $60,469 or nearly 30% lower than in non-Black Belt states. Further, the income level is a strong predictor of housing values across all states but that in the Black Belt, population change and the percentage of Asians in the population have a negative impact. This effect is just the opposite outside of the Black Belt. There, housing prices increase as the percentage of the Asian, White, and never married populations increase, but falls when the percentage of married individuals in the population increases. Last but not least, we also find that violent crime has a negative impact on home values outside of the Black Belt but no effect within the Southern Black Belt. In this paper, we study the variables that affect the housing values inside and outside the Southern Black Belt in a state level. Therefore, the result from this research paper can be used as a guidance when conducting a further research on the housing values inside and outside the Southern Black Belt in a county level.

How Compensation Packages Affect Salesperson Satisfaction

Colton Spates

The world of sales has drastically evolved over the past several years. The days of competing on product quality are all but inexistent due to the stricter standards and laws placed on manufacturers. In today's sales world, the best salespeople are ones who understand their customers' businesses and uncover issues to help them to improve their business and drive profitability. Nearly everything about selling has changed very drastically with the exception of how we pay our salespeople. As I hope to one day operate my own selling organization, I hoped to discover the most effective way to compensate salespeople, whether that be traditional commissions or nearly unheard of salaries. To attempt to uncover which method of compensation creates the highest level of satisfaction of employees, I have conducted a survey of various salespeople that are compensated in a variety of situations. The survey gauges the level of which a person is satisfied with their work situation and then more specifically their compensation package to be able to determine which type of compensation people are most satisfied with, and if those same people are the most satisfied with their job situation. One of the clear conclusions that have been drawn from the survey is that a clear majority of salespeople do prefer a compensation package that contains some type of commission factor. What this implies is that employees are willing to entertain certain levels of uncertainty but still desire some level of certainty that can be found in a salary.

How Mission Statements and Values Are Portrayed Through Birmingham Hospitals' Marketing Strategies

Kathleen Neighbors

Hospital marketing, a modern phenomenon, evolved out of the need to compete for patients in a crowded healthcare services market, such as the one in Birmingham, Alabama. There are five major hospitals, both for profit and not for profit, in the Birmingham area within a five-mile radius of each other. Each hospital tries to differentiate themselves and present value through various marketing strategies to patients, who have an unprecedented amount of input on where they are treated. Part of how hospitals differentiate themselves is in their mission statement. A mission statement's purpose is to provide an organization with direction by setting a clear goal while guiding decision-making and inspiring organization members. Often times it asserts the way a company hopes to be perceived by their community, which is an important faction of the marketing department. This study explores the hypothesis that hospital marketing strategies are influenced by and convey their organization's mission statement. It involves conducting a content analysis on hospital mission statements and their components in comparison to various marketing messages on print advertising in local newspapers and magazines, billboards throughout the Birmingham metro area, and social media accounts. Its results prove to be mixed, especially in the case of not for profit hospitals, suggesting hospitals may not be incorporating their mission statements in their messages to the community as much as the purpose of a mission statement may inherently suggest.

How Sleeping Late Isn't Great: The Effects of Sleep Deprivation

Miriam Semaan

Today, Americans face increased pressure and demands from work, family, and society; and, therefore, they are not receiving the necessary amount of sleep per night. Whether people realize it or not, sleep deprivation impairs cognitive abilities, decreases motor performance, lowers quality of life, and places an economic burden. Hence, sleep deprivation is too harmful to be overlooked. Ninety students, forty-seven in high school and forty-three in college, completed an online survey consisting of thirty-four questions on sleep habits, work demands, academic performance, and daily functions. Although the recommended amount of sleep is eight to nine hours per night, an alarming 47.8% of students reported getting six or less hours. High school students and males reported getting less sleep with 53.2% and 57.1%, respectively. Results show that 88.4% of students who received six or less hours of sleep felt they received an inadequate amount, compared to 29.6% of students who received seven to eight hours of sleep. When students reported receiving six or less hours of sleep each night, they had higher reports of depression, difficulties waking, tiredness, sickness/absenteeism, sleepy driving, napping, and caffeine intake. Furthermore, an increase in coursework and extracurricular activities correlates with a decrease in sleep because students replace sleep with work. Consequently, students go to bed later and are still forced to wake up early in the morning. This analysis presents the need for more flexible schedules allowing students to receive the proper amount of sleep that will not hinder their health.

Identity and Customer Satisfaction

Devin O'Rourke

The purpose of this research is to determine whether organizational identity within sales teams has a positive relationship with how customers use brand-identity and salesperson-identity to determine their level of customer satisfaction. A total of 80 professional buyers and 65 salespeople were surveyed in order to collect the data for this research. A total of 96 usable questionnaires were returned, generating a response rate of 66.2%. The buyers were given surveys that asked questions about whether they identified with the firm they buy from or the salesperson. The salespeople were given surveys that had questions about their level of identity with the firm that they represented. The empirical findings regarding the studied business relationships support the hypothesis that a positive relationship between a salesperson's level organizational identity and customers' level of satisfaction exists. Also, the results confirm that a customer's satisfaction is positively correlated with a customer's identification with the salesperson. It turned out that the majority of buyers make their purchasing decision based on how they identify with the salesperson rather than with the company or firm they are buying from. These results give an insight into how buyers making their purchasing decisions, and how they become satisfied with those decisions they made. This data can be used to better inform firms about the impact that an employee's organizational identity plays in their performance.

Judgment in a Judgment Free Zone: An Investigation of Clients' Perceptions of a Local Planet Fitness Practices

Joey Jones

Planet Fitness, a nationwide commercial fitness center that appeals to clients who lack self-desired fitness goals and who may also have some insecurities about being judged in settings such as gyms, has become the target of controversy in recent years. The national chain utilizes a policy that touts a "Judgment Free Zone" (JFZ) for all of its clients. At the same time, the company has been criticized for alienating a certain group of individuals, particularly fitness enthusiasts, bodybuilders, and power lifters. Do clients view Planet Fitness's practices as hypocritical or unethical? I surveyed 30 volunteer participants who have gone to a local Planet Fitness center. The questions were based on their perceptions rather than their observations of Planet Fitness's JFZ. After reviewing all of the surveys, I found that approximately 73% of the participants' answers in the survey indicated that the local Planet Fitness center operates its gym and interacts with clients in an ethical manner. On the other hand, 17% of the participants responded that the local fitness center used some unethical practices in the way fitness trainers/specialists interacted with clients. Another 10 percent of participants gave responses indicating they were indifferent in whether the local fitness center used unethical tactics to lure and interact with clients. Although I originally hypothesized that majority of participants would view Planet Fitness's JFZ as unethical, I now understand from my research findings that consumers' perception of the JFZ differs depending on their unique experiences at a particular fitness center.

Live to Work or Work to Live? Breaking the Millennial Stereotype

Christian Maziarz

Generation Y, or Millennials, may come to find that the path to establishing a career is challenging due to a stereotype related to their work habits that is prevalent among the working world. Basically, these individuals are often viewed as having an attitude of entitlement which translates to the lack of a work ethic. However, perhaps it is not a question of why Millennials do not want to work; perhaps companies should ask themselves what motivates this generation. David McClelland's acquired-needs theory was used as a blueprint for the motivation survey that was conducted. It was comprised of 15 questions. Questions 1-5 measured the need for achievement, 6-10 measured the need for affiliation, and 11-15 measured the need for power. A five point Likert scale was used to measure each question with 1 being "Strongly Disagree" and 5 being "Strongly Agree." Whichever group of questions a participant scored highest in was the need they were motivated by most. The results indicate that a majority of the 80 participants are motivated by the need for achievement, with power being second and affiliation being last. It is not shocking that achievement is the number one need among this generation, as past research indicates that Millennials desire both fulfillment and constant recognition in their job. Affiliation being last did come as a surprise, simply because Millennials are often described as individuals who desire a team oriented environment. In conclusion, it is evident that to generate productive employees, organizations must learn to develop both meaningful and challenging tasks for a generation which craves to excel in all that they do.

Millennials' Perspective of Aged Workers

Olivia Rouss

While there are mixed results, studies have shown that stereotypes of older workers remain prevalent among millennials. This is significant as the ratio of older workers to millennials remains high as baby boomers (in particular) are remaining in the workplace just as the most senior millennials are entering lower management positions and the most junior are just now entering the workforce. These stereotypes could result in discriminatory practices and reduced productivity and profitability. Motivation and sense of self-worth among older workers also decrease, impacting workplace morale. My intent is to advance research by adding intellectual confidence to the hypothesis that with proper knowledge and understanding, Millennials' attitudes towards older workers could be positively altered. To accomplish this, a sampling of Millennials born from 1982-1993 was given a survey before and after receiving credible information concerning older workers. The Qualtrics Research Suite is being used for data collection and analysis. Results are not yet final; I will immediately provide an updated abstract upon completion of my analysis and hypothesis assessment.

Preferences for Respect Due to Diversity

Anaiza Medina

Understanding diversity and learning how to manage one another's differences is a growing factor in today's society because everyone's uniqueness brings new opportunities and new outlooks in daily tasks. Diversity is a focus on the inclusion of others differences, and so then in order to achieve respect from another individual then there must be a deeper understanding in their preference for either the Golden Rule or the Platinum Rule. The Golden Rule is "Do unto others as you would have others do unto you." The Platinum Rule is "Do unto others as they would have you do unto them." Once a better understanding of one's preference is achieved then there will be greater communication and understanding for one another's preference for respect. There are three arguments that can be used to help identify one preference for the Golden Rule or the Platinum Rule. One, religious beliefs provide traditional ways of seeking to respect each other. Two, class predisposition resonates actions given towards others with some interchanges varying on the "who" factor. Three, achieved status cultivates a standard for which is used in regards to respecting others who are different.

Primary and Spillover Effects of Community Uninsurance

Alex Cason

National healthcare policy has long focused on increasing the number of individuals covered by both private and public insurance. Healthcare delivery, however, is a tremendously local phenomenon, causing national estimates to be of little explanatory value on the effects of these policies. Using the data from the MMSA-level subset of the CDC's Behavioral Risk Factor Surveillance System, I gather empirical estimates, through multilevel regression models, of the results of increasing or decreasing insurance coverage on local populations. A central point of concern is the "spillover" effect, where changes in insurance rates at the community level can have an impact on the access to care, quality of care, and health outcomes of the insured population. If such a spillover exists, it adds weight to policy measures that increase the access to health insurance and adds further evidence that health insurance has a positive effect on the population as a whole.

Risky Business: Creativity and Innovation in the Technical Workplace

Kelly McAninch

Technology is widely seen as a confusing, complex field, requiring the knowledge of many languages, regulations, and processes. Technical companies and technical departments are often expected to create products and services that satisfy users' needs, which are becoming increasingly complicated and extensive as issues such as information security become more prevalent. Technical workplaces must strive to enhance creativity and innovation, yet still consider the risks of implementing new ideas and variables into an already labyrinthine system. I analyzed technical workplaces to see if they were effectively using their employees' creative resources to generate innovative output. I conducted a quantitative survey with employees across six different companies and completed qualitative interviews with several diverse respondents. The companies were grouped by size to compare findings between small businesses (under 150 employees) and large businesses (over 150 employees). From this research, I found that technical employees at small businesses were less discouraged by the complexity of the industry, more often encouraged to be creative, and more likely to describe their company as innovative than technical employees at large businesses. That being said, the majority of respondents from both groups reported that they would like to see more creativity and innovation at their respective companies. Creativity and innovation have not previously been studied specifically within the scope of technical fields. This new knowledge will emphasize the gaps in creative encouragement and the factors that widen this gap in technical workplaces so that managers and leaders can identify and address them.

Strategic and Comprehensive Business Plan for the Birmingham LJCC

Lily Prince, Lalit Karnam, Anna Buie, Brystin Arnold, Johneice Pearson, Kristin Agee, Justin Hill

The Birmingham Levite Jewish Community Center serves more than 130,000 members of the Birmingham community. It is a unique place that provides meaningful experiences and activities for a diverse membership. They provide for their members by promoting the health and well-being of the mind, body, and soul through educational, spiritual, and fitness programs. In addition to these programs, the LJCC offers other benefits to the Birmingham community. It serves as a facility that can be rented out for events. It also serves as a great location for an after school program. In order to make these aspects of the LJCC more beneficial, we partnered with them to develop two strategic and comprehensive business plans. In doing this, we interviewed and consulted with the Executive Director, Betzy Lynch. We found that both programs were viable within the organization and could help sustain one another. A competitive and appealing rental program could bring in enough money to provide a comprehensive after school care program. Furthermore, the improved programs at the LJCC are bound to attract new faces from the community as well as maintaining and re-energizing existing customers. The redesigned After-School Program and the Rental Program will open new doors with many opportunities to the LJCC and expand its future role within the Birmingham community.

The Corporatization of Nonprofit Organizations Impedes Their Mission Objectives

Amanda Rice

Nonprofit organizations, or NPOs, can be defined as an institution that has an obligation to lead their society and community in advancement in sustainability, well-being, conservation, and more depending on the issues or actions that meet their mission. While evidence has shown that NPOs have grown, there is still evidence of a corporate dominance in the nonprofit sector. Several factors of nonprofit corporatization, including leadership capabilities and techniques, the handling of ethical dilemmas, the increased competitive market of the nonprofit sector, and much more substantiates the corporatization of nonprofits, causing mission creep. Mission creep causes a shift of nonprofit's objectives within their organization, impeding their focus on their core goals. Increasing focus on financial performance, competition, as well as perceptions provides clear evidence that NPOs have had to shift away from their original core objectives. The methodology in this project achieved validity and reliability by gathering concrete scholarly journals from various sources and about various topics relating to NPOs and their changing of operations, which supports the corporatization of nonprofit organizations. Secondly, a thoughtful, informative, and detailed survey was created and sent to various nonprofit leaders and executives throughout the Birmingham, Alabama area via email. This survey reached out to large and small organizations, as well as to leaders in different levels of management. In concluding that NPOs are in fact corporatized, this study plans will provide NPOs with the understanding and enlightenment of their business environment and changing culture.

The Effect of Medicaid on Voter Turnout

Brian Haynes

In the United States, the primary method by which citizens participate in the political process is by voting. However, there are great variances in the rate at which voters turn out to cast ballots, and low income groups tend to vote at dramatically lower rates than citizens with higher incomes. If we hold the belief that higher voter turnout is an intrinsic good, then it seems reasonable that researchers would want to find new ways to increase turnout. This position paper seeks to explore the possibility that the increased availability of Medicaid will result in an increased rate of voter turnout among low income voters. The core argument is built on the claim that Medicaid acts as a proxy for income, thereby lowering the costs associated with voting. It is believed that if this is the case, then the rate of voter turnout will increase in states with greater availability of Medicaid. Through the close study of three states with varying levels of Medicaid accessibility and similar demographics, it will be determined whether this claim can be substantiated. Using data gathered from the 2004, 2008, and 2012 general elections, as well as Census data regarding income levels, Alabama, North Carolina, and Ohio will be examined. This position paper will help build the foundation necessary for further research into the matter of Medicaid and voter turnout.

The Effect of the Unemployment Rate on School Enrollment

Margot Beerman

The focus of this paper is the effect of state unemployment rates on enrollment in school; specifically, high school and college. In this research study, the models control for state and year fixed effects, state-specific time trends, and previous educational completion, age, gender, marital status, and race. The standard errors are clustered by state. This research has been motivated by the Great Recession; furthermore, microeconomic logic suggests individuals will be more likely to enroll in school when there are fewer job market opportunities. This implies school-age students would respond rationally to recessionary situations. The estimate is increases in unemployment rates reduce the likelihood of enrollment for respondents who have not yet graduated from college. Expressly, there are positive and significant effects for respondents 20 years and under who have not graduated from high school, ages 21-24 who have graduated high school but have not attended college, and ages 24-27 who have attended but have not graduated from college; this suggests worse labor market conditions encourage college non-graduates to return to school.

The Link Between Personal Characteristics and Pursuing a Study Abroad Experience

Amanda Viikinsalo

While extensive literature exists in the field of international education explaining the benefits of a study abroad experience, few studies attempt to discover why 98% of American students in higher education fail to study abroad. A globalized education is held in high regard by countries around the world, and the need for American students to become international citizens is being recognized. If we are to increase the percentage of our students studying abroad, it is first necessary to determine why they are not currently capitalizing on this unique experience. My study aims to identify key characteristics certain students possess that may increase their likelihood of studying abroad. Through an intense literary review and my personal experience, I hypothesized that students with a strong desire to make new relations, learn differing values or beliefs, and understand cultural differences will be much more likely to pursue a study abroad experience. To test this theory, I created three questions to assess each variable in my hypothesis. An online survey was created using a Likert Scale of Strongly Agree to Strongly Disagree. Participants were asked to indicate where they fell on the scale with each question. The results thus far are mixed. It would appear students who have not had a study abroad experience have a stronger desire to learn about differing values or beliefs than students who have had a study abroad experience. This could indicate other factors aside from personal characteristics may prevent students from pursuing study abroad during their college career.

The Physician-Healthcare Manager Divide: An Analysis of the Culture Gap at the Undergraduate Level Utilizing the Competing Values Framework

Jonathan Pilgrim

My research will examine the relationship between physicians and healthcare managers, with special consideration given to the conflict between the two groups. There are many reasons for this conflict between doctors and managers, including negative perceptions, culture differences, and competing incentives. In today's healthcare delivery environment, collaboration between the business and clinical sides of medicine is essential. Conflict between the doctors and administrators results in diminished patient outcomes. In this research, the cultural differences between the groups will be analyzed at the undergraduate level. The project will involve the administration of an electronic questionnaire to two samples of students: a sample of healthcare management and business students and a sample of pre-medical students. It is from these two groups that the future physicians and healthcare managers will emerge. The questionnaire is adapted from a validated methodology known as the Competing Values Framework. The survey is designed to determine the values of each individual, which can then be aggregated to determine the overall culture of each group. The results will be analyzed, looking for statistically significant differences between the two samples. The results of this study could provide valuable insight into whether or not the cultural divide between the physicians and hospital managers is already present at the undergraduate level.

The Sweet Home Alabama? An Analysis on How Globalization Affects the Stock Performance of Companies Based in Alabama

Boyang Sun

The topics of globalization have been very popular in the research world, because globalization is the main driven force of international trade, as while as the perfect cradle for multinational corporations to do business overseas. However, there has been lack of research on how globalization affects specific state. The work mainly focuses on how the stock price performance of Alabama-based companies would be affected by significant world events that are divided into different categories (climate change, oil price shock, etc.). The paper can be a reference for current and prospective companies that will be headquartered in Alabama. Relying on the Bloomberg Terminals, the work created a portfolio that consists of more than twenty Alabama-based companies and calculated the systematic risk (beta) of the portfolio. By using the Capital Asset Pricing Model, the work compared the expected return and actual return of the portfolio with the benchmark (S&P 500 Index) when the world events occurred. According to the research, Alabama-based companies' stock price performance responded to the global events in the same tendency compared with the overall market, although the stock price performance experienced less volatility. The results may be subject to change due to more precise events and data will be tested.

The Unforeseen

Imani Burnett-Byard

In today's society, there are hundreds of thousands of professions to exploit and degrees to seek. However, what exactly are the key determinants that lead to degree selection? Sixty college students, children, and parents were surveyed to examine the thought process of what a child wants to be when he or she matures, what a college student selects to pursue, and how adults go about selecting their career paths. Current studies discovered the effects of children being over praised, which are proving that children with low self-esteem tend to avoid challenges, act out, exploit bad behaviors, and they did not perform as well in the classroom compared to praised children with high self-esteem. This study tests whether or not other factors such as political stance, parental involvement, SAT/ACT score, length of study, potential earnings, along with self-esteem ties with the process of how a student selects a major. Easy and hard majors were defined by the students that were surveyed. Results from the children survey show that children tend to lean towards the career paths of which their parents are currently pursing. In addition, this work adds to the current work by incorporating major selection in college students and career paths in adults that may have changed due to self-esteem, difficulty in major selection, new job opportunities, or even change in interest. These findings show that inflated praise in children with low self-esteem avoid challenges, which can later cause a college student to change majors and parent to change professions.

Understanding the Effects of the Academic Tutoring Program on Student Athletes' Academic Achievement at UAB

Amenan Johanne Audrey Taho

It is well documented that intercollegiate athletes are not many people's first thought when it comes to academic achievement. They are often labeled as unintelligent and uncommitted by their classmates, professors, and the news media. As very few college athletes will go on to the professional ranks, it is imperative that they gain an education. However, their involvement in sports is often seen as a detriment to academic performance. To address the unique academic needs of athletes, tutoring programs have been implemented. Tutorial assistance has been proven to be an effective tool for creating awareness of student athletes' potential and to improve their academic ability. The present research explores the relationship between tutoring and academic achievement of college student athletes. For this evaluation, 31 tutored student athletes involved in both high and low profile sports at UAB were surveyed and compared to 31 non-athlete UAB students. The research utilized a non-experimental methodology to identify statistical significance. The results indicate that contrary to the common perception of student athletes in general, the surveyed student athletes in the tutoring program compare favorably to non-athletes in terms of motivation (measured by daily study hours) and academic performance (measured by cumulative GPA).

EDUCATION

Engaging Pre-Service Teachers in the Research Process

Kathleen Watkins

The School of Education teacher candidates are preparing qualitative studies to answer questions of child development, classroom environments, and teaching methods. This research is significant to the pre-service teachers' continued growth of their pedagogical knowledge as preparation for their future classrooms. The pre-service teachers' goal is to bridge the gap between structured university instruction and the realities and challenges of the real-world classroom. This research will be accomplished through collaboration between UAB, an urban school in the Birmingham area, mentor master teachers, and pre-service teacher candidates. Data will be collected in self-contained classrooms of rising kindergarten through second grade students. Each pre-service teacher will work with 10-12 students for 5 weeks collecting data through instruction in reading, writing, math, social studies, science, and the arts. The majority of students will be from low socio-economic backgrounds and roughly 30% are projected to be learning English as a second language. The conclusions will be used by each teacher candidate to further shape their teaching philosophy. Each teacher candidate has identified research questions that will be their focus during the 2016 summer program. Inquiries range from classroom management and environment, student accountability, family structures, English Language Learners, and nutrition effects on literacy development. Results and implication will be presented at a later date once all data has been collected and analyzed.

ENGINEERING

Biodegradable Fibular Fracture Fixation Plate

Siddhartha Nanda, Briana Machen, William Gilbert, Austin Taylor

Nearly 13 million people will suffer a bone fracture in the next year, with the most common weight bearing bone being the distal fibula. The current method for fixation uses a permanent metal hardware that can cause complications, such as inflammation and stress shielding, and the need for a second surgery to remove the device. Our team is working on a biodegradable method to fixate the distal fibula after fracture, to provide flexibility, to degrade at a controllable rate, to stimulate the bone healing process while avoiding toxic response, to maintain adequate mechanical strength during the healing duration, and to negate the need for a second surgery. Our client has stated the biggest concerns with an updated internal fixation process are the design, degradation rate, and mechanical properties of the implant. After evaluation of different fixation plate designs and materials, the proposed fixation plate will be designed to resemble the 96 mm, seven hole VariAx plate while being composed of the biodegradable biomaterial MgCa0.8, a magnesium calcium alloy. Several factors were used when determining the thickness of the plate, which was calculated to be 3.17 mm for the degradation rate of the device to exceed the healing time of the fracture. These elements will allow our product to mimic the elements of the bone and to easily metabolize into the body, which will encourage bone healing and also decrease the chances of refracture during the healing process. This device would be labeled as a Class II device, and a 510(k) will be needed. The FDA standards and codes that must be followed for this type of device have been included. The orthopedics market is continuously growing. According to a BCC research study, the orthopedics market was $36.4 billion in 2014 and is expected to continue to grow 3% annually through 2019. The value in the proposed product will be created through its ability to increase revenue for our key partners.

Carly's Swing

Keaira Lloyd, Mason McAnnally, Teldra McCord

Cyclin Dependent Kinase-Like 5 (CDKL5) is a rare genetic disorder that affects the neurological development of children. CDKL5 causes multiple uncontrollable seizures, lack of muscle control, and impaired vision. This disorder as well as Rett Syndrome, ADHD, autism, OCD, and cerebral palsy requires stimming to satisfy inputs of the vestibular system. Stimming is common and can be achieved by actions such as tapping a pen, spinning, etc. Studies prove that swing therapy exercises the vestibular system and can substitute stimming. Amy Chandler, the client, desires an automated swing for her 5-year-old daughter, Carly, who has CDKL5. The swing currently used by the Chandlers isn't efficient for a child after one year of age. Because there isn't a motorized swing for older children, a specialized swing will be designed for Carly. The design of the swing includes: a c-shape frame, DC motor, and seat support. Engineering tests were used to calculate forces from the device and user; therefore, the frame supports a maximum weight of a 100 lb. user. The construction includes aluminum for durability and a DC motor which drives the swing in a side-to-side motion for productivity. The marketable design will include LED lights, a bungee training system for additional muscle therapy, and wheels for movability. This project is on-going and is being investigated for intellectual property for commercial sale. In addition to the Chandler family, potential clients include families and therapeutic facilities; therefore, this device can make a difference not only in Carly's life, but also in others.

Crosstalk Between Human Mesenchymal Stem Cells and Human Umbilical Vein Endothelial Cells on a Peptide Amphiphile Scaffold

David Chasteen-Boyd, Lily Deng, Dhruv Patel, Jeremy Vines, Amjad Javed, Shawn Gilbert, and Ho-Wook Jun

This study assessed the osteogenic differentiation of human mesenchymal stem cells (hMSCs) when co-cultured with human umbilical vein endothelial cells (HUVECs) in peptide amphiphile (PA) coatings in vitro. The angiogenic behavior of HUVECs in the co-culture was also studied. Using a co-culture, cell-cell communications that take place in natural bone tissue regeneration can be mimicked. The PA scaffold mimicked the native bone extracellular matrix (ECM) environment. In previous studies, PA-RGDS enhanced the osteogenic differentiation response of hMSCs, compared to hMSCs grown on tissue culture plate. It was hypothesized that co-cultured cells would exhibit the best osteogenic response, compared to HUVECs or hMSCs in monoculture. As control groups, hMSCs were cultured separately in conditioned media containing osteogenic supplements, while HUVECs were cultured separately in endothelial basal media. Three different conditions were tested: 1) PA-RGDS coating, 2) PA-S coating, and 3) tissue culture plate substrate. The cells were collected at 1, 7, 14, and 28 days and analyzed using Picogreen and alkaline phosphatase assays. In another experiment, Von Kossa staining was performed after 28 days. RT-PCR was performed after 7, 14, and 28 days to analyze osteogenic and angiogenic gene expression. Angiogenesis was studied using GFP-transfected HUVECs in both monoculture and co-culture conditions on the same scaffold conditions (PA-RGDS, PA-S, and TCP). The results of these studies showed that PA-RGDS coated scaffolds with co-cultured cells show great potential for use in bone tissue regeneration due to their increased angiogenesis, mineralization character, and osteogenic differentiation.

Development of a Virtual Instrument for Remote Monitoring of Oxygen Saturation in Critical Care Patients

Sai Chintha

Remote monitoring of patients in critical care wards of hospitals and clinics is extremely important for patient safety and comfort, especially if the ward has multiple patients present, with a small number of medical staff in attendance. The objective of the project was to develop a virtual instrument (VI), that essentially presents the pulse rate (BPM) and percent oxygen saturation (SpO2%) in a patient's bloodstream, using an existing, non-invasive, optically-coupled pulse oximeter. An RS-232 serial interface to a hospital-grade pulse oximeter was built to establish a stable data connection between the oximeter and a personal computer. A unique software driver was designed in National Instruments LabVIEWTM , using the G (graphical) programming language. Various data requests, in the form of hexadecimal code statements, were sent to the oximeter, and then the pulse rate and SpO2% values were extracted from the received data. The VI was also built to mirror the various alarms of the oximeter, such as when the pulse rate or SpO2% value exceeds certain limits. As such, this VI provides many user-friendly enhancements, like remote monitoring of the patients' current status and computer-based audio-visual alarms, whereas the pulse oximeter by itself will only allows for setting of alarm limits, and provides limited displays to the medical staff. Comprehensively, this virtual instrument could be part of a much larger research objective, to develop automatic control of patient ventilation.

Improving Coil Embolization of Intracranial Aneurysms through the Application of a Nitric Oxide-Releasing Nanomatrix Coating

Maggie A. Collier, Patrick Hwang, Ph.D., Grant C. Alexander, David F. Kallmes, M.D., Ramanathan Kadirvel, Ph.D., Ho-Wook Jun, Ph.D.

Established as one of the few noninvasive treatments for subarachnoid hemorrhages, coil embolization is a technique in which a platinum coil is fed through a catheter placed in the femoral artery of the groin and inserted at the site of an intracranial aneurysm. Although embolization is less problematic than more invasive treatments, a significant number of ruptured intracranial aneurysms treated with coiling can undergo recanalization, thus causing a second hemorrhage. One of the possible causes of recanalization is the inert nature of the coil: no biological response is produced to promote proper healing. According to numerous publications, factors like endothelialization and intima formation at the neck of the aneurysm could contribute to proper healing. Therefore, we propose introducing a peptide amphiphile nanomatrix coating to the coil surface that mimics the native endothelium and provides long-term release of nitric oxide, a natural chemical known to play an integral role in vascular formation and endothelial homeostasis. To characterize our coating, SEM imaging and FTIR spectroscopy were utilized; additionally, we evaluated our coating's ability to release nitric oxide for a long duration by performing a release test. Finally, an in vitro study using Human Umbilical Vein Endothelial cells was performed to obtain images from a live/dead assay and quantitative data using a CyQuant DNA assay. The results of the release test and the in vitro study suggest that our coating is capable of promoting the endothelialization required to allow proper aneurysmal healing, thereby decreasing the risk of recanalization and a second hemorrhage.

Integrated Electroencephalography and Transcranial Direct Current Stimulation Device

Matthew N. Gray, Lauren S. Dewberry, Aaron R. Sears, Daniel Morris, Veronica Challenger

In recent decades, transcranial direct current stimulation (tDCS) has been extensively investigated as a promising new treatment for neurological disorders such as depression, chronic anxiety, and eating disorders. The use of brain imaging modalities concurrently with transcranial direct current stimulation has recently gained popularity in order to more accurately discern its physiological effects and mode-of-action on neuronal activity. For this reason, we are developing a device for concurrent stimulation and monitoring of the same region of the brain. The device will allow researchers to easily access the real-time physiological response of brain activity before, during, and after tDCS. Electroencephalography (EEG) was chosen as the optimal brain-imaging modality for use in conjunction with tDCS because of its extensive use in prior research, simplicity, and ease-of-use. The device will consist of an EEG-tDCS combined circuit designed to minimize interference between each other, a microcontroller for data recording and analysis, concurrent EEG-tDCS electrodes for simultaneous, same-location stimulation and monitoring, headgear to secure the electrodes, and an ergonomic and noise-reducing casing. It will output a 2 mA constant current through two silicon rubber electrodes placed on the subject's head while measuring EEG signals ranging from 1-100 μV from these same two electrodes with reference to a third ground EEG electrode. Our innovative circuit will provide tDCS stimulation and EEG amplification while being safe, noise cancelling, and reducing the interference between tDCS and EEG subsystems. This easy-to-use and affordable device will allow faster and more informative research to be conducted on this promising new neurological treatment.

Portable Alignment Device for Taylor Spatial Frame X-Ray Imaging

Erika Harkness, William Rury, Robert Noble, Brittany Love, Rachel Gomes

Dr. Shawn Gilbert, a pediatric orthopedic surgeon at Children's Hospital of Alabama, uses a Taylor Spatial Frame (TSF) for treatment in bone realignment. Use of a TSF involves capturing x-ray images to obtain measurements for the associated computer software which creates an adjustment guide. The current problem is that the TSF cannot easily be aligned with the portable x-ray machine used in the operating room, inhibiting the capture of an ideal lateral image quickly. The current solution uses a small guide light emitted from the x-ray machine that gives an idea of where the x-ray will image. This is an inferior solution as alignment is not achieved easily leading to an extraneous number of images taken resulting in wasted OR time and excess x-ray radiation exposure. Our need is to develop a simplistic method to assist in accurately aligned x-ray imaging of the TSF. After brainstorming and evaluation, the proposed design is a portable device using a three part system. A laser alignment clip, TSF alignment cylinders and a portable stand. Lasers are clamped to the head of the x-ray machine and aimed at an alignment device attached to the TSF. The x-ray plate is held by the portable stand.

HEALTH SCIENCES

A Community Approach to Smoking Cessation, Occupational Safety, and Nutrition

Jeremy Jackson, Janvi Jani, Adam Robinson, Rachel Wilson

The Foundry helps substance addicts with recovery and delivers resources to those in need. Community health assessment revealed that the Foundry residents were at risk for injury related to improper body mechanics and lung cancer related to incidence of smoking. Additionally, the community members were at risk for diabetes and heart disease related to knowledge deficits regarding nutrition. The purpose of The Community Impact Project was to prevent back injury related to improper body mechanics, reduce smoking amongst workers, and reduce the risk of heart disease and diabetes by conducting teaching sessions and providing resources. The students gathered educational materials, researched adult teaching strategies, and constructed an educational crossword puzzle to address knowledge deficits. Students conducted a series of informal teaching sessions on proper body mechanics and smoking cessation, which encouraged discussion and enhanced retention of the content and conducted teaching sessions. The crossword puzzles were distributed to the community members via the outreach program and a template was provided to the program director for future use. Students were independently responsible for assessing the needs of the facility and the community without detailed input from The Foundry program directors. A thorough and comprehensive nursing assessment over several weeks revealed deficits that necessitated public health nursing interventions. The residents demonstrated learning though verbalization and return demonstration.

A Quick and Easy Guide to Healthy Eating

Kellie Bates, Ariel Chavis, Kellie Stephenson

MedNet West of Tuscaloosa serves Alabama Patient First Medicaid recipients who are diagnosed with one or more chronic illnesses. The problems that seem to exist are a trend of obesity, chronic health issues, and lack of education amongst the majority of the population. The purpose of this project was to educate community residents on healthy food and meal options using funds provided through SNAP. A cook-book was chosen based on the needs and education level of the population. The information used to create this book utilized the most accessible grocery store to determine the prices most specific to this community. With this information and some nutritional guidance through the USDA Choose My Plate, “A Quick and Easy Guide to Healthy Eating” was developed. This cook-book will be implemented (following Medicaid approval) through the MedNet West employees. They can then refer to this book to provide examples of healthy meal options and the pricing for the number of servings listed. These meal guides will be given out free-of-charge to any qualifying recipients of MedNet West services. One challenge has been complying with the lengthy process of getting this project approved by Medicaid. Another challenge that has been observed is a lack of patient compliance with positive lifestyle changes. The biggest reward following the implementation of this book would be to see rising overall health status along with a declining obesity trend within our patient population. Overall, this project has encouraged healthy eating options within this population.

Access to Transportation as a First Step to Utilizing Prenatal Resources

Jaslyn Jackson, Jasmine Starkling, Shreaya Patel

Greater Alabama Health Network (GAHN) exists to provide prenatal care for women who are currently on Medicaid and live in West Alabama. They partner with other healthcare professions from local hospitals and agencies to provide services such as hospital care when the child is born, family planning, and community outreach. The main barrier identified at GAHN is noncompliance related to lack of transportation, lack of knowledge about the first signs of pregnancy, and lack of knowledge regarding benefits of available resources. The purpose of this project was to optimize the use of resources by providing patients with incentives to counteract issues related to noncompliance. Agency logo button pins, First Steps for a healthy baby, were sold to raise money to purchase gas cards as incentives and local businesses were contacted to obtain donations. Additionally, information regarding the first signs of pregnancy was provided to the patients to increase knowledge and aid in compliance with resources. Fifty button pins were sold and seventy meal donations were received from local Chick-Fil-A's. Challenges faced included time restraints related to planning the project and the process of creating and obtaining the button pins. Rewards included learning about the Medicaid process, the benefits provided, and the patient population served. More time would be needed to implement the purpose of the Impact Project and to evaluate the outcomes of the interventions. As a result of the implementations of the intervention this will result in a decrease in noncompliance rates within the population.

Addressing Low Literacy Rates in Fairfield, Alabama Through "Little Free Libraries"

Brooks Hinnant, Heather Lipscomb, Katherine Tarrance, Olivia Taylor

Better Basics' literacy programs strive to achieve increased literacy rates in the communities they serve. Better Basics has identified a risk of illiteracy among low-income children related to lack of access to reading materials. The goal of the project is to increase the overall literacy rate of children living in a low-income community. UAB School of Nursing assisted Better Basics' efforts by providing assistance in creating two "Little Free Libraries" for the Fairfield community, with help from the third to sixth grade students at Robinson Elementary School's afterschool program. This approach was implemented in order to encourage the community to get excited about reading and stimulate the children's creativity. The libraries were stocked with books donated by Better Basics. The libraries were strategically placed in high-traffic areas to encourage their use. In time, Better Basics hopes to see improvement in standardized test scores, as well as an increase in overall literacy rates within the community. By encouraging a positive outlook on reading and education, the community is placed on a course of literacy and education growth for future generations. To determine the effectiveness of the libraries, surveys would be distributed in the community to assess feelings concerning reading, and frequency in which the libraries are accessed. Standardized test scores are also needed to evaluate effectiveness of the project. Time constraints were challenging throughout implementation of the project. The "Little Free Libraries" reward the community as a whole by increasing literacy and narrowing the word gap.

All About Arthritis

Leigha Lentini, Melissa Morris, Miranda Ballenger

Nursing students partnered with Spring Gardens, an entity of the Jefferson County Housing Authority (JCHA) to provide health education and wellness promotion to residents of the facility. JCHA's mission statement is "To provide decent, safe, sanitary, and affordable housing and related services to qualified citizens." The purpose of this project was to equip Spring Gardens community members with coping strategies to manage arthritis through nutrition, exercise, and overall healthy living. Educating about stretches and exercises helped members learn to reduce pain caused by arthritis. Teaching to distinguish between nutritious and non-nutritious foods helped them manage arthritis inflammation related to poor dietary choices. Flyers and educational handouts about arthritis were presented to community members to reinforce instruction about diet and exercise. Students attended weekly ceramics classes to access informal time with community members to gain insight regarding their individual health needs. A line of communication was maintained with community members by posting an anonymous suggestion box housed in the library for members to ask questions about health concerns. Students responded to questions and suggestions with evidence-based handouts distributed to members at the clubhouse. The majority of people who participated in the arthritis education community impact project expressed they are better equipped to manage the symptoms of arthritis. Overall, the use of hands-on education focused on arthritis was very beneficial for the Spring Gardens community. Weekly interactions with residents impacted patient-provider communication skills of UAB nursing students.

Associations of Human Skeletal Muscle Fiber Type and Insulin Sensitivity, Blood Lipids, and Vascular Hemodynamics

Perry Griffin, Gary R. Hunter, Marcas M. Bamman, Barbara A. Gower, Gordon Fisher

Cardiometabolic disease remains a leading cause of morbidity and mortality in developed nations. Consequently, identifying and understanding factors associated with underlying pathophysiological processes leading to chronic cardiometabolic conditions is critical. One such factor that impacts cardiometabolic health is skeletal muscle function. More specifically, the myofiber composition (i.e. I, IIa, IIx) of skeletal muscle can be a critical determinant of overall physical function and may be associated with risk of pathology. In fact, it is well established that myofiber distribution can be associated with cardiometabolic risk factors such as whole body insulin sensitivity (SI) as well as obesity. Therefore, the purpose of this study was to evaluate potential relationships between myofiber distribution and SI, arterial elasticity, blood pressure, and blood lipids. Muscle biopsies were performed on the vastus lateralis in 16 subjects (BMI=27.62±4.71 kg/m2, Age=32.24±6.37 years, 43% African American). The distribution of type I, IIa, and IIx myofibers was determined via immunohistochemistry performed on fresh frozen cross-sections. Pearson correlation was performed to assess associations between myofiber composition and SI, arterial elasticity, blood pressure, and blood lipid concentrations. Type I myofibers were positively correlated with SI and negatively correlated with systolic blood pressure SBP, diastolic blood pressure, and mean arterial pressure (MAP). Type IIx myofibers were negatively correlated with SI and large artery elasticity, and positively correlated with LDL cholesterol, SBP, and MAP. These data demonstrate a potential link between myofiber composition and cardiometabolic health outcomes in a cohort of premenopausal women.

Banishing Bronchospasms: Childhood Asthma Education in Industrial North Birmingham

Tatum Buzbee, Ivana Ellis

At Fairmont Head Start, in industrial north Birmingham, education of pre-K children from low income families is the mainstay of the program. A major issue identified by Fairmont administration is the lack of education of parents and faculty about childhood asthma. The purpose of this project was to educate the faculty and parents, as well as the children, about the key points of asthma management. Children's education consisted of a lung model demonstrating the function of lungs and associated vocabulary. An education session was presented to faculty focused on medication administration, asthma triggers, and management of childhood asthma. Post-tests were distributed to gauge participant learning. The parents attended a health fair after school hours, to increase health literacy awareness and learn proper management of childhood asthma. The children learned new vocabulary related to lung function. The faculty were able to accurately and thoroughly answer questions related to asthma after attending focused education session. Parents increased their knowledge of childhood asthma, and took home action plans as a resource for asthma management. One major challenge was lack of faculty attendance at the education session. Maintaining attention of the children during classroom education presented an additional challenge. A major reward of this project was realizing how much the faculty, parents, and children learned about asthma, and the importance of appropriate acute and maintenance management of this condition.

Bond Strength, Wear, and Enamel Wear of Translucent Zirconia

S. Kwon, N. C. Lawson, P. Beck, R. Bansal, J. Burgess

Changes in the microstructure of translucent zirconia may influence its wear and adhesive properties. The objective of this study is to compare bond strength, wear, and antagonistic enamel wear of translucent zirconia to traditional zirconia, lithium disilicate, and enamel. Translucent zirconia (Katana UTML and STML), traditional zirconia (Katana HT), and lithium disilicate (e.max) were sectioned into blocks, wet polished to 1200 grit and heat treated following manufacturer's directions. Bond strength was measured on zirconia specimens after particle abrasion with 50 micron AlOx2. Lithium disilicate was etched with hydrofluoric acid (5%, 20 sec). A silane/MDP primer (Clearfil ceramic primer) was applied to all materials, a tube filled with resin cement (Panavia SA) was bonded to their surfaces, and specimens were stored wet for 24 hours and 150 days at 37°C. The cement was debonded in shear (1 mm/min) in a universal testing machine. Each of the polished ceramic specimens (top and bottom surfaces of multi-layered Katana materials) as well as labial surfaces of human incisors were wear tested using a modified Alabama wear testing device. Modified human premolars were mounted as antagonists. The specimens were wear tested 300,000 cycles of wear simulation at 20 N force, 2 mm sliding distance, 1 Hz frequency, and 33% glycerine lubrication. Volumetric wear and opposing enamel wear were measured with non-contact profilometry. Data were analyzed with 1-way ANOVA and Tukey post-hoc analysis (alpha=0.05). No significant differences were found between the bond strength ($p=.78$) or enamel wear ($p=.40$) of any of the materials. e.max demonstrated more material wear than natural enamel. No material wear was measured on zirconia. Translucent zirconia has similar wear and adhesive properties as traditional zirconia.

Breaking Down Barriers of Healthcare Accessibility for the Homeless, Bringing the Agency to the Consumer

James Deese, Stephanie Duncan, Shmonica McCarroll

Firehouse Shelter exists to meet the needs of the male homeless population in Birmingham and to empower them to reach their full potential in the community. These men are at risk for negative effects of many chronic diseases due to lack of awareness of services that are available to them. The community service project purpose was twofold: to increase awareness of local healthcare resources available to homeless and uninsured/underinsured men at Firehouse Shelter, and to provide education on health topics of interest to shelter guests. Nursing students met with representatives from 4 community agencies that are dedicated to providing healthcare for homeless, uninsured, or underinsured individuals. Information on each agency's services and registration requirements were compiled. Current evidence based literature was used to create short health workshops on topics of interest to shelter visitors and staff. Six health workshops were held. Information from 4 healthcare agencies were presented to the men using a step-by-step format. The men provided positive feedback on the workshop sessions and information packets. Firehouse administration will be given the electronic files for future use and distribution. Educating the homeless on how to utilize local community resources breaks down barriers that inhibit individuals from seeking healthcare services. Additional approaches to promote healthcare access in this population include engaging men who are not a part of the Firehouse team, inviting representatives from the agencies to the shelter to register consumers for services, and sharing the agency information packets with other shelters.

Brushing Up on Dental Hygiene

Anna Coleman, Ethan Boston, Sarah Ashouri

Project Horseshoe Farm (PHF) was founded with the purpose of meeting the needs of the vulnerable populations in the rural Greensboro, Alabama community. The PHF after-school youth program seeks to enrich the children through academic improvement and character development. Lack of access to dental care among the pediatric population was the identified problem. The goal for the group's project was to educate elementary children about dental health. As a result, the group's objectives were to teach the children about the anatomy of the oral cavity, the results of poor oral hygiene, lack of dental care, and the importance of preventing oral disease. The group administered a pre-test, followed by instruction, hands-on activity, and post-test. The first intervention involved coloring the tooth anatomy and creating mouth models by using cardstock and marshmallows. The second intervention covered brushing, flossing, and using mouthwash with instruction and return demonstration. The first intervention included 11 students. The students' pre-test average was 18% compared with a post-test of 70%. The second intervention consisted of 7 students. The students' pre-test average was 60% compared with a post-test percentage of 57%. Children's skills were also evaluated and corrected based on their return-demonstrations of brushing, flossing, and using mouthwash. The mode of teaching was effective in the first intervention and neutral with the second intervention based on the pre-posttest. A barrier the group faced was the children's short attention span. Based on the results, the children gained valuable knowledge about dental health.

Characteristics of Inpatient Stroke Rehabilitation Facilities Associated with Functional Status Scores

Prima Modi, Justin Blackburn, Ph.D., Meredith Kilgore, Ph.D.

Approximately 795,000 strokes occur each year in the United States. Up to 50% of stroke patients never regain functional independence and deal with permanent disability. Variation in cognitive and motor function at discharge in patients receiving post-acute stroke rehabilitation may be related to difference in facilities. This study aims to identify facility level characteristics that predict functional status change among post-stroke patients within inpatient rehabilitation facilities. The Medicare 5% sample of Inpatient Rehabilitation Facility Data from the Centers for Medicare and Medicaid Services (CMS) was linked to the American Hospital Association (AHA) annual survey for years 2006-2007. Linear regression was used to identify relationships between functional status change and facility characteristics while controlling for patient characteristics. Among 6,990 stroke patients, less improvement was associated with greater number of hospital beds (β = -1.781; p 0.002) and accreditation (β= -0.902 ; p 0.015). Among 1,212 free-standing facilities, having above the median number of rehab beds was associated with a greater change in motor function score (β= 5.513; p 0.057). Less improvement was associated with a higher proportion of doctors within the workforce (β= -2.306; p 0.037). Findings suggest that larger facilities with more beds may have fewer resources devoted to rehab, whereas larger free-standing rehab facilities may be outfitted better. Workforce analysis suggests a need to have a lower proportion of doctors. Additional research is needed to further investigate possible exogenous or arbitrary factors that impact motor functional status scores with accreditation by CARF.

Chronic Diseases and Health Literacy: Social Marketing Campaign in Rural West Alabama

Shivangi Argade, Jesi Lankford

The mission of West Alabama Area Health Education Center (WAAHEC) is to increase the availability and promotion of primary healthcare for rural and underserved populations in West Central Alabama. The group identified health literacy as the problem. While prevention education for chronic diseases exists in rural areas, the prevalence of these diseases has not significantly decreased. The group's goal was to provide preventative health education to individuals in West Alabama about the top chronic diseases for the area. The group researched and developed a social marketing campaign to increase health literacy about the top six diseases. The project was implemented through the WAAHEC Facebook with posts containing short summaries of each disease along with developed pamphlets containing additional information about each disease. The group collaborated with WAAHEC staff and a health literacy expert to assure all materials were educationally appropriate. Additionally, the group submitted an article about heart disease, the number one cause of death in Hale County, for potential publication in the *Greensboro Watchman*. The outcomes the group could expect would be a lower prevalence of common chronic diseases in West Alabama. Since this is an ongoing project, rates of these diseases would have to be surveyed over time to get an accurate representation of whether the project was successful. Limiting factors included having the article in one newspaper rather than multiple newspapers in different communities. The group experienced scheduling challenges, but remained flexible and in the end everything still went according to plan.

Combating Poor Health Outcomes in Poverty Through Financial Literacy

Pamela Carroll, Alyssa Polley, Rachel Williams

New Rising Star's Afterschool Program serves school aged children from a low income Birmingham community. The program seeks to promote the six pillars of community development. In this project students from UAB's School of Nursing targeted the pillar of financial literacy as a means to promote health outcomes. The purpose of this project was to improve financial literacy in fourth through eighth grade students attending the afterschool program. Age appropriate activities were developed to gauge the students' current financial literacy, including a game to assess what students believed common household goods cost. Savings banks were created to encourage saving. Different financial topics were covered on a weekly basis, leading up to a Game of Life simulation. During the simulation, children "lived" through a month as an adult with a set paycheck and numerous financial obligations. Most of the children successfully managed their money during the simulation, but were appreciative of the pressures created by bill deadlines. They also saw the benefits of health insurance and the need for a savings cushion in their accounts when they encountered "bad luck," such as illness or unplanned expenses. The project was deemed successful based on the children's reports on the importance of saving money, paying bills on time and before purchasing non-essential items, placing needs before wants, and the benefits of investing in health insurance and good nutrition. What this experience brought to light was the importance of being able to teach important topics about a literacy level which children can understand.

Creation of Promotional Materials to Expand Awareness of UAB HealthSmart

Black, C. F., Grillo, J. T., Penick, T. L., Russell, J. J., Jones, A.R.

UAB HealthSmart is a program offered by UAB Preventative Medicine that provides free wellness services, including chronic disease screening and counseling, to adults in the Birmingham area. A major challenge faced by UAB HealthSmart is recruitment of new clients due to limited staff and marketing resources. The purpose of this project was to expand awareness of the services offered by producing a permanent promotional tool that can be rapidly shared via social media and email. In order to become more familiar with the client experience, each student completed a screening session and participated in the WALK Feel Alive exercise program. Using footage from these events, a 90-second video was created, highlighting the location and staff of UAB HealthSmart, and the services offered. The video was approved for use by the UAB HealthSmart staff and administration. The video was uploaded to YouTube and the link was provided to the staff of UAB HealthSmart as an additional marketing resource. This project allowed hands-on practice of the process of assessing a community, identifying a need, and creating a solution. UAB HealthSmart received a video that was short enough to capture the viewer's attention, while also portraying the wide variety of services available. This site now has a resource that can be easily distributed, allowing more Birmingham residents to be aware of what UAB HealthSmart is. Providing for patient privacy and seeking approval from administration were barriers encountered during this project.

Did You Remember to Breathe Today? Stress and Cardiovascular Disease Management

Jaleesa Gilyard, Lillian Khodabandeh

The Well-Integrated Screening and Evaluation for Women across the Nation (WISEWOMAN) is a program offered by the Centers for Disease Control and Prevention to identify and reduce heart disease and stroke risk factors in women ages 40-64 who are low-income, underinsured, or uninsured. The goal of this project was to facilitate a support group on the topic of stress, including educating on the physiologic response to stress and chronic stress: a risk factor for cardiovascular disease. To adequately serve the diverse needs of the population, two groups were held: one in Spanish and one in English. The group led an interactive discussion on causes of stress, followed with a talk by a social worker from the Chilton-Shelby Mental Health Center on relationships. A social worker from SafeHouse, a domestic violence prevention program, provided information on their services. The support group ended with a balloon release to reinforce the theme of letting go of stress. Six women attended the group in Spanish, and two attended the group in English. The number of participants may have been affected by the weather. However, the women in both groups were interactive and shared personal stories. Both support groups were successful. One challenge included presenting to the Spanish speaking group, but an interpreter was present for the duration of the support group. In the future, an evaluation would be needed to determine how the stress relief interventions were beneficial.

Does High School Residential Status of Pre-Health Undergraduates Affect Their Knowledge of the Health Professions?

Itia Dowdell

The purpose of this study was to determine if there is a relationship between high school residential status and knowledge of the health professions among undergraduate pre-health students in Alabama. The Association of American Medical Colleges (AAMC) estimates a shortage of 46,000 to 90,000 physician providers by 2025 and recommends collaborative team-based care with other health professionals as an essential element to address these shortages (1). A maldistribution of healthcare providers further compounds shortages in rural areas (2). Healthcare education, recruitment, and retention efforts in rural areas have been proposed to reducing rural workforce shortages (3). It is therefore important to know if knowledge of careers in the health professions, especially in regards to physician assistants (PA) and other mid-level practitioners is well understood among undergraduate students from underserved areas. A cross-sectional survey was developed and distributed to college students across the State. Descriptive statistics were tabulated in SPSS and Excel. Relationships between high school residential status and knowledge of the health professions were analyzed in SPSS through use of the ANOVA procedure. Results were not statistically significant, $F(3,208) = .235$, $p = .872$, therefore it was not possible to conclude a relationship. Further examination of the data revealed that, among undergraduate pre-health students, knowledge of health professions increased as year of college increased. Outreach and recruitment may be more effective for freshmen and sophomores rather than targeting college students from healthcare shortage areas.

Effects of a Carbohydrate-Restricted Diet on Body Composition in Older Adults with Obesity

Adrienne Bolan, Katie Short, Kimberly Wendland, Lacey Wise

Excess adiposity may increase risk for poor metabolic and functional outcomes in older adults. The hormone insulin promotes fat deposition and limits its mobilization and oxidation, and previous studies have shown that a diet designed to limit insulin secretion via a reduction in carbohydrate (CHO) intake can induce loss of body fat while preserving lean mass. The objective of this study was to examine the effects of a CHO-restricted vs. low-fat diet on body composition over 8 weeks in older adults >60 years old with obesity. Participants were randomly assigned to either a CHO-restricted diet or a low-fat diet. Participants kept weekly food journals and met with a Registered Dietitian every 2 weeks to evaluate adherence to the diet assignments. Participants' body composition was assessed via dual-energy X-ray absorptiometry (DXA) at baseline and following 8 weeks of diet intervention. Participants on the CHO-restricted diet lost 6.0 ± 1.9 kilograms ($p. <0.05$) while those on the low-fat diet lost 0.1 ± 0.9 kilograms. Of total fat mass, participants on the CHO-restricted diet lost 4.6 ± 1.4 kilograms ($p. <0.05$), while those on the low-fat diet lost 0.9 ± 0.6 kilograms. There was no significant difference in change of total lean mass. In conclusion, consumption of a low-CHO diet resulted in weight loss and preferential loss of fat mass, over eight weeks in older adults with obesity. These findings should be further examined in a larger study.

Etsy for Eagles' Wings

Jodee Robinson, Payton Smith

Eagles' Wings is a non-profit organization that focuses on helping adults with intellectual disabilities lead the most meaningful and independent lives possible. Although the site is expanding rapidly, they still face financial issues. The site receives all funding through donations and their onsite gift shop. The purpose of this project was to increase revenue for Eagles' Wings through an online Etsy account. This account would allow the site to take their gift shop online. This project began by taking photos of the merchandise in the Eagles' Wings gift shop. The photos were then edited and posted, along with prices and descriptions, to an Etsy page created for Eagles' Wings. Safe money transfers were obtained through the website carrier. A description was added to the page in order to let customers know that all proceeds would go directly to help the individuals living with intellectual disabilities. Staff at Eagles' Wings was then educated on how to navigate and upload to their website. If successful, this project will provide additional revenue to benefit Eagles' Wings and assist with expansion, salaries, and additional opportunities for individuals with intellectual disabilities to integrate themselves into the community. Those who wish to purchase from Eagles' Wings will no longer have to drive to Tuscaloosa, which will increase the number of customers, and consequently, revenue. The project will be considered a success even if only a few people make purchases, because every little bit of funding tremendously helps Eagles' Wings.

Evaluating the Impact of an Emergency Obstetric Care (EmOC) Program on Sepsis Outcomes in India

Samuel Moss, Seth Borgstede, Aarin Palomares

Lack of access to quality emergency obstetric care (EmOC) contributes to high rates of maternal and neonatal morbidity and mortality in resource-poor nations. Thus, this study evaluates the impact of an EmOC training program on maternal and neonatal sepsis outcomes across India. Case records were analyzed for sepsis, antibiotic utilization, managed cases, and maternal and neonatal outcomes from 10,558 reported deliveries between 2006 and 2012 at twenty-three district hospitals across seven states. Of the 155 identified cases of sepsis (116 maternal and 39 neonatal), 40% were independently managed by those trained in the EmOC program and did not result in the referral of the patient to a higher center. Antibiotics were used to treat 10.9% of cases. Among patients (89.1%) who did not receive antibiotics, there were 5 maternal deaths (3.6%) and 3 neonatal deaths (2.3%). Managed cases were associated with a greater ratio of antibiotic use and lower sepsis-related mortality. Training nonspecialist physicians in EmOC and proper identification and treatment of sepsis could greatly improve the outcomes of patients with sepsis in India. Increasing antibiotic availability and consistent and accurate reporting of sepsis cases could lead to a marked decrease in maternal and neonatal mortality. However, systemic underreporting of sepsis cases limit the generalizability of these findings.

Fall Risk of Stroke Patients in Inpatient Rehabilitation

Megan Benefield, Elizabeth Karst, Kayla LeBerte

The purpose of this study is to investigate the characteristics of falls in post-stroke patients that occurred in inpatient rehabilitation, in an effort to create a more predictive falls risk assessment tool for this population. Following a stroke, many patients are transferred from hospitals to inpatient rehabilitation facilities to continue recovery. Falls have become a major problem for these patients in this setting, and thus a major concern for healthcare providers. There is no current falls risk assessment specific to this population. Current literature asserts that cognitive function, medications, and musculoskeletal dysfunction are common risk factors associated with an increased fall risk in post-stroke patients. However, there exists a gap in current literature for a post-stroke specific falls risk assessment tool for use in inpatient rehabilitation. This study is a retrospective analysis of the medical records for 25 different patients who experienced at least one fall in an inpatient rehabilitation facility following a stroke. The researchers pulled data points from each patient's chart and entered them into SPSS software analysis.

FAM20A Null Mice Mimic Syndromic Amelogenesis Imperfect with Gingival Fibromatosis

Steven R. Sheibley

Mutations in FAM20A, a non-enamel protein, are associated with the syndromic autosomal recessive (AR) forms of Amelogenesis Imperfecta (AI): AI and Gingival Fibromatosis (AIGFS;MIM#614253) and Enamel-Renal Syndrome (ERS;MIM#204690). These disorders have overlapping dental/oral features such as hypoplastic enamel, pulpal calcifications, delayed tooth eruption/resorption, enlarged follicles and gingiva overgrowth, with or without kidney calcifications. In this study we perform extensive characterization of the craniofacial/dental phenotype of FAM20A knockout (KO) mice compared to wild-type (WT,+/+) and heterozygous (+/-) littermates while determining the expression pattern of major enamel proteins amelogenin and ameloblastin. FAM20A KO mice were breed, pups collected at postnatal (PN) days 1-28 and genotyped by PCR. Mouse heads were isolated, photographed, fixed and prepared for histology. Molars were isolated, mRNA isolated and converted to cDNA for qRT-PCR analysis. Radiography, microcomputed tomography and von Kossa staining were performed to assess morphology and mineralization from 7 day PN through 6 months. Immunohistochemistry was performed at 1, 3, 5, and 7 days PN using specific antibodies against FAM20A, Amelogenin, and Ameloblastin. FAM20A KO mice demonstrate severe dental/oral malformations: incisors were rough chalky white; molars had little enamel with severe abrasion. The teeth had a delayed in root formation and eruption, with enlarged follicles, and overgrown gingiva surrounding the molars. IHC showed no detectable FAM20A protein. Localization of Amelogenin and Ameloblastin was normal at 1 day becoming highly dysregulated by 3 days. Ameloblasts detached from the enamel matrix, remained proliferative forming tumor-like epithelial structures with ectopic mineralization of these epithelial islets with hyperplastic dental follicle. FAM20A is critical for cytodifferentiation of ameloblasts, production of enamel matrix and mineralization. Altered Ameloblastin and Amelogenin expression and localization likely contributes to the dental/oral phenotypes seen in FAM20A KO mice.

Geographic Location and Risk of Developing Type A Personality Traits

Candy Mosley

Personality traits play a huge role in the health and mental well-being of individuals. The Type A personality is linked with cardiovascular disease risk due to increased and sustained levels of anxiety and stress. There have been several studies that investigate the adverse health effects that Type A personality traits can cause but many of them are not generalizable to the population; however, there are currently no studies that look into whether geographic location plays a role the development of a type A personality. Using the Reasons for Geographic and Racial Differences in Strokes (REGARDS) study data collected from the initial computer aided telephone interview (CATI) calls and a snapshot of where the participants lived at age 18 from the Calculation Variable data, we used the computer program SAS, Version 9.2, to perform frequency procedures. We compared percentage of Type A traits between participants living within the Stroke Belt and participants living outside the Stroke Belt. We hypothesized that participants living inside the Stroke Belt will show a higher prevalence of Type A personality traits than their non-Stroke Belt counterparts. 38.17% of Stroke Belt individuals reported a strong need to excel compared to only 29.19% of non-Stroke Belt individuals. Results were consistent across the 4 questions explored and analyzed from the CATI call data. Individuals in the Stroke Belt are more likely to self-report Type A personality traits than individuals outside of the Stroke Belt.

GI Motility: Making a Move at Cornerstone

Emily Allen, Victoria Bowman, Ashley Waudby, Brittany White

Cornerstone Elementary exists to provide a Christ-centered, world-class school in the inner city. Nutrition has presented to be of concern among low-income children in the Woodlawn/Eastlake area. Due to lack of knowledge about nutrition, these children are at risk for bone fractures, decreased cognitive function, decreased eye health, and diabetes. The purpose of this project is to create a fun environment that enables second graders to gain a better understanding of the four nutritional food groups, empower students with the ability to make healthy food choices, and explore the path food takes through the digestive system. The students participated in interactive lessons that consisted of hands on experiments or crafts, focusing on a different part of the digestive system each week. After the activity, the students completed a worksheet to practice the skills they learned. During lunch, the students learned about the importance of nutrition by discussing healthy food choices and how the digestive system works to give their bodies these nutrients. After each lesson many students were able to complete a worksheet that asked them questions about the material they learned. Each student displayed an understanding of his or her knowledge by completing the worksheet. After speaking with the students during lunch for a few weeks, they were able talk about the benefits of certain nutrients and it became evident that they started to understand the concept of nutrition. The rising amount of knowledge the students displayed after each lesson was rewarding. The project's main challenge was trying to follow the curriculum while simultaneously incorporating nutrition into the lesson.

Health and Safety Boot Camp for the Silent Generation

Lori Hicks, Hannah Leopard

The Shepherd Center is community driven and exists to encourage senior members in the eastern area of Birmingham to become involved in activities outside their home. Members must be over the age of 60 and may participate in activities to stimulate their minds and bodies. Several problems have been assessed including: lack of nutrition information, deficits in health and medication knowledge, and basic safety concerns. The primary aim for a student with The University of Alabama at Birmingham School of Nursing and service through community health partnerships would be to provide knowledge of nutritional food choices and healthy food preparation, medication information, and home safety education. Pamphlets with information concerning heart healthy food choices, healthy food preparation, and medication education were distributed to members and roundtable discussions ensued. Reusable food charts were provided and daily food journaling was encouraged. A Recipe Share program was implemented in the center's computer lab for sharing healthy cooking ideas. Access to weather alerts by phone and smoke detectors were provided. Fact sheets were distributed concerning home safety checks and tips for correcting existing home dangers. Members were involved in discussions and restated knowledge of nutrition and medication education. The members were vested in using provided resources and vowed to implement learned measures. Pre- and post-assessment would have been beneficial if the same group was present on a weekly basis. The group was very involved and provided needed education opportunities for the students. Understanding of the need for community health nursing, the power of education, and evaluation of teaching measures was attained by the students.

Healthcare Knowledge Deficit in Spanish Speaking Communities

Valerie Barreau, Jessi Johnson, Brooke Murphree

The Literacy, English, and Parenting Skills (LEAPS) program at Valley Elementary School exists to teach Latina mothers English, reading comprehension, math, and parenting skills. Significant challenges facing these Latina mothers are access to healthcare and knowledge deficits about health and the U.S. health care system. The purpose of this project was to educate Latina mothers in Pelham on the healthcare system and pertinent health topics, so they could use the information with their families and share the knowledge within the Latino community. The group developed lessons and learning objectives for each topic taught. The topics included: tuberculosis, differentiating between winter colds and the flu, health emergencies, and sexually transmitted diseases. Spanish language handouts were provided for each topic. To ensure knowledge retention and understanding and to provide time to answer questions, new topics were introduced every other week. On weeks when new topics were not introduced, the group reviewed the previous week's material. To evaluate the learning retention of the topics, the group created a questionnaire with two basic knowledge questions chosen from the lessons taught. Seventy-five percent answered both questions correctly, indicating teaching was successful and the mothers had knowledge retention of the topics taught. The method of teaching was effective. However, barriers to more in-depth teaching and learning included the mothers' limited English proficiency, their hesitancy to fully engage with comments and questions, and time constraints for the teaching. The mothers gained valuable knowledge about health and healthcare.

Healthy Infant Brain Development Related to Bonding and Nutrition

Shannon Moller, Laura Terrebonne

Nurse Family Partnership (NFP) exists to support and serve low-income women in Tuscaloosa County who are Medicaid eligible and pregnant with their first child. Mothers are lacking knowledge regarding the importance of early maternal infant bonding and malnutrition, and how this can affect their baby's cognitive and emotional development later in life. The purpose of this community impact project is to improve relationships between mothers and babies while also teaching the basic foundation of good nutrition habits therefore decreasing the risk of abnormal brain function and physical growth. In order to help combat these problems, NFP was supplied with a new client survey in order to receive feedback on areas in which the NFP program could improve. Also, NFP clients were supplied with an educational pamphlet, tucked inside a storybook, stressing the importance of maternal infant bonding. The pamphlet provided mothers information on how to create a loving environment and possible memorable moment for the mom and baby while also educating the mother on important risk factors that can affect infant brain development. Evaluation will be based on outcomes of relationships between mothers and their infants and the mother’s knowledge of how brain development can be affected. Additional hands on interaction with clients would be needed to experience the full result of the project.

HIV Outreach Education in Birmingham Alabama's Homeless Community

Kelsey Bullard, Erin Fuller

One Roof is a non-profit networking agency that coordinates with 40 different organizations in Jefferson, Shelby, and St. Clair counties to help persons experiencing homelessness connect with needed services. Persons experiencing homelessness are at an increased risk for physical illnesses, including infectious diseases. The rate of HIV infection is increasing, especially in the deep South. The purpose of this project was to research the outreach HIV interventions already in place at homeless shelters in Birmingham and across the country, and from that develop an education program to implement in two local shelters. Each education program consisted of one thirty minute presentation about the disease process of HIV and ways to prevent transmission, followed by optional HIV testing provided by the 1917 Clinic's SHAPE volunteers. The participants were also given evidence-based SHAPE brochures and free condoms. Through education about the disease and how it is transmitted, the participants learned how to reduce their risk of contracting HIV. Through testing, more of the high-risk homeless population will know their HIV status. Participants are better equipped to make the right choices in high-risk situations if they know about HIV and about disease prevention. Effectiveness of the program was evaluated by asking the participants at the end of the session what they learned about HIV. The time constraint for the presentation was a challenge; in the future one might consider lengthening the session or having multiple sessions with each group of participants.

Learning to Breathe with Ease: Creative Respiratory Education for Preschoolers

LaVonna Parham, Soniya Perry, Jade Sanders

Calloway Head Start, an educational entity of the Jefferson County Committee for Economic Opportunity (JCCEO), provides a comprehensive approach to serve needs of preschool children. JCCEO and Calloway Head Start partner to combat poverty, providing a broad range of services for children and their families. The students are at risk for respiratory health conditions, attributed to area environmental pollution. The purpose of this project was to educate children and their parents about common respiratory illnesses, methods to prevent infection, and prevention of asthma exacerbations by adhering to prescribed medication regimens. A questionnaire regarding respiratory system diseases and prevention techniques was distributed to parents. Parents were encouraged to communicate any comments or questions related to questionnaire content. Children participated in hands-on learning by creating a working model of the lungs. They were given a diagram of the lungs to color, and participated in an interactive lesson about lung function. Of 44 questionnaires sent to parents of three classrooms, 29 were completed and returned. Ten participants requested additional information. Children were able to recall and demonstrate key points of the information presented. Challenges included the age of the children, and the number of parents who participated in the questionnaire. Excitement and enthusiasm displayed by children and teachers were rewards of this project. In the future, it is important to remember when working with children that even small bits of information retained can make a great impact in the life of a child.

Lipscomb Medical Clinic: Reaching the Unreached

Madison Bellew, Rachel Cummings, Anna Petty

Nursing students partnered with E3 Medical, a non-profit organization that focuses on equipping believers, evangelizing, and establishing churches throughout the world. As a team, the nursing students and E3 staff worked with the community of Lipscomb, AL to provide a free medical clinic to community members. The purpose of this project was to bring awareness, provide care, and educate members of the community about common issues relevant within this population; most prevalently, hypertension and diabetes. Interprofessional collaboration comprised of nursing, medical, dental, and pharmacy students allowed for ample provision of services and targeted education that encouraged patients to modify unhealthy behaviors. Multiple health screening stations were arranged at Lipscomb Fire Department. Patients were assessed by nursing and dental students, a physician, and nurse practitioner. Thirty-five patients were screened with some receiving prescriptive treatment for health conditions. Hypertension and diabetes were the most prevalent conditions identified. Overall, the clinic functioned efficiently and effectively. Challenges faced included tackling complex marketing strategies with a small team, and deficiencies in communication during planning with community leaders. The team received positive feedback from the community and volunteers.

Patient Education for At-Risk Diabetic Patients in Birmingham, AL

Jasmine Corder, William Shows, Logan Thrasher

PATH Clinic is a UAB nurse managed facility serving at risk diabetic patients in Birmingham, AL. PATH clients may be uninsured or underinsured, undocumented, and face many other structural barriers to care. PATH provides primary care, diabetic medication, patient education, nutrition, social and mental health services to diabetic patients. The community assessment phase revealed the common thread between PATH patients was disease process knowledge deficit. The objective was to provide relevant patient education materials that best serve PATH patient needs. Per the community assessment, patient education was the priority patient need. After completing the assessment phase and surveying PATH Clinic providers, knowledge deficits to be included in a comprehensive patient education manual include were: Rule of 15 (hypoglycemia), carbohydrate counting, fasting glucose chart, flu shot, insulin administration, community resources, mental health materials, and bus route directions to PATH. Three patients were identified to receive the comprehensive patient education manual and were assessed after two weeks to evaluate effectiveness of materials. Nurse implemented patient education was critical to successful patient self-management of complex diabetes. Locating material that fit each patient need was a challenge to providing individual care, but successful patient education was pivotal to filling individual patient knowledge deficits.

P.E.E.R., Inc. Lifestyle Learning

Scott Gamble, Jesse Wiggins

The community site P.E.E.R., Inc., is a non-profit organization that runs a local food market and is helping with an after school care program (grades 1-8). These children have deficient knowledge in nutrition and healthy lifestyle choices. The purpose of this project was to increase children's knowledge of healthy lifestyle choices and proper nutritional habits. Another goal is to increase daily physical activity. Visual presentations followed by short lectures were performed to increase the children's knowledge about nutrition. Physical activity exercises were also set up for the children to participate in. The children showed an increase in knowledge about nutrition as each week passed. The children also showed an increase in daily exercise. Not only were these shown, but an increase in interest was also seen in the younger population. It was difficult to maintain the children's attention and gather them in a central location to teach the information. There was a lack of structure in the program we worked with, however the children showed interest in our materials and activities. We suggest an organized schedule for the children to follow each week that is strictly implemented by the staff. With this the children could attend weekly session about organized topics pertaining to their health.

Preventing Illness and Accessing Healthcare in the Rural Community

Ashley Evatt, Pearce Gruenenfelder, Carly Mashburn

The purpose of project Horseshoe Farm Adult Day Program (PHFADP) is to meet the needs of the vulnerable populations in rural Greensboro, Alabama. The main problem identified by the group was lack of access to health care and knowledge of when to seek appropriate healthcare. The goal of the community project was to provide the participants of PHFADP with knowledge and skills to prevent illness and seek health care accordingly. In the first intervention, participants were taught about flu and pneumococcal vaccinations, respiratory etiquette, and how wash their hands. The participants practiced handwashing, and Glo-germ was used to represent germs. The group used a bingo game to educate about vitamins. The second intervention included instructions regarding the type of healthcare provider (doctor's office, urgent care, 911, and emergency department) needed for common conditions of the head, heart, lungs, and trauma. Brochures specific to the healthcare providers in Hale and surrounding counties were distributed. Intervention one pre-test average was 48.4% for 19 responding participants and the post-test average was 65.9% with 17 participants responding. Intervention two pre-test average score was 76.6% for 23 responding participants and the post-test average was 78.8% for the 18 responding participants. The pre-posttest for both interventions showed improvement. Evaluation of the interventions revealed the pre and posttests should have been printed and tested for readability, hand washing should have been limited to 20 seconds per participant, and careful wording during presentations was needed in regard to the available resources for the rural community.

Progress on a Systematic Review of Heart Failure Family Caregiving

Allison Monaco, Amanda Segars, Jakira Myers, Gisella Mancarella, J. Nicholas Dionne-Odom, Marie Bakitas

Approximately 5.7 million Americans suffer from heart failure (HF) each year. HF is debilitating and often requires the support of a family member or friend who provides necessary care to maintain the patient's quality of life. The purpose of this systematic review was to examine the state-of-the-science of research focused on HF family caregiving. A literature search was conducted for all dates up to December 2015 in PubMed and CINAHL using the search algorithm: heart failure AND caregiver AND hasabstract[text] AND English[lang]. Eligible studies reported original research or systematic reviews of family caregiving for adults with HF. Data extracted from articles included: author, year, journal, title, setting, location, design, purpose/research question, hypothesis, theoretical framework, caregiver sample size and eligibility criteria, patient sample size and eligibility criteria, study variables and frequency of collection, intervention description, main findings, limitations, and clinical implications. The literature search yielded 176 studies. To date, we have extracted data from 67 articles, including 8 systematic reviews and 24 qualitative, 29 quantitative, 4 mixed-methods, and 2 intervention studies. Of the extracted articles, research findings suggest that HF family caregivers lack knowledge and resources to provide care, experience significant physical and psychological burden, and feel excluded from the healthcare team. Family caregivers provide necessary care to persons with HF that can be burdensome. Clinicians should evaluate ways to educate caregivers, reduce caregiver burden, and include caregivers in care decisions and processes in order to improve the quality of life of both families and patients.

Providing Education and Supplies Related to Proper Foot Care among Adults with Special Needs

Chalandra Barley, Amanda Scott, Bailey Whitfield

Wylam Adult Health Care Center is a program funded by DHR and Jefferson County. The center provides meals, activities, and social interaction for adults that require daytime supervision. After participating with nurse practitioners in monthly health screenings, it became obvious the clients were at risk for foot injury related to lack of knowledge on proper foot care techniques, and access to care. The purpose of the community project was to improve foot care among the elderly and disabled populations at Wylam through three objectives. The objectives were to: provide education on proper foot care, provide the supplies for proper foot care, and to provide written materials demonstrating proper foot care techniques. Partnering with Vandiver Church of God, Magic City Harvest, and the UAB School of Nursing soap, lotions, exfoliators, and socks were collected. Individual "foot-care packages" were created, as well as a brochure to take home to caregivers. A teaching session explaining the purpose of proper foot care, and step-by-step instructions on self-care of the feet was conducted. Approximately fifty foot care packages were created and provided to the clients at Wylam. After providing the tools and education, the clients were tested verbally on their ability to retain the knowledge. Challenges of the project included: the limited time frame not allowing time for reinforcement of teaching, as well as not gathering the supplies sooner. However, it was a great experience to see how much this project impacted the people at Wylam.

Quit "Dragon" Your Feet and Get Healthy!

Mary Grace Cady, Jessica Lambert

Workshops, Inc. is a vocational rehabilitation agency whose purpose is to create jobs for adults with disabilities and shape them into reliable workers. Common health problems in the Workshops Inc. population include obesity, sedentary lifestyle, and access to healthy foods. The purpose of this project was to provide Workshops Inc. consumers information and experiences empowering then to start a healthier lifestyle. UAB nursing students met with consumers at lunch to illicit topics of interest for health education and exercise instruction. Students hosted workout classes during consumers' break times. Blood pressure and blood glucose screenings were paired with information on the DASH diet and healthier vending machine options available at work. The project culminated in a competition to promote team exercise. The number of consumers attending health screenings exceeded attendance at exercise activities, although a core group of five consumers attended all exercise sessions. Through our health screenings we identified five people with stage 2 hypertension who were unaware of their elevated blood pressures. Each was provided with information on the DASH diet and encouraged to seek medical follow-up. Improvements in one patient's blood pressure were observed the following week after starting medication. Workshops Inc. is an educational place where people go to learn and grow. UAB students faced challenges such as lack of communication and lack of motivation seen by the consumers. The group then realized that there needed to be more motivation and if there were an incentive, the consumers would respond better. This method has had better results!

Recovery Through Resources

Abby Carreker, Ashley Coirier, Felicity Cureton, KeAsha Knight

Aletheia House is a non-profit organization providing substance abuse treatment and prevention services to low-income individuals. Common substances abused by consumers of Aletheia House include alcohol, heroin, marijuana, and narcotics. Education of the drugs' effects on the body is critical during treatment. The purpose of this project was to provide consumers of Aletheia House with health information to positively impact their recovery from substance abuse. Discussing the physical, social, and psychological effects of these substances and expanding the consumer's knowledge regarding such were the objectives for this project. The target populations were men and women (including pregnant women) currently undergoing substance abuse treatment at Aletheia House in Birmingham, AL. Since many clients were unable to read/write, information was presented in an easy-to-understand format (5th-grade reading level). For consumers' convenience, resource binders were compiled for each Aletheia House location. The binders contained educational handouts/worksheets and information about different substances, along with information on smoking cessation. Interactive tools, such as games, were used to generate discussion. To inform the consumers about the project, a class was presented at the men's and women's facility, utilizing information from the binders. To evaluate how well the learners grasped the information, a BINGO game with integrated health-related questions was provided at the end. After teaching different health-related topics, based off of verbal feedback, the project was successful. One obstacle faced was presenting material at a 5th grade reading level for easy comprehension. The learners actively engaged in discussion and enjoyed the informative material. However, if the project were to be completed again, visual aids would be utilized to help consumers retain information.

She Lied: The Influence of Just World Beliefs and Religiosity on Sexual Assault Myth Acceptance

Haley Vinson, Eric Conrad

Sexual violence is a frequent occurrence in the United States and a strong concern within college populations. Rape and sexual assault myths may contribute to ongoing sexual violence by shifting blame from perpetrators to victims. Previous literature has investigated the role of just world beliefs (JWB) and religiosity on sexual assault blame attribution, but little evidence exists regarding their impact on the perception that victims frequently lie about their victimization (SLA). A sample of 137 university students were surveyed to assess the influence of JWB and religiosity on SLA, with organizational religiosity (OR), non-organizational religiosity (NOR), and intrinsic religiosity (IR) evaluated as independent predictors. A stepwise multiple linear regression analysis was used to develop a model for predicting university students' SLA from their JWB, OR, NOR, and IR. The multiple regression analysis yielded a statistically significant [$F(3,133) = 11.36$, $p < 0.0001$; $R2 = 0.22$] model. The three predictor model accounted for 22% of the variance in SLA among university students, with the statistically significant predictors of JWB, NOR, and IR accounting for 14%, 4%, and 4% unique variance, respectively. JWB is not only a strong predictor of overall sexual assault blame attribution, but also SLA. Additionally, distinctions within the dimensions of religiosity indicate that frequency of private religious and spiritual activity (NOR) as well as the pervasiveness of religious influence in daily decisions (IR) were more important factors than the frequency in which individuals attended religious meetings (OR).

Sleep Quality During Pregnancy and Changes in Insulin Sensitivity and Secretion

Yesenia Lopez, Paula Chandler-Laney

For some women, the compensatory increase in insulin secretion is insufficient to maintain glucose within the normal range, in which case, gestational diabetes develops. The purpose of this study was to test the hypothesis that during pregnancy, women who report poor sleep quality would have insulin secretion relative to insulin sensitivity, otherwise known as the disposition index (DI). Data for this study was obtained from 44 pregnant women who were enrolled in a study to examine changes in metabolic health across pregnancy. Women underwent a liquid meal tolerance test (LMTT) to assess whole body insulin sensitivity and insulin secretion, at 16-20 weeks' gestation and again at 30-34 weeks' gestation. The Pittsburgh Sleep Quality Index (PSQI) was also administered at 30-34 weeks' gestation. Participants were assigned to either a "good" or "poor" group according to their sleep quality. Repeated measures analysis of variance (ANOVA) were used to examine whether the change in DI, insulin sensitivity, or insulin secretion differed by group across pregnancy. Nine women reported "good" sleep quality and 35 reported "poor" sleep quality. DI stayed the same for the good sleep quality group but decreased for the poor sleep quality group. Insulin sensitivity decreased across pregnancy, but the groups did not differ in terms of the magnitude of change. The difference in DI was attributable to a greater increase in insulin secretion across pregnancy for the good sleep quality group as compared to the poor sleep quality group.

Stressful Life Events Predicting Fatigue Severity in Chronic Fatigue Syndrome

Angelica Chapman, Molly Brown Langner

Individuals with Chronic Fatigue Syndrome (CFS) and other related conditions struggle to identify triggers for their fluctuating symptoms. The unpredictable nature of symptom flares significantly lowers quality of life and negatively impacts professional and personal relationships. Identifying triggers of symptom flares would significantly increase patients' ability to manage their condition. One such trigger may be stressful life events; such as a car accident, death of a loved one, or a personal health crisis. The goal of the present study is to evaluate the hypothesis that stressful life events increase the fatigue severity of subsequent days. In the parent study, participants completed twenty-five days of daily blood draws, as well as twice-daily reports of symptom severity. In order to understand the effects of stress on participants' symptoms, the data were analyzed to contrast fatigue levels in the three days before a major stressful event with fatigue in the three days after the event. We hypothesized that fatigue would be significantly greater following a stressful life event. Based on the trends in the data, factors predictive of increased levels of fatigue may be revealed. Results from the study will lead to a better understanding of the disease process and more effective management of CFS.

Survey of Radioactive Items in the Home

Elizabeth Kritzberger

Whether it be the sun or natural substances we encounter, we are subject to radiation every day. There are some items that can be found in the home that are either naturally radioactive or have a component containing radioactive material. This study was conducted to identify radioactive elements and to assess the exposure we receive from items that have been previously studied. We used three types of radiation detectors to obtain quantitative and qualitative information regarding the radioactive properties of items that can be found in the home like Fiestaware, smoke detectors, Brazil nuts, and granite. We found that Brazil nuts, newer Fiestaware, and modern smoke detectors showed little to no radiation exposure. For example, one would have to eat a large amount of Brazil nuts to get even a small amount of radiation exposure. Concerning the granite, we noticed that only certain dark spots on the polished side showed higher readings but it was not enough to be harmful. We also found that the unpolished side of the granite samples was slightly more radioactive than the polished side and once again it was not enough to be harmful. Overall we found that we receive little to no harmful exposure from the surveyed items.

Take Charge of Your Health: Impact of Health Management on the Homeless

Kira Lampton, Sarah Urdaneta, Margie Webb

The First Light Shelter is an emergency shelter for homeless women. Their goal is to help women transition from homelessness to stable housing and equip them with skills to maintain success. Health-related problems affecting this population are diminished health literacy and poor organizational skills. The purpose of this project was to empower the clients to take charge of their health through self-organization and health literacy. To encourage self-organization and increase health awareness, we provided 24 organizers to the women to secure their health-related documents. We also hosted mini sessions on common health conditions affecting this population. We used databases such as Ebscohost and Medline Plus for the latest information on these health conditions. On average, fifteen ladies attended each of the health sessions and actively participated in the sessions. The clients expressed their satisfaction with their folders and verbalized an increased responsibility for their own health. There were new clients at the shelter each week creating challenges in evaluating the outcomes of the project. One factor that made us most effective was the clients' receptiveness to our project. We always felt welcomed and appreciated. From this clinical experience, we learned how to collaborate with other members of the health care team in order to provide individualized care to clients from a variety of socioeconomic backgrounds.

Teaching Healthy Food Habits Among Preschool-Age Children

Dahae Park, Jessica Rouillard

The Kindergarten Readiness Program at the Pelham YMCA provides early learning opportunities to under-served and non-English speaking children in the Pelham area. Children in this program often bring unhealthy foods that are highly processed and high in sugar. This may be due to lack of knowledge or unavailability of healthy food in the home. The purpose of this project was to teach the children about health through education on hygiene and safety, in addition to the primary focus on nutrition. The goal was to teach the children, so they would be knowledgeable about healthy, tasty snacks to ask their parents to buy. Topics regarding dental health, hygiene, and safety issues were taught to the children using coloring worksheets. This all served as groundwork for the final presentation on nutritious snacks. During the nutrition presentation, the children were taught about appropriate serving sizes. Fresh fruits and vegetables were offered to teach healthy snack choices and increase exposure to new foods. The experience was interactive to boost learning and attentiveness. Each week, the children were asked to repeat back the information taught. Generally, they were able to do this with ease. After the nutrition presentation, the children were able to verbalize what a healthy portion size looked like and list healthy foods. Repetition is the most effective way to teach preschoolers a new topic. It is very beneficial to use visual aids, interactive models, and coloring sheets to hold their attention and spark interest.

The Effects of the Rescheduling of Hydrocodone on Physician Assistants in Rural Underserved Areas

Tanner McClinton

In rural, medically underserved areas of Alabama, physician assistants commonly aid physicians in treating patients. When Hydrocodone was changed from a Schedule III to Schedule II, physician assistants had to find an alternative for Hydrocodone containing prescriptions. In response to this, the Limited Purpose Schedule II Permit was structured to allow physician assistants the ability to continue to prescribe Hydrocodone products. The target of this study was to determine the effects of the rescheduling of Hydrocodone and the inclusion of the Limited Purpose Permit on physician assistants in rural underserved areas. Due to the recent development of the subject, no previous studies have been conducted in regards to this topic. For this study, a survey was developed and distributed to physician assistants working in rural underserved areas of Alabama with questions regarding their use of Hydrocodone before and after the rescheduling, their use of other pain relieving medications, and how the rescheduling affected their ability to prescribe medication. The results of the survey showed that by rescheduling Hydrocodone, the ability for physician assistants to provide medical care to patients was negatively affected. Because of this, physician assistants were more likely to refer patients to a physician for pain management, which minimizes their efficiency.

The Effects of Visual Cues on the Implementation of Intentional Hourly Rounding

Alyssa Graham, Shivangi Argade, Caroline Camp

Performing purposeful hourly rounding poses a challenge for many hospitals. Little information is known about the effectiveness of using visual cues as a tool to assist nursing staff. The purpose of this student led interventional pilot study is to determine if visual cues improve nursing performance and accountability of purposeful hourly rounding and thereby, improve responsiveness time, and decrease falls on a busy medical-surgical unit. Three students led the Visual Cues Project on eight consecutive Tuesdays on a 30-bed medical-surgical unit. Students rounded hourly using the Visual Cues Magnet designed for this project and focused on patients' pain, positioning, personal needs, and possessions. The students performed hourly rounding, and collected data on responsiveness, falls, and appropriate interventions. Nurses were asked to participate in a pre and post survey, an education session, and a post intervention focus group. The average daily census was 99% and many patients were 65 years and older. The Morse Fall Scale showed 16.2% of patients at risk for falls. HCAHPS scores found that responsiveness increased from 70% to 90% and nurse communication increased from 81% to 93.3% during the study period. 75% of staff surveyed either agreed or strongly agreed that the visual cues were a useful way to help with hourly rounding and also supported the use of the magnets after the study. This study showed how purposeful hourly rounding and the use of visual cues can improve patient care and indicated a need for hourly rounding protocols on medical-surgical floors.

The Impact of Hazardous Waste Sites on Human Health in Emelle, Alabama

Dan Morriss

Alabama, known as "the Amazon of North America," contains 10% of all freshwater resources in the continental United States. These habitats are home to nearly half of all North American species of fish, turtle, snail, and mussels, making Alabama #1 for freshwater biodiversity. These waterways represent some of the most vital and endangered natural resources dually enjoyed and abused by America today. A 2012 report by "Environment America" shows that Alabama ranks 4th in terms of toxic waste discharges into waterways, weighing its total releases at 12.3 million pounds per annum, a number echoed by EPA Toxic Waste Inventory reports. River quality continues to degrade due to eutrophication from agricultural fertilizer runoff, treated (and untreated) effluent waste from water treatment plants, industrial seepage from ill-managed industrial sludge reservoirs, sediment erosion from construction sites, and, possibly, chemical diffusion from the largest hazardous waste site (HWS) in the nation, situated in Emelle, AL. Since its opening in 1977, the facility accepted about 288,000 tons of hazardous wastes per year (1982), with volume decreasing in later years due to public health concern. Research includes analysis of public health impact of HWS proximity.

The Integration of Social Media and Outreach for the Advancement of Healthcare in Jefferson County

Ashley Bryant, Gaffery Buggs

Cooper Green Mercy Health Services provides health care to the uninsured and the underinsured population of Jefferson County. The problem faced by this population is access to healthcare related to lack of insurance and lack of knowledge about healthcare services offered at Cooper Green (CG). The target population is the 18-35 year old uninsured and underinsured residents of Jefferson County. The objective was to educate the uninsured and underinsured residents of Jefferson County on the healthcare services offered at CG through social media and outreach presentations. A social media template was developed for CG on Twitter, Instagram, and Facebook. Clients of CG and local shelters were interviewed on their utilization and accessibility of social media. Informational pamphlets and a presentation were given to local shelters and community centers in downtown Birmingham. 70 individuals were interviewed on their utilization and access to social media sites, 35 stated yes and 35 stated no. Information was presented to 13 residents of the Fire House Shelter about membership at CG. The number of individuals that received pamphlets at YWCA, First Light, Pathways, and the Salvation Army is unknown, but 217 individuals were potentially reached. The individuals interviewed were split equally in their responses, but all agreed social media would be a positive outlet for CG. Due to time restraints, more individuals could have been interviewed and more outreach presentations conducted. It would have been more effective to determine the impact of social media, if the sites were officially launched.

The Relationship of Self-Efficacy and Mobility with Fatigue in People with Multiple Sclerosis

A.C. Vitemb, J. Roy, H.J. Young

Multiple Sclerosis (MS) is a neurological disorder and is a common cause of disability in adults. As there is no cure for MS, understanding how the disability relates to quality of life (QoL) is important. The primary purpose of this study is to understand the associations between MS and measures of QoL such as mobility, self-efficacy, and fatigue. The second purpose is to examine the relationship between mobility, self-efficacy, and fatigue in individuals with MS. A total of 44 participants enrolled in the study and completed the patient determined disease step (PDDS) scale, a fatigue questionnaire and a physical exercise self-efficacy scale. Participants also performed repeated chair stand, timed up and go (TUG), and a balance test. Participants (6 males and 38 females) between the ages of 30 to 64 (47.9 ± 9.33 yrs) completed the study. The PDDS was positively associated with TUG ($r = 0.6$; $p < 0.01$), repeated chair stand ($r = 0.3$; $p = 0.02$), fatigue ($r = 0.3$; $p = 0.02$), and was inversely associated with balance ($r = 0.5$; $p = 0.01$) and self-efficacy ($r = 0.4$; $p< 0.01$). Self-efficacy and TUG were found to explain a significant amount of the variance in fatigue ($F(2, 38) = 5.44$, $p < 0.01$, $R^2 = .22$, R^2 adjusted = .18). It also showed that TUG significantly predicted fatigue (Beta = .36, $t(41) = 2.48$, $p < 0.05$). The study found significant associations between the MS severity and QoL measures. It also found that mobility but not self-efficacy predicted fatigue in MS. The study results will help design future exercise interventions for individuals with MS.

The Use of Wellness Tools for the Health Maintenance of Mental Health Consumers

Kiyah Herlong, Jessica Shelley

South Highland Presbyterian Church began an outreach program in 2014 facilitated by church volunteers to provide support and resources for consumers diagnosed with a mental illness. A community site assessment revealed a risk for ineffective health maintenance among the consumers diagnosed with a mental illness related to knowledge deficit of wellness and application of wellness tools. The aims of the SHOP lessons were to educate the consumers on wellness and engage them in their personal goals for wellness in order to maintain group therapy adherence. An eight-week wellness theme was used to facilitate discussion-based, interactive lessons on goals, prayer, good thoughts, nutrition, socialization, fellowship, hobbies, and crafts. Each lesson was designed utilizing input from the consumers and handouts for reference. The use of personal and applicable wellness lessons promoted positive consumer retention. The consumers displayed motivation through attendance and engagement during weekly lessons. The use of a consumer satisfaction survey provided imperative qualitative data for lesson evaluation. This population responded to holistic and consumer-centered lessons which built rapport and led to positive retention. A thorough assessment and observation of the consumers prior to beginning the lessons could have improved lesson design.

Think Well: A Program to Address Cognitive Changes Among African American Breast Cancer Survivors and Co-survivors in the Community

Kyndal Cheng, Dallas Gilley, Macy Stockdill

African American (AA) breast cancer survivors (BCS) are living longer and may experience cognitive changes after treatment. However, disparities exist among AA BCS regarding the nature of cognitive changes and how strategies for healthy living can address such changes. Think Well is an educational program developed and designed to address cognitive changes after cancer treatment. The purpose of this poster is to evaluate: (1) the educational components of Think Well (TW) topics and (2) the overall quality of the TW program through a partnership with a local AA church in Birmingham. TW was incorporated and delivered as part of the church's health outreach program in the community. TW consisted of four educational components: nutrition, physical activity, stress management and coping strategies, all to promote better daily cognitive function. Participants were asked to complete a 27-item evaluation consisting of demographic questions; and a 5-point Likert scale (1= Poor, 5= Excellent) regarding the quality of both topics and the presentation. 30 evaluations were returned; 86.7% were AA, 6.9% were BCS, and 75.9% were co-survivors. The topics and quality were rated as follows: cognitive changes (4.4), nutrition (4.4), stress management (4.5), coping strategies (4.5), and physical activity (4.4). Overall quality of TW was rated at 4.7. The TW program was well received and successfully reached AA BCS and their co-survivors in the community. Participants reported high quality in both the educational topics and the overall program. Future implications suggest expanding TW outreach through local community partnerships.

Using Educational Activities to Increase Knowledge of Proper Nutrition in Children Who Attend Pelham YMCA Afterschool Care Program

Molly Brown, Emily DePew, Alanna Dineen

The Pelham YMCA Afterschool Care Program is designed to help children in the community succeed both developmentally and academically. The program offers activities that allow its participants to build important skills and values that lead to achievement, growth of positive behaviors, and development of life-long social skills. However, there is a widespread knowledge deficit regarding proper nutrition among this population. The purpose of this project was to promote nutrition education to improve the children's food choices and decrease the risk of childhood obesity in the long term. The target population included elementary school children (grades K-8) who attend the Pelham YMCA Afterschool Care Program. The methods used to impart nutritional knowledge in these children, were educational lessons and activities. The students were taught about nutrition labels, portion sizes, healthy foods, and long term risks of poor nutrition. The majority of children reflected an understanding of the topics at the conclusion of each activity. Comprehension varied among age groups. The younger groups were able to develop a more basic understanding as compared to the older children who displayed a better understanding of the more complex topics. The children actively participated in each lesson and demonstrated enthusiasm about the topics. Some lessons required higher literacy skills than some may have possessed, which posed the greatest challenge. In retrospect, a pre-test and post-test would have been helpful in determining how much the children knew prior to each lesson and what they learned as a result.

Will a Student Led Prevention Team Impact Quality Metrics?

Jordan Barksdale, Zachery Jones, Jessica Stillabower, Ashlea Herrero, Kelley Williams, Connie White-Williams

Hospital acquired falls and pressure ulcers continue to be a major concern for many hospitals. While student-led prevention teams have been used in nursing homes, little information is known regarding similar teams in hospitals. Thus, the purpose of this pilot study is to examine if a student-led fall and pressure ulcer prevention team will increase staff knowledge of these nurse sensitive indicators, and decrease falls and pressure ulcers on a unit that is currently not meeting benchmark in those two areas. Three students led a prevention team on eight consecutive Tuesdays on 9 South, a 30 bed medical surgical unit with many patients greater than 65 years of age. Each patient was assessed using the Morse Fall Scale and received hourly rounding allowing for the collection of quality and clinical data. Nurses were asked to participate in a fall and pressure ulcer pre and post-survey, an education session, and a post-intervention focus group. The Morse Scale revealed that 25.7% of patients are at risk for falls. 13.3% of falls for this unit typically occur on Tuesdays; however, zero falls occurred during the eight Tuesdays that students were present. Focus group results found that staff felt frequent contact with the patient was key to improving nursing sensitive indicators and that it would be helpful if bed monitors worked on all the beds. 93.75% of staff surveyed agreed that a quality team such as the student lead team would be beneficial in improving quality metrics on the unit.

Winter Weather Protocol: A Safety Plan to Protect and Educate Those with Housing Insecurity

Rachel Hall, Scott Marine, Ashley McDaniel

Through collaboration with Urban Ministry, a local non-profit organization that refers people to resources, it was determined that insufficient resources place the low income and homeless population at an increased risk for shelter disparities during winter weather. The purpose of this project was to implement a safety protocol and educate the West End Birmingham population on winter weather preparedness. The project also included assessing the need for winter supplies and collecting donations to provide to those in need. A survey was created using evidence based domains and matrices to assess housing status and other barriers to winter safety. Implementation of an educational trifold was used to inform the public of winter safety guidelines, shelter and warming station information, and a notification of weather advisories. Donations were obtained by establishing flyers and drop boxes at two local businesses and a church. The survey analyzed two comparison groups between street outreach populations versus urban ministry populations (N=26) to differentiate trends between the groups. Charts were used to express the trends of the groups. The comparison gave a stronger understanding of where the most vulnerable populations were located. Statistics showed the street outreach population to be the most vulnerable. Based on the differences in data between respondents in the community outreach program and the street outreach program, further investigation of these two populations along with a larger sample size could provide more individualized interventions. Overall, this project has long-reaching possibilities that can be built upon by further interventions.

PHYSICAL AND APPLIED SCIENCES

A Study in the Physical Processes Involved in Phosphor Imaging of PRMT-Peptide Interactions

Hao C. Nguyen, Min Wang, Andrew Salsburg, Bryan Knuckley

The detection and quantification of molecular interactions is essential in the study of biological processes. The direct observation of the interaction of molecules is often impractical, and is, therefore, assisted by a variety of indirect methods and technologies. Such methods are used to measure a quantitative parameter of importance as the molecular process of interest unfolds. Perhaps the simplest example of such relevant parameters is the concentration of a given molecule of interest in a solution. In a previous experiment, SAM (S-Adenosyl methionine) was a cosubstrate used for methylation. Various peptide substrates were used in the methylation reaction. PRMT type I and II was the enzyme that enhances/modify the transfer of methyl groups. Phosphorimaging was used to study the reaction with various peptide constructs. This was done by labeling the carbon on the methyl group of SAM. After labeling the carbon, reactions were initiated and stopped to quantify the amount of methyl transferred by methylation. The quantification was done with the phosphorimaging method. The phosphorimaging method measures the radioactivity from polyacrylamide gels, and correlates the radioactivity with concentration. However, the physics underlying the method was largely ignored, and not understood to the greatest extent. Therefore, the objective is to determine the physics behind such techniques (in this case, phosporimaging) and bring a greater and deeper understanding and appreciation to the methods used in biochemistry. The physical aspects that will be explored are the luminescence of phosphorous groups and the relation of radioactivity with concentration. Knowing the details of the physical phenomena behind phosphorimaging can help refine the method of determining the concentration of radioactive labelled groups.

Biochemical Investigation of Novel Noncanonical Coronavirus Macrodomains

Matthew C. Chan, Kyrene M. Villavicencio, Robert G. Hammond, Xuan Tan, Pamela Brady, Ph.D., Margaret A. Johnson, Ph.D.

Coronaviruses (CoVs) are complex, positive-sense RNA viruses that are responsible for mild to severe respiratory tract infections. Infecting both humans and animals, these viruses undergo complex infectious cycles including multiple RNA processing steps. These viruses produce a class of proteins classified as macrodomains which are a key polyADP-ribose (PAR) binding module. They are believed to be involved in many cellular processes such as DNA chromatin repair and cell signaling pathways. We are investigating the macrodomain proteins of bat coronaviruses (Bt-CoV) HKU4 and HKU9 which have been found to share sequence identities with other known CoVs such as SARS and MERS. Through homology modeling, solution NMR analysis, and biochemical assays, the domain M (SUD-M) of HKU4 and HKU9 has been shown to bind with G-quadruplex DNA and RNA complexes similar to the SARS-CoV. With future studies and analysis, we hope to fully understand the relationship between structure and biochemical functions of these coronaviral macrodomains.

Biofilm Inhibition by Polyphenolic Inhibitors of Streptococcus Mutans Glucosyl Transferases

Bhavitavya Nijampatnam, Luke Casals, Hui Wu, Sadanandan E. Velu

Dental caries are a widely prevalent disease in the world that affects the majority of the world's population. Despite the fact that the human mouth contains over 700 bacterial species, *Streptococcus mutans* is the main cariogenic agent. This bacterium uses the glucosyl transferase pathway to synthesize water soluble and water insoluble glucans which are crucial for biofilm formation. Developing specific inhibitors of the GTF pathway to prevent dental caries has not been widely researched. In this project the syntheses of inhibitory agents for the GTF pathway were performed producing polyphenolic chalcones which demonstrated varying degrees of inhibition of biofilm growth without being bactericidal.

Compiling MATLAB to C++

Amalee Wilson

MATLAB is widely used for academic, research, and industrial applications, and my work is part of a larger effort at UAB to run MATLAB code efficiently on parallel heterogeneous architectures. Our aim of efficiently running MATLAB code raises this question: how do we extract that much parallelism from MATLAB programs, and how do we schedule computations to utilize all processors while minimizing data transfer among them? This question is inherently interesting, and we hope to explore it in the future; however, rather than attempting to parallelize MATLAB code directly, we are currently converting it to C++ and expressing matrix operations by using a parallelized C++ matrix library. Some preliminary findings for the speedup gained by converting MATLAB to C++ will be presented. An incomplete prototype of a MATLAB to C++ converter has been created by modifying Octave's LR grammar for Bison to generate an abstract syntax tree (AST) with the ROSE compiler; this prototype supports the basic elements of the MATLAB language. My work has been focused primarily on extending the functionality of this converter, including adding support for MATLAB while loops and adding transformations such as the inverse operator which must be converted from an unary operator in Matlab to a function call in C++. Using a while loop and the inverse operator as examples, the modifications that must be made in order to extend the functionality of the converter will be explained.

Diffusion Rates of Metal Cations in Alginate-Hyaluronic Acid Beads

Sophie McVicar, Joanna Schmidt

Alginates have commonly been used in biomedical applications such as wound healing; oftentimes antiseptic additives or moisture-controlling additives are integrated to bolster the alginate's healing effect. Little research has been done on combining both an antiseptic and a moisture-controlling additive, so this research determines how quickly antiseptic additives diffuse onto the skin when a moisture-controlling additive is present. The antiseptic additives tested are Zn^{2+}, Cu^{2+}, and an Ag^{+}/Ca^{2+} mixture; the moisture-controlling additive is hyaluronic acid. Each cation's diffusion rate through alginate is tested in a 25°C and 37°C pH 7.4 buffer. The rates through a mixture of alginate and 0.1%, 0.25%, and 0.5% of hyaluronic acid by weight are also tested at 25°C and 37°C in the pH 7.4 buffer. Rates of diffusion are tested by letting the alginate beads sit in the pH 7.4 buffer for 8 hours, 24 hours, and 48 hours. After the beads have sat in the buffer for their allotted time, a portion of the supernatant, which is the solution that the cations have diffused into, is tested to see how much of the cations are in solution. The Zn^{2+} supernatant is tested using EDTA titration, the Ag^{+} supernatant using Atomic Absorption Spectroscopy (AAS), and the Cu^{2+} supernatant using UV-Vis spectroscopy. We will show how much of these common antimicrobial agents would come in contact with the skin over time if they are employed in alginate dressings for wound healing.

Dye Uptake in Alginate Beads

Altamish Daredia, Wynton Sims, Emmanuel Oni

The use of cross linked alginates is a widely used method for protein and drug encapsulation and delivery. This experiment was designed to determine the difference in dye uptake between divalent and trivalent ionically cross-linked alginate beads. Dyes were used to measure the actual uptake. The alginates were cross linked with a divalent or trivalent cation and were allowed to uptake dye, which was then measured using UV-vis spectroscopy. We found preloading to be an alternate method for dye uptake in comparison with postloading. This study can be very useful as alginates are often used in protein delivery, and knowing which cross-linked bead has a better uptake potential can help scientists decide which alginate would have more favorable biological outcomes. A possible extension of this study would be to study how these alginates uptake actual proteins.

Effect of Loading Concentration on Drug-Delivering Alginate Microspheres

Danielle Madsen, Angela Chieh, Yang Liu

Alginates have been established as a versatile material for biomedical applications including drug delivery. While traditional drug delivery methods involved crosslinked alginate gels, non-crosslinked polymers are being explored in novel methods of microsphere formation. One approach to this is the creation of solid microspheres using a two-phase emulsification procedure. Here we quantify the effect of drug concentration on microsphere retention of the drug. This approach can be used to load ideal volumes of drugs. The two-phase emulsification process began with emulsified alginate-water solutions with varying concentration of aspirin. These aqueous solutions were then added to the nonpolar solvent hexane, emulsified to form microspheres, and coated with surfactant to prevent breakage. The microspheres were then isolated and their mass was used to determine the retention of aspirin. Retention behavior was then calculated and the ideal drug/alginate loading ratio was determined.

Hydroxychalcone Inhibitors of *Streptococcus mutans* Glucosyl Transferases and Biofilm

Ruowen Zheng

Streptococcus mutans has been implicated as the major etiological agent in the initiation and the development of dental caries due to its robust capacity to form tenacious biofilms. Ideal therapeutics for this disease will aim to selectively inhibit the biofilm formation process while preserving the natural bacterial flora of the mouth. Several studies have demonstrated that the *S. mutans* biofilm formation depends on its glucosyltransferases. These enzymes metabolize sucrose into water insoluble and soluble glucans, which are an integral measure of the dental caries pathogenesis because they play a critical role in mediating irreversible attachment of *S. mutans* to the tooth to form a protective biofilm extracellular matrix which shields the bacteria from the host immune response, mechanical stresses, and antimicrobial agents. Our research is focused on developing new natural product based polyphenolic inhibitors of *S. mutans* glucosyltransferases. Several scaffolds with varying regiochemistry of the phenolic groups and stereochemistry of the double bond of chalcones have been synthesized and we have identified a few low micromolar inhibitors of *S. mutans* biofilm. Synthesis and biological evaluation of these compounds will be presented.

Number of Neutral Magnesium Acceptor Atoms in AlxGa1-xN after Isochronal Annealing

Andrew Bastien

Gallium nitride (GaN) and aluminum gallium nitride (AlGaN) doped with Mg are p-type semiconductors used in the electronics industry to create blue LED lights. More research must be done on the p-type AlGaN to increase neutral magnesium acceptor atoms (Mgo) to increase the overall efficiency of AlGaN. During the metal organic chemical vapor deposition growth process, hydrogen passivation of the Mgo occurs. This causes AlGaN to be inefficient. To remove hydrogen from the material, a high temperature nitrogen anneal is performed. Previous research on AlGaN shows that anneals performed between 700°C and 900°C increase the Mgo concentration. Previous limits imposed on GaN anneals are lifted when shifting to AlGaN alloy because AlGaN can withstand higher temperatures compared to GaN. In an attempt to increase Mgo in AlGaN, anneals were performed at 900°C and 950°C. Electron paramagnetic resonance (EPR) spectroscopy was used to measure the amount of Mgo. Four different samples were used with 0%, 8%, 18%, or 28% aluminum and each was annealed for fifteen minutes. When comparing the EPR signal from a 700°C to an 800°C anneal, the 800°C anneal increased Mg0 by a factor of 2. A similar increase occurs from an 800°C anneal to a 900°C anneal. The 950°C anneal only increases by a factor of 1.03 when compared to the 900°C anneal. Therefore, performing high temperature nitrogen anneals is not a method to increase Mgo and this does not increase the overall efficiency of AlGaN.

Optical Evidence of Photoexcited Polaron Mode in Perovskite Photovoltaics

Luke McClintock, Yaomin Dai, Dmitry Yarotsi, Wanyi Nie, Aditya Mohite, Antoinette Taylor, Rohit Prasankumar

Photovoltaic cells, or solar cells, are modern devices used to convert light energy from the sun into usable electricity. For the last several decades, silicon-based solar cells have been the main focus for the scientific community, boasting overall conversion efficiencies of about 20%. Even though high quality silicon solar cells can harness solar energy with a conversion efficiency that competes with the average fuel burning power plant, synthesizing, installing, and maintaining these cells still costs too much for global installation. Over the last few years, an interesting newcomer to the field of solar energy has emerged, and is now one of the most studied materials in its field, the organic-inorganic perovskite solar cell. The photoconductive efficiency of perovskite solar cells continues to skyrocket, as both the difficulty and price of synthesis fall. Polaron activity (lattice vibrations) within these photovoltaics is theorized to decrease electron mobility, and thus hamper the cell's efficiency. Using Fourier transform infrared (FTIR) spectroscopy, we performed the first temperature dependent mid-IR spectroscopic measurements, with and without photoexcitation, on a well-known perovskite solar cell, methylammonium lead iodide. We observed monotonic transmission temperature dependence of the material before photoexcitation and nonmonotonic dependence, as well as a general decrease in transmission, after excitation. We believe these observations are directly related to the photoexcited polaron mode of this perovskite solar cell. We anticipate that our study will open the doors to further investigation of the effects of the polaron mode within these photovoltaic materials.

Safe Training Adjustable Non-Invasive Device

Jessica Blair, Emily Geiger-Willis, Eddie Cedeno, Van Sims

There are millions of individuals that are unable to obtain sufficient exercise because of a physical limitation. These individuals often use some form of assistive technology, such as a wheelchair or walker, which inhibits standard exercising. Even though some existing solutions have been developed for this issue, the user is not always safe while utilizing the exercise equipment. One such device is a redesigned Wii Balance Board which provides a way for individuals with congenital or acquired balance limitations to exercise; however, there is insufficient safety mechanisms in place to catch a user should they lose their balance while playing. Therefore, our capstone team has designed a fall protection exergaming frame that will allow the user to freely enjoy gameplay and exercise without fear of falling and getting hurt. We are currently constructing the exergaming frame which will be used in conjunction with the redesigned Wii Balance Board at the Lakeshore Research Foundation beginning at the end of April 2016. Our frame can also be extended and used with treadmills or other common exercise equipment. The frame is constructed from Al 6061 and designed in such a way that it will protect the user against fall injury during exercise. Our market advantage is in our design's reduced complexity, decreased price, and ease of use. Our frame will be implemented at the Lakeshore Foundation to provide enhanced safety for exercising patients with limited mobility. It is our hope that this frame can promote healthy exercise for those with balance problems.

Silver Ions Reduce the Water Retention Capability of Alginate Gel

Simranjit Kaur, Prosper Njitoh, Andrew Yarbrough

Alginate gels are used to provide a moist environment to facilitate wound healing. The gel absorbs the excreted fluid, and, unlike traditional gauze, keeps the moisture surrounding the wound. The incorporation of silver, a natural antimicrobial, into the gel has the potential to reduce the risk of infection. Thus we investigated the effects of forming alginate gels in a solution of both calcium and silver ions on the water retention properties of alginate gels. Alginate gels were prepared in solutions where the Ag^{+}:Ca^{2+} ratio was controlled. The alginate beads were removed from solution and the change in mass, due to water evaporation, was monitored over five days. The incorporation of silver was found to lower the water retention capability. The relationship between the percent silver and the water loss over time was quantified.

Terahertz Spectroscopy via the Pump-Probe Method Utilizing Optical Fibers and Optical Rectification

Ashlen Kurre, Dr. David Hilton

Terahertz spectroscopy has been recognized as a powerful technique over the past decade due to the interesting and unique dynamics the terahertz pulses can display in materials such as semiconductors. In this experiment, we have performed pump-probe spectroscopy in a fiber-based spectrometer to observe the resulting femtosecond dynamics in gallium arsenide. Future plans for the prototype include utilizing photonic-crystal fibers in place of ordinary fibers to transport the light, and the apparatus will be subject to a high magnetic field at the National High Magnetic Field Laboratory in Tallahassee.

The Effect of Divalent Cations on the Swelling of Cross Linked Alginate Beads

Courtney Barkley, Amanda Lawrence, Justin Tchernov

Alginate is a natural polymer with various biomedical and engineering applications because of its ability to form hydrogels. One method of forming hydrogels is ionic crosslinking using divalent cations, which forms pockets where water can attach through hydrogen bonding. The swelling of hydrogels can be measured by the ionic radius of the cation crosslinker by comparing how the ionic radii of calcium and magnesium cations affect the hydrogel swelling by allowing more interstitial space for water molecules to bind. Two experimental groups of alginate beads were formed, using a standardized drop size. The beads were dried and the water loss was measured through a difference in mass.

The Effect of Interfacial Charge Distributions on the Potential Profile in Double-Schottky ZnSe/Metal Thin Film Structures

John N. Ptacek, Renato P. Camata

Predicting and modeling the behavior of semiconductor structures remains an important step in the design of modern microelectronic and optoelectronic systems. Here we model a double Schottky junction formed when a thin film of the wide bandgap semiconductor zinc selenide (ZnSe) is sandwiched between two nickel (Ni) electrodes. This semiconductor/metal configuration is attracting renewed attention due to its potential use in electrically excited mid-IR emitting devices based on ZnSe thin films doped with transition metal impurities. Free carrier diffusion in this structure is determined at varied equilibrium conditions by numerically solving the Poisson equation in the structure. The solutions yield the resulting charge distribution and its associated electric field. This charge distribution, which results from interaction between the metal and the semiconductor, leads to the formation of a potential barrier at the junction, known as a Schottky barrier. The width of this barrier and its effective capacitance is determined. The behavior of the system is then investigated with no applied voltage and also when an external potential is applied to the system. The numerical solution was implemented through a computational code that is set up to be modular and can easily be modified as the structure is expanded to explore new experimental configurations.

The Effect of pH on Alginate Cross-linking and Dye Retention

Blake Baker, Joe Lucker, Jesse Stillwell

Alginates have been studied and used as a biodegradable material in biomedical applications such as sutures. However, the ability of alginates to uptake small molecules suggests that alginates can be used as a drug delivery system. We investigated the ability of calcium crosslinked alginates to uptake and release dyes in various pH solutions. The overall goal of our experiment is to investigate optimal pH ranges for the delivery of a small molecule. Our results will show the feasibility of an alginate based drug delivery system. To accomplish this, uniform calcium chloride based alginate beads were exposed to a variety of pH ranges that can be found throughout a biological system. The retention of the dye in the beads was measured using a variety of dyes that represent drugs that can be delivered via the alginate. The diffusion of these dyes was monitored using UV-vis spectrometry. The results of our experiment will show the potential of applying an alginate based drug delivery system in a variety of pHs that commonly occur in the body.

The Swelling Capabilities of Alginate Hydrogels Crosslinked with Different Calcium Salts

Shannon Lukens, Michael Casper, Martha Abbott

Swelling is an important characteristic of alginate hydrogels as it allows them to take up significant amounts of liquids, making hydrogels useful in drug delivery systems. Previous research has shown that calcium is the most effective divalent ion in crosslinking with alginate. However, the type of calcium-based salt used to make the hydrogel most effective for swelling is a topic of research which is still being studied. Thus, in this study, different salts were tested to see how they affected the swelling characteristic of the hydrogels. Three different salts, $CaCl_2$, $CaSO_4$, and $CaCO_3$ were mixed with alginate solution to form hydrogel microbeads. Microbeads were characterized by their average bead size and their change in volume and mass upon swelling. This research demonstrates how different anions impact bead size and swelling capability.

Vanadium Oxide/YSZ Composite Anodes for Built-in Energy Storage in Solid Oxide Fuel Cell Structures

N. W. El-Bermani, K. K. Dillon, A. M. Fenton Jr., A. L. Genau, R. P. Camata

Incorporation of charge storage functionality into fuel cell electrodes allows sustained operation during periods of refueling, intermittent fuel interruption, and reduction in the response time to intermittent load spikes. The multiple and easily accessible oxidation states of vanadium make vanadium oxide (VOx) a candidate for a charge storage material in solid oxide fuel cell (SOFC) anodes. Thin film yttria-stabilized zirconia (YSZ) cells using thin film VOx anodes have previously been shown to generate power for several minutes after H_2 fuel supply interruption. In this work we explore the fabrication, electrochemical properties, and response to thermal stresses of a thin film YSZ fuel cell structure supported by an YSZ/VOx composite anode. The YSZ/VOx pellets (0.5-inch diameter by 1-mm thick) were manufactured by milling and pressing V_2O_5 and YSZ powders at various mixture ratios and annealing at 650°C for approximately 17 h in air. Following sintering, contacts of Ni were deposited via magnetron sputtering. Electrochemical impedance spectroscopy (EIS) of pellets, reduced in 5% H_2 at 450°C for 6 h, is performed to determine the electrical conductivity of the composite pellets. We present a comparison of our results with measurements in equivalent reference structures utilizing conventional YSZ/Ni cermets as the anode material.

SERVICE LEARNING

2016 UAB Science Olympiad Regional Tournament

Kaila B. Wood, Alexander Nelson, Angelin Ponraj, Norman Schmitz

Science Olympiad tournaments include teams of high school or middle school students competing in events in different fields of science, technology, engineering, and mathematics (STEM). Science Olympiad at UAB, a recognized UAB organization since 2015, hosts a regional tournament that offers not only scientific exploration and academic recognition/achievement to students and teachers but also offers students, parents, and teachers the opportunity to explore and learn about UAB's campus, departments, research, and other diverse opportunities. Since its establishment in 2010, the Regional Science Olympiad tournament at UAB has included the high school division, Division C. The 2015 tournament directors were able to expand the tradition of the UAB tournament by hosting both the established Division C competition and by incorporating a new Division B competition for middle school students. The 2016 UAB Science Olympiad tournament was a great success and had a participation of over 450 students, teachers, and parents from 30 central Alabama schools. We hope to promote an interest in science, technology, engineering, and mathematics fields and careers to a wider range of age groups in the Birmingham area.

Breaking Stereotypes: The Middle East

Mallack Jaber, Aseel Dib

A group of students at UAB will tackle issues of Islamaphobia and xenophobia towards Middle Eastern populations in Birmingham, Alabama by collaborating with student organizations on campus. They will apply a religious and ethnic lens to address the multifaceted nature of discrimination so that students who suffer from stereotypes and students perpetuating stereotypes can come together to engage in a dialogue about Islam and the Middle East. The solutions discussed can then be implemented on campus, in the community, and in the city of Birmingham through education and understanding in order to challenge the perceptions presented by the media.

Building Bridges: Bridging the Technology Gap with the Elderly to End Senior Isolation

Anisha Das

Building Bridges is an organization started at the University of Alabama at Birmingham in 2015. It is centered on combating perceived social isolation which the elderly population is extremely vulnerable to. Research has linked senior isolation to a number of detrimental health conditions and higher risk of mortality so it is important that programs are put in place that encourage integration of the elderly into the rest of the community. Currently, Building Bridges has around 20 volunteers and has started two programs at Highland Manor Apartments, an assisted living in Birmingham, Alabama. The first program is a buddy system which pairs volunteers with residents at this facility. The second program is a Technology Empowerment Class where college volunteers help residents at the facility learn basic technology skills that they will hopefully be able to implement in their daily lives. The overall goal is for these programs to help the residents build their social networks and ultimately promote a closer knit community in Birmingham. The organization hopes to branch out and provide their volunteer services to other assisted livings and nursing homes in the Birmingham area. In addition, Building Bridges also hopes to expand the programs they offer to include an art therapy program and exercise classes catered for the elderly and/or individuals with disabilities.

Camions of Care at UAB

Michelle Nguyen, Clara Wan, Aileen Jong

In society, females often struggle to afford expensive menstrual hygiene products every month. Though feminine hygiene products necessary to maintain a healthful lifestyle are often considered luxury items, they are in fact basic necessities that should be readily accessible to women of all income levels. The high cost of these products is especially restrictive for women who are less privileged and prevents them from achieving their full potential. In addition, there is a social stigma surrounding menstruation that starts at an early age. We seek to educate students about their bodies and focus on how periods are a natural process through healthy, open conversation. As a Camions of Care chapter, our main goals will be to provide basic hygiene care packages for low-income or homeless women in the Birmingham area and end the stigma surrounding menstruation to empower women through advocacy, education, and service.

Consulting Proposal for the Birmingham Levite Jewish Community Center

James, Hanna, Grant Walkup, Kwesi Butler, Hayley Barber, Eddie, and Hanna

Birmingham Biz set out to eliminate the possibility of an after school program due to quality assurance for the creation of party packages and an enhanced rental program that may earn more for the Birmingham's Levite Jewish Community Center, LJCC, over time. By creating and utilizing information available through Birmingham's LJCC, local organizations offering rental packages, and national LJCCs, we have developed the capability to produce and finalize a plan that will allow LJCC to earn money in an efficient and effective manner. Due to the enhanced plan we have developed, the LJCC will be capable of growing financially in a shorter time span, expand their available services, and enhance their current stance in the rental market. While enhancing the LJCC financially, the enhancement rental plan also allows for the organization to fix issues with current rental decisions and locations, such as optimizing their space in meeting rooms and fields. Birmingham Biz created a consulting proposal for Birmingham's Levite Jewish Community Center and performed an analysis of the potential outcomes instilling two programs into their current business model: an after-school care program and a facility rental program. After performing a SWOT analysis of the company and researching competitors in the market, we created a plan for the facility rental program. Our proposal involves an implementation plan, the budget, and the range of possibilities the program offers the company. Our research was gathered from personal experience at the company's facility and websites regarding after-school programs, other branches of Levite Jewish Community Centers, and rental party packages. After researching both ideas, the after school care program and facility rental program, we concluded that the rental program would be the most beneficial to the LJCC as a whole. It is something that members of all ages could be involved with. Once enough money is earned through the rental program, they could then work towards an after school care program. By enhancing areas of monetary gain for the organization, the influx of new money may also help develop other areas and aspects of the Levite Jewish Community Center while allowing for repairs and restorations of depreciated values within the organization. While developing the enhancement plan for the rental program, we found that the project may work in unison with several services the LJCC currently offers, such as catering. Due to several services being in contact with the enhancement plan, we have created a fair priced solution that revamps the rental packages to be both affordable and competitive against local organizations that offer rental services.

Creating a Difference "One Life at a Time"

Sagar N. Kaushik, Neha Kaushik, Esha Kaushik

Building on One Life at a Time's successful access to education and healthcare model, our commitment to action aims to empower the next generation of leaders, business owners, and college graduates from the young girls and women in the rural parts of India. One Life at a Time is an initiative through which over 10,000 people have received medical care and four village schools have been started. We will further our commitment by adding an additional seven schools in the next two years empowering young children and women through education, digital literacy, and healthcare. Soon, our female students will be able to enter society with an educated mind, progressive attitude, and capability to support themselves and their families.

Empathy Through Service and Studying Literature

Ally Middleton, Courtney Ryals

Our poster presentation focuses on the empathetic communication through literature and its role in teaching us how to form relationships and display empathy towards people in our community. Since this is a service learning class, the presentation encompasses our volunteer efforts through the SPOONS program in the ACE (Acute Care for the Elderly) Unit at UAB Highlands Hospital and demonstrates the connection between our empathy techniques learned through literature and our experiences volunteering with elderly patients at the hospital. One of our group members also participated in pet therapy at the hospital during her visits where the hospital staff along with the volunteers used animals as a way to calm the patients and make them happy. Volunteering gave us the chance to see empathy in action and provided a chance for us to build those relationships with people we wouldn't normally connect with, so our poster showcases our experiences, what we learned, and how the service project relates to the theme of the class, "Literature and Empathy."

Evaluation of Compliance with National Standards for Culturally and Linguistically Appropriate Services (CLAS) in Health Care Facilities: A Comparison of Two Emergency Departments in Birmingham, Alabama

Michael P. Steinkampf, Angélica Jaimes, Érika Pérez Ibarra

The US Department of Health and Human Services has established 15 national standards for culturally and linguistically appropriate services in health care facilities. CLAS Standard 8 states, "Easy-to-understand print and multimedia materials and signage should be provided in the languages commonly used by populations in the service area." The purpose of this study was to compare the compliance with CLAS 8 for Spanish-speaking patients in two hospital emergency departments (EDs) in Birmingham, Alabama. We determined CLAS 8 compliance by on-site inspections of the EDs of UAB Hospital (UAB) and Brookwood Medical Center (BMC). Clinical and administrative forms and outreach materials such as brochures and pamphlets were requested, and signage was examined. CLAS 8 compliance at the two institutions was similar in several respects: Multilingual post-treatment information was available via electronic information management systems, and posted right-to-treatment signs were bilingual; neither ED employed universal healthcare symbols for clinical or administrative services, and directions were posted in English only. There were translation errors and deficiencies in the request-for-treatment forms of both institutions. However, a detailed bilingual consent form for treatment and services was available and limited other bilingual signage was present at UAB, but not at BMC. In conclusion, the availability of bilingual clinical instructions and educational materials at both institutions was good, but compliance with other aspects of CLAS 8 was limited, with some documents nonexistent or poorly translated. Lack of a bilingual form for consent to treatment and services was the most significant deficiency encountered.

Fighting Blight: Birmingham Business Project 2015

Elijah Davis, Ariel Smith, Jason Jones, Zachary Walker, Mia Dillard

For the past five years, the Collat School of Business, under the direction of Nathan Oliver, MBA, has conducted The Business Student Scholars Program, which is a service-learning program geared towards providing students with an opportunity to apply business concepts and knowledge in real world settings while mentoring local area high school students. Students from both levels of secondary and post-secondary education learn the importance of collaborating and cooperating to achieve and/or work towards positive change in their community with the support of community partners. In 2015, high school students interviewed community partners, conducted research, and offered solutions to urban blight and education outcomes in the North Titusville Community.

Health Disparity: Polluted Minds

Jeremy Chu, Jing Khoo

Observations from serving the communities of Birmingham, Alabama, suggest adverse effects of air pollution and lack of cultural competency on health equity. In previous years, industrial plants released excessive amounts of pollutants into the Birmingham air. Current pollutant levels are within the acceptable range defined by the Environmental Protection Agency; however, vehicle exhaust from congested highways and fumes from homes may increase those levels. The topography of Birmingham causes the toxins to remain trapped in the area, affecting neighborhoods. Due to institutional racism and low income, several African Americans live in the polluted residences and have an increased risk of developing lung problems. Though there are many hospitals in Birmingham, a lack of trust between patient and physician separates undiagnosed individuals from proper medical care. To illustrate this health disparity, the comic strip depicts an African American boy who comments on the sources of air pollution as he walks to school. In order to provide a conceivable instance of health disparity, the basis of the depiction comes from stories and observations gathered from service learning experiences. From working on this project, we hypothesize that health disparity in Birmingham continues to threaten the lives of the African Americans who live near highly polluted sites due to their low income. Furthermore, with little trust in their physicians, several live their lives suffering from treatable conditions. Awareness and action in these issues may lead to the improvement of the environment for all Americans and a better understanding between different cultures.

Increasing Connections for Brain Awareness Week

Tess Vessels, Ben Boros, Seth Courtad

Brain Awareness Week (BAW) is an annual event that is dedicated to generating enthusiasm for science and the brain. Each year, BAW seeks to attract both middle school and elementary school students to the field of neuroscience through multiple, engaging demonstrations. In previous years, these events have included the Super-Taster Test, Illusion Confusion, Sheep-Eye dissection, and Human-human interface. While BAW does communicate some basic principles of neuroscience (neurons, electricity, vision, audition, taste), each of these are presented to multiple small groups of students simultaneously, making the experience personal and interactive. BAW is hosted by Birmingham's McWane Center and is operated by students in UAB's medical program, graduate programs, and undergraduates interested in neuroscience. On the other hand, the greatest concern noted in previous years and distinguished in our data collection was a distinct lack of public awareness, as evidenced by the large number of attendees ignorant of the event until they arrive at the McWane Center and pass by it. To overcome this, our group decided to focus efforts in advertising, particularly to the local area. To do this, we contacted all elementary and middle schools in the Birmingham area, hung posters in several libraries across Birmingham, and approached Al.com and multiple newspaper services across Birmingham to get a story published on the event. Survey data collected from the BAW of this year and last year indicate that advertising efforts influenced an increase in the amount of people who were aware of the event before attending.

Levite JCC Service Learning Project

Blair Hamm, Barbra Mewborne, Jason Paulin, Lynn Tran, Zach Walker, Danielle Zito

The Mission of the Levite Jewish Community Center is to enhance Jewish Identity by providing an environment for programs and activities that promotes cultural enrichment, cultivates educational development, and provides for the well-being of its members. To help further its mission, the JCC will be exploring two options. They are looking to see it would be viable for them to enhance their rental program and start a comprehensive after-school program. Both could help them grow and remain a pillar in the community. The project will help the JCC determine the best course of action by using SWOT and Porter's Five Force analysis to determine the viability and benefits from each program. Enhanced and strategic business plans will also be a determining factor.

Mobile Development

Seth Borgstede

Mobile Development is an innovative idea to spread the knowledge of basic health practices in villages in sub-Saharan Africa. This project aims to address the issue of death due to dehydration from diarrheal disease in children under five. The project utilizes existing local technology, in the form of basic cell phones, to spread a simple transcultural video via Bluetooth demonstrating health practices such as boiling water, creating an oral rehydration drink, and promoting hand washing. This project includes creating a comprehensive media file to distribute through microSD cards over Bluetooth, which will include the transcultural diarrheal prevention and treatment video. This project utilizes a relationship-based model and will take place in one rural village outside of Kampala, Uganda, and one urban slum. An initial health state of the community will be adequately assessed through a health survey, and the media file will then be distributed through Bluetooth. If the initial project is successful a second phase will be initiated which we will revisit these communities to assess the progress through an additional health survey.

Peer Mentoring: Making a Family

Emily Quarato, Lauren Silverwood, Matthew Strachan

The Science and Technology Program has a peer mentoring system that provides incoming freshman with a peer mentor who assists them during their transition into college life. Mentors provide their mentees with advice about academics, college life at UAB, and any other topic their mentee has questions about. Previously, the peer mentoring program provided each student with their own personal mentor. However, this system was relatively unsuccessful and had only a 6.13 out of 10 mentee satisfaction rate. After a survey evaluation, this dissatisfaction was mostly attributed to a lack of communication between the mentor and mentee, a lack of compatibility, and a desire for increased mentor-mentee interaction. Using this information, the program was redesigned to increase mentee satisfaction and improve mentor-mentee communication. The new program has a "family" model in which two upperclassmen co-mentor to provide assistance to a group of 4-5 mentees. This provides the mentees with an additional resource and upperclassman connection while also allowing the mentees to get to know their freshmen peers. Due to this change in system the overall satisfaction rate of the mentees has increased to 7.36 out of 10. The increase in overall satisfaction was a result of mentor screening, careful co-mentor and mentee group matching, and holding the mentors more accountable for interacting with their mentees.

Pre-Med Partners

Rebecca Massey

In America today, there is an astonishing lack of diversity in medical schools. This is due to the fact that students from low socioeconomic backgrounds are simply not given all the tools they need to succeed in rigorous college pre-med programs. Pre-Med Partners is an official UAB student organization that pairs current UAB pre-med student mentors with underprivileged high school students in Birmingham City Schools. Pre-Med Partners hosts monthly workshops covering important pre-med related topics such as résumé building and study skills. Through this program, we help to ensure that these inner city students can be successful in pre-med programs in college and will not become part of the statistic of minority students who quit or fail out of pre-med due to unpreparedness. Pre-Med Partners has just completed its first year of this program at Carver High School in Birmingham. Pre-Med Partners is a Clinton Global Initiative University project.

Project Pad

Aarin Palomares, Sean McMahon

Project Pad seeks to increase access and practice of feminine hygiene among refugee women and girls in Turkey. The project utilizes local and international partners to create a curriculum that will teach the importance of feminine hygiene to the women and reduce stigma among the community. Additionally, the project seeks to scale up an existing model that addresses the lack of feminine hygiene supplies in low resource communities. This holistic model implements a low-cost, low-resource sanitary pad machine in a camp and trains refugee women to use it. This not only addresses the need for supplies, but allows economic opportunity for these women as well. By creating an environment conducive to feminine hygiene education and establishing an innovative solution to address the lack of supplies, we hypothesize that the rate of co-morbidities associated with improper feminine hygiene will decrease.

Promoting Neuroscience Awareness in Alabama

Marie Michenkova, Allison Dahlberg

The International Brain Bee (IBB) is the largest worldwide neuroscience competition for high school students. Founded in 1999, the contest is designed to test student's neuroscientific skills and to foster interest in the growing field of neuroscience. For the approximately 30,000 competitors each year, the Brain Bee focuses on topics such as sleep, memory, vision, hearing, many psychological and neurological disorders, and other topics. The competition has steadily grown throughout the years, from 12 local chapters in the United States to greater than 160 chapters throughout the more than 40 countries spanning six continents. The IBB hosts a multitude of competitors who focus on scientific explanations for the mysteries of the nervous system. Every local chapter delegates a competitor to its country's National Brain Bee and from there the winner from each country goes on to compete at the International Brain Bee. Students in the UAB Science and Technology Honors Program started the annual Alabama Brain Bee (ABB) in 2011. As the program rapidly grew, the decision to integrate the ABB with the 1st annual Neuroscience Day was definite. Today, the conjunction of both the ABB and Neuroscience Day work together to utilize all of the resources UAB has to engage high school students from across the state in interactive neuroscience activities and to promote brain awareness as well as increase ABB attendance. The 2015 Alabama Brain Bee was a success with many returning competitors to fight for the chance to represent the United States at the International Brain Bee.

Spanish at the UAB Child Development Center

Melanie McDonald

With an increasingly diverse United States, especially from Hispanic cultures, learning how to use the Spanish language effectively is becoming increasingly important for Americans that live all over the States, not just states bordering Mexico. Many studies have shown that the best time to learn another language is at a young age. Given my interest in second language acquisition and children, I decided to do my service learning at the UAB Child Development Center teaching Spanish to 3 and 4 year-olds. Hands-on experiences are usually the easiest way to teach younger children, but it can be difficult for them to conceptualize the material. To remedy this, music was a great way to immerse the children into the language and learn vocabulary while keeping them involved. The oldest class of students will even sing the Itsy-Bitsy Spider at their 4-K graduation this spring to demonstrate what they have learned this semester. Learning how education with young children works allows the student to find the best ways to teach, as well as have a deeper understanding of the language. This also opens up the door for children who are learning to have a deeper understanding of cultural diversity at a young age, instilling the importance of learning with an open mind. By spending my semester with these children, I have learned that not only does it take time to teach as well as willingness to be persistent in pursuing the goals of teaching a foreign language and being open to change myself.

The Sustenance Sahara

Kiria Betts, Leah Perz, Lydia Deuel

Our goal is to inform the community how food deserts as a health disparity impact students and their education. We must take action to change how this disparity continually effects the future generations, and work to stop the cycle of poverty and hunger. Through our service learning experiences, walking students to school with walking school buses, we have been provided the opportunity to see first-hand how hunger effects the physical activity and ability of students. In our presentation, we will use the perspective of a child to engage the audience in understanding the severity of this issue. Adding visual aids through a walkthrough photo experience will supplement our oral evidence and help the audience understand the situation that many students in Birmingham are facing daily. So far, our research and experience implies that hunger in children produces uninterested learners. We have few conclusions from our experiences so far, but what we have seen has shown the serious impact that food deserts have on a child's ability to succeed in the classroom. Previous research indicates that students who do not receive an adequate amount of food are hindered from learning as they could, and in fact are uninterested in learning. We hope to bring attention to this important issue in a clear and moving way.

UAB CondomSEXpress

Armand Fernandez

Similar to services found on other campuses, this commitment is a selective hours condom delivery service, beyond convenience store and health center hours, giving students fast and discreet access to condoms through a sexual health educated peer delivery system in the six residence halls at the University of Alabama at Birmingham. By collaborating with direct relief effort organizations, this commitment is based off of a one-for-one business model where a condom distributed on the UAB campus equates to condom distribution and sexual health education efforts in countries devastated by HIV/AIDS. This system will collaborate with student health organizations to educate residential students by giving them access to condoms and sexual health information, thus empowering them to make sound decisions, informing them of risks involved, fostering a positive sexual health environment, and decreasing the rates of sexual transmitted infections.

HEALTH SCIENCES

A Plateau in the Neurorehabilitative Enhancement of Movement in a Patient with Initially Motor Complete Tetraplegia

Brennan Hickson, Brent Womble, Edward Taub, Ph.D.

The subject in the present research was an individual who suffered a high spinal cord injury (SCI) resulting in motor complete tetraplegia. We have attempted to restore some of the lost motor function in one of the arms using training methods derived from this laboratory's Constraint-Induced (CI) therapy. Most notably, we utilized training by shaping, in which the desired movement was approached in small steps by successive approximations. We began by using electromyographic (EMG) biofeedback to strengthen miniscule muscle contractions in the patient's paralyzed upper arm and shoulder. Once the muscles were sufficiently strong to produce minimal overt movements, we trained them using CI therapy techniques. The overt movements became sufficiently strong and refined to enable the patient to control her wheelchair using a hand joystick. In the last 1.5 years, we have been training her to lift her arm with gravity partially eliminated by counterweights via a Swedish Sling device, in order to enable self-feeding and facial hygiene. Although she is now able to lift her arm and hand between 6 – 12 inches with approximately 50% of the force of gravity eliminated, her progress has plateaued in the last year. We are now exploring the possibility of stimulation-based therapies—including functional electrical stimulation (FES) and transcranial direct current stimulation (tDCS)—which may serve to strengthen disused muscles and neural connections to overcome this plateau. We are also recruiting two additional patients with tetraplegia following cervical spinal cord injury to extend this case study into a case series.

A Technological Intervention to Reduce Distracted Driving Among Emerging Adults: The SMARTwheel

Morgan Parr

The objective of this project is to examine a possible technological intervention to distracted driving called the SMARTwheel. According to the CDC, motor vehicle collisions (MVCs) are the leading cause of death for people age 5-25. The leading contributor to these MVCs is distracted driving. The SMARTwheel seeks to end the unsafe driving behaviors that cause MVCs. The SMARTwheel is a steering wheel cover that collects data while participants are driving. These data are then processed into an aggregate letter grade. Twenty participants age 18-22 will drive with the device for 2 weeks. An experimental group will come into the lab one week after installation to receive a letter grade for their driving over the past seven days. Both the experimental and the control group will return to the lab after two weeks of using the device. During this visit, both groups will be shown their letter grade for driving performance as well as complete a consumer satisfaction survey. We hypothesize that the SMARTwheel will decrease distracted driving over the two week period and that feedback provided to experimental participants will accelerate behavior change in the second week of driving as compared to controls. Finally, it is expected that participants will provide high levels of satisfaction with regard to comfort of the device and ability to change behavior. The SMARTwheel may provide a teaching resource for new drivers to ensure good driving behaviors or an intervention for experienced drivers with unsafe driving habits.

Coping Skills and Partner Satisfaction as Moderators Between Abuse History and Abuse Risk

Maria-Ernestina Christl

The effects of child abuse are long felt throughout the victim's life. Research has found that victims of child abuse suffer poorer mental and physical outcomes in adulthood as well as poorer financial stability. The cost of child abuse weighs heavily on society, estimated at $124 billion a year. Being a victim of child abuse has been shown to be highly correlated with becoming abusive to one's own children. Exploring the possible moderating effects of coping skills and partner satisfaction on reducing the likelihood that an abused mother will become abusive would allow for early intervention as well as detection of non-abused mothers that are more likely to initiate a cycle of abuse. One-hundred eighty six mothers were recruited from local OB/GYN clinics and child birthing classes for the Following First Families study. Inclusion criteria for the subset in this investigation will involve first time mothers who are in a romantic relationship. The first appointment consisted of mothers in their third trimester. The Parent-Child Conflict Tactics Scale was administered to measure mothers' past history of abuse. Mothers were then seen for the second time when the child was six months old. At time two, the mothers' ability to implement coping skills was assessed using the Coping Self-Efficacy Scale. Partner satisfaction was measured using the Couple Satisfaction Index. Abuse risk was measured using the Child Abuse Potential Inventory and Adult Adolescent Parenting Inventory-2. Intergenerational effects are predicted to be observed largely for those with low partner satisfaction and poor coping skills.

Demographic Predictors of Pain Severity in Fibromyalgia

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Fibromyalgia is a syndrome involving chronic pain, chronic fatigue, sleep problems, and temperature and pressure sensitivity. There are many co-morbid symptoms, most common of which are tension headaches, anxiety, depression, irritable bowel syndrome, and temporomandibular joint disorders. Over 80% of those afflicted with fibromyalgia are women, although men can suffer from the disease as well. Patients experience flare-ups or instances when their symptom severity increases. These flare-ups seem to be a stress-related exacerbation of symptoms, and it is possible that chronic stress may drive long-term disease severity. Previous research has shown that poverty, socio-economic status, low education level, and minority racial status can be contributors to chronic stress in someone's life. We are therefore looking at whether demographic characteristics, such as socioeconomic status, annual income, education level, and employment or disability status, are predictors for pain severity in patients who have been diagnosed with fibromyalgia. Body mass index (BMI) is another factor that can cause stress on one's body. While previous research has been done on BMI and symptom severity, the results are mixed, so we decided to complete our own investigation. This project is using self-report questionnaires to see if any consistent life stressors could be predictors for pain and fatigue severity in women with fibromyalgia.

Development and Validation of a Novel Fibromyalgia Model

Jennifer Weikard

Characterized by chronic widespread nerve pain, fibromyalgia is a prevalent pain disorder affecting between 2 and 4% of the population, predominantly women. Furthermore, the pathogenesis of the disorder is unknown, and diagnosis typically follows elimination of other pain inducing factors such as arthritis. Although three different animal models currently exist for fibromyalgia, none of them sufficiently replicate all features or possible etiology of the disorder; therefore, this study aims to develop a novel animal model that addresses these gaps in knowledge. After collecting baseline data, we administered the endotoxin lipopolysaccharide (LPS) to mice via intraperitoneal injections. This was designed to determine whether chronic systemic immune system activation would lead to persistent pain, as measured by the Von Frey test. Depression and fatigue, two common co-morbidities of fibromyalgia, were also measured using the forced swim and the rotarod tests, respectively. After each week of testing, mice were injected with another dose of LPS if they had returned to baseline values of touch sensitivity. Mice who remained sensitive received saline injections. In support of our hypotheses, we found that allodynia persisted long after sickness signs had resolved, forced swim float time increased indicating the presence of depression, and rotarod times decreased suggesting the mice were more fatigued. These results demonstrate the possibility of creating a valid mouse model of fibromyalgia that encompasses a number of co-morbid conditions and a translatable etiology. This model, when fully developed, may serve as a basis for understanding fibromyalgia and pursuing more effective treatments.

Empathy Predicts Maternal Sensitivity to Infant Behavior

Regan E. Gaskin, Christina M. Rodriguez, PhD.

Findings linking empathy to a higher risk of child abuse have been mixed, but empathy is still considered a risk factor for child abuse potential. Research demonstrates lower empathy scores are linked to a higher risk of maternal physical child abuse. Thus, the current study examines whether empathy can predict mothers' sensitivity to their infant both longitudinally and cross-sectionally. Participants of this study include 120 first-time mothers living in the Southeast. Respondents are currently participating in an ongoing longitudinal study of at-risk parenting and child abuse potential. The data from this analysis are selected from the first and second wave. During the first wave, mothers were in their third trimester. At both time points, mothers completed self-report measures on a computer, including the Interpersonal Reactivity Index which is a self-report measure of empathic concern and perspective-taking. At the second time point, the infant was six months old and mother-child dyads were videotaped interacting, coded blind to mothers' self-reported empathy. Preliminary analyses show a significant positive correlation of longitudinal and concurrent empathic concern and sensitivity to non-distress. In other words, empathy can predict mothers' behavior with the infant both when the child is 6 months old but even before the child is born. Empathic concern at both time points tends to influence sensitivity to distress as well (power is limited given the small number of babies evidencing distress). Consequently, administering simple measures during pregnancy may predict mothers' subsequent behaviors toward their unborn infant which has implications for understanding child abuse risk.

Failure to Achieve Legitimacy in Afghanistan

Joseph Green

The future of the current democratic government in Afghanistan is far from assured. Despite understanding that the survival of the regime depends on its ability to gain legitimacy, the US and its allies in the International Community have been unable to build a sustainable government in Afghanistan based on legitimacy. This problem is due to a lack of understanding of two important issues that proved fundamental to the constitution of Western democracies. Drawing on the works of John Locke in "Two Treatises of Government" and Edmund Burke in "Reflections on the Revolution in France," I identify the particular type of popular consent required for the constitution of a legitimate government and the role of time in vesting the institutions of government with legitimacy as critical needs unmet in the Western state-building project in Afghanistan. In the absence of indigenous discourse focused on shaping the institutions of government, the International Community attempted to use media to achieve legitimacy for the democratic government by investing in Afghanistan's information infrastructure and using the new outlets to encourage active participation in elections and to amplify Afghan voices that supported the new government. Ultimately, this has led to an unsustainable media environment and has left the "fourth estate" vulnerable to exploitation by factional voices. I argue that the failure to establish legitimate governance in Afghanistan reveals that liberal democracies are limited in their ability to build lasting democracies abroad, which raises questions about the efficacy of regime change and state-building as foreign policy.

Pedestrian Use of Texting While Crossing the Street on a College Campus

Sufia Alam, Jenni Rouse, Dr. David Schwebel

While crossing the street, pedestrians tend to act less cautiously while distracted. Crossing the street is a complex task that requires individuals to be able to have "accurate perception of the street environment and the vehicles traveling in it, efficient cognitive processing of that environment to make a processing of that environment to make a decision about the safety of continuously appearing and changing traffic gaps, and initiation and maintenance of motoric movement to traverse the street." When individuals begin texting and crossing the street, their attention to all aspects of the road begins to decrease dramatically. For example, one study found that texting individuals were 3.9 times more likely to display an unsafe behavior. An interesting approach in analyzing texting behavior of pedestrians crossing the street is through group behavior and tendencies of each gender. For example, the Chameleon effect, offers a theoretical explanation for the reason why individuals tend to mimic the behavior of one another when waking in as a group than they do individually. The purpose of this study is to identify whether people are more likely to text when crossing the street among a group of people than when crossing alone. The hypotheses for this study are: women tend to text more than men while crossing the street; individuals tend to text more when crossing in a group versus crossing the group individually; as the group size increases, the number of texters within a group increases as well.

Road Users' Perception and Reaction to Conceptually Different Driving Hazards

William Wagner, Benjamin McManus, Despina Stavrinos

Previous work has found that pre-drivers' reaction time to road hazards that contain a visible human element ("social hazards") tends to be slower than their reaction time to motor vehicle hazards ("non-social hazards"). Pedestrians are the most physically vulnerable road users, and this vulnerability may be compounded if drivers react slower to them. This study is among the first to compare drivers' reaction times to social and non-social hazards. Fifty-two drivers were recruited from introductory psychology courses. Participants viewed eight video clips of simulated driving hazards (four social and four non-social) and were instructed to press a response key whenever they perceived a hazard. Reaction times were calculated from their first response after a hazard moved from a stationary position. Finally, participants' driving experience was measured as the number of months since receiving a driver's license. A Poisson regression found that hazard type (social or non-social) was not a significant predictor of reaction time. However, females reacted 1.604 (95% CI, 1.224 to 2.101; $p < .01$) times slower than males, and for every extra month of driving experience, reaction time was 1.008 (95% CI, 1.004 to 1.013; $p < .01$) times slower. In contrast to what has been shown in pre-drivers, drivers did not react significantly slower to social hazards, even when controlling for driving experience. Thus, drivers' individual factors may play a larger role in reaction time than a hazard's appearance.

Tunnel Vision: The Need to Decrease the Spanish Language Barrier in Healthcare Settings

Taylor Bartlett, Angela Hollowell, Tina Etminan, Jalen Wesley

To better serve Spanish-speaking patients, many medical professionals take courses in the Spanish language that are specific to health professions. However, the manner by which students are taught Spanish is not applicable to real world scenarios. Students are taught a Castilian dialect of Spanish with vocabulary and grammar that is common to the medical field, but this is in isolation of the predominantly Mexican dialect and colloquial phrases spoken by the community that they aim to serve. This disconnect causes a demand for interpreters in the healthcare setting. As many parents rely on their bilingual children to interpret for them, this could lead to the inaccurate transfer of information or the lack of information altogether. Our aim for this service-learning project as interpreters in the UAB Eye Care Clinic Pediatric Unit, Cahaba Valley Health Care Clinic, and UAB Hospital Guest Services is to decrease the language gap between healthcare providers and their Spanish-speaking patients and families. Providing greater access to quality preventative and primary care is imperative in developing better community health outcomes. Working to decrease the language barrier between health care providers and patients would help to increase positive health outcomes by encouraging the Hispanic community to go in for diagnosis and treatment.

"Virtual-U" and Undergraduate Education in Criminal Justice: Comparing For-Profit and Not-For-Profit Baccalaureate Programs in the U.S

Jonathan W. Buchwalter, John J. Sloan III, Ph.D.

In the modern age of technology and innovation, for-profit online universities offer students convenience and flexibility at a price that may actually be lower than that of traditional "brick-and-mortar" institutions. To date, however, little is known about online schools offering baccalaureate degrees in criminal justice. To examine differences between For-Profit (FP) and Not-For-Profit (NFP) colleges/universities offering bachelor's degrees in criminal justice, we collected primary and secondary data on institutional, departmental, and programmatic characteristics of the population (N=386) of all private schools operating in the U.S. during the Fall of 2015 that offered a bachelor's degree in criminal justice. Results indicated FP schools have narrower curricula, lower annual tuition, and more open admissions. They are also more likely to offer associate's degrees, offer their programs 100% online, require both more total hours for, and required hours in, the major and specific substantive courses, and offer a concentration within the major. Implications of these results for both online and brick-and-mortar students are discussed as is the future of online education in criminal justice

WORKS IN PROGRESS

An Automated Rocking Bed to Induce and Enhance Sleep

Anna Buie, Lily Deng, Soojin Kim, Ketan Awasthi, Will Mackin, Dhaval Patel

According to the National Health and Nutrition Examination Survey, more than 30% of the adult population in the United States are experiencing sleep-related difficulties. Current solutions include sleep medication and cognitive behavioral therapy, but these have issues. A study showed that rocking induces sleep; therefore, our client expressed a need for an affordable residential bed that rocks in a side-to-side motion, helping individuals fall asleep and stay asleep at night. After evaluating several designs (wheel beds and conveyor belt beds) we will proceed with a glider bed design: a gliding structure and bed frame. This structure would suspend the bed frame via 4 metal brackets (one attached to each leg.) The bed would be rocked 2 inches to each side at 0.25 Hz, using two linear actuators. The market for this type of product is quite large, consisting of 70 million people. Currently, there are patents that we could infringe upon, but with a motor and some altercations, our glider bed design should not cause any infringement. This bed would not have to comply with FDA medical device regulations because it targets the residential sector. However, it should follow consumer regulations.

Cellular Changes in *Hydra oligactis* in Response to Cold Stress

Christopher Aaron Smith, Heather K. Patterson, Kathleen E. Fischer

In most organisms, stress over time is associated with changes in phenotype, such as decreased fertility or a degradation in cellular processes, which taken as a whole, we recognize as aging. Some animals can replace damaged cells constantly over their lifetime using stem cells that replicate to become needed cells. Although many organisms show a decline numbers of stem cell numbers as they age, the invertebrate species of *Hydra* do not appear to show this age-related decline in stem cells and as such are said to be "immortal". However, when exposed to cold stress, one strain of *Hydra oligactis* appears to age, showing declines in reproduction, accumulated damage to tissues and reductions in physiological function. The animals start reproducing sexually and lose many of their functional capabilities such as catching food, and eventually, they die. This is believed to be caused by either a loss in the ability to replicate their interstitial stem cells, a loss of self-renewal—or through a loss of potency, the ability to differentiate into cell types other than the reproductive cells. I have completed macerations on cold stressed *Hydra oligactis*, of an aging and non-aging, cold insensitive strain, and plan to separate the different cell types using flow cytometry. This will allow me to see how the morphology, size, and numbers of different cell types change in response to cold stress. Results will support future studies and help us understand aging in *Hydra*.