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Oral Presentations

Biological and Life Sciences

Synaptotagmin-9 Affects Early Phase Insulin Secretion

The progression of type 2 diabetes (T2D) is marked by a decline in the rate of insulin secretion. Thus, understanding the mechanism of secretion is crucial to understanding T2D. Tomosyn-2 binds to syntaxin1A. However, it is not yet established whether Tom-2 binding to syntaxin1A limits the formation of the Soluble NSF Attachment Protein Receptor (SNARE) complex at the plasma membrane and exocytosis. Our preliminary data show that in addition to syntaxin1A, Tom-2 binds and co-fractionates with synaptotagmin-9 (Syt-9) in a sucrose density gradient under conditions of high glucose and elevated calcium concentrations. Syt-9 protein is a calcium sensor and is known to regulate the formation of the SNARE complex. However, its role in regulating insulin secretion is not yet well characterized. We observed a significant increase in in vivo insulin secretion at 5-minutes and 15-minutes post-glucose challenge in 10-week old male Syt-9/- vs. control mice - suggesting that Syt-9 regulates early phase of insulin secretion from beta cells. Interestingly, islets of Syt-9/- vs. control mice have reduced tomosyn-2 protein abundance by 50% without altering the levels of other key t-SNARE or v-SNARE proteins. These results indicate that the reduction in Tom-2 protein abundance leads to an increase in insulin secretion observed at early time points in Syt-9/- mice. We hypothesized the role of Syt-9 is in chaperoning or localizing Tom-2 protein from the cytosol to the SNARE complex to regulate insulin secretion. Herein, unpublished data describe acritical role of Tom-2 in regulating early phase of insulin secretion modulated by Syt-9 protein.

Huynh T, Gupta R, Nguyen D, Bhatnagar S.

Business, Financial, and International Studies

Strategic Analysis of Apple Inc

For this project, our team set out to think about the strategy of the company, Apple Inc., by examining its present business position, its long-term direction, its resources and competitive abilities, the caliber of its strategy, and its opportunities for gaining a sustainable competitive advantage. This is important because Apple is one of the most wealthy and successful companies in the entire world, while also being at the forefront of changing the way many people live their everyday lives with technological innovations. In order for us to thoroughly analyze and gain insight on the strategic methods of Apple, we conducted meaningfully research on the market, industry, and the financial standings of the company. The scope of our analysis is to assess the factors that a firm faces that impact their overall decision making. Two of the main models that we used to analyze Apple includes the Porter’s five model and the Strategic-Planning Gap model. We used these models in our analysis to gage where Apple stands as a firm and where they plan to go. The resources we used to provide supporting evidence and research include Apple’s direct website, the most current press releases available, and financial publishing on the company. In our strategic analysis of Apple, we found that Apple is a strong market leader in the technology sector. Apple executives use strategic management regarding their vision for the company’s future and have a well-rounded plan for achieving their objectives. We concluded that with Apple’s continued innovation and drive to bring customers new and exciting technology, they will remain the leading company in the business and continue to revolutionize personal technology.
The conclusion that can be drawn from Apple is that they are innovative and early adapters. They are usually first with new products, which is risky but is working to their advantage. The work that Apple is doing adds to the existing body of knowledge by introducing and incorporating theoretical contributions (new techniques, concepts, and analysis) and in practical contributions (including system experiments, prototypes, and new applications). The implications of Apple imply that they are committed to bringing the best personal computing experience to students, educators, creative professionals and consumers around the world through its innovative hardware, software and Internet offerings.

Janisha Peters, Michael Doyle, Katelyn Bailey, Roderick Spivey

Education

Engaging Families and Enhancing Literacy through Family Dialogue Journals

Research supports that family engagement is one of the most powerful tools in a child’s education. However, it can be hard to engage families in everyday classroom activities. Family dialogue journals allow constant communication between the students, families, and teachers. While family dialogue journals have been used in older elementary students, it is not a common practice found in pre-k classrooms. This is unfortunate because family dialogue journals can be an incredibly powerful tool in the classroom. Through the writing workshop and the use of photographs, family dialogue journals can be adapted and used to engage families and enhance literacy in preschool students. Allowing creativity and open-ended opportunities to write and participate in the family dialogue journals proves to be a great way to bridge the relationship between home and school, as well as strengthen the classroom community as a whole. This research shows the benefits of using family dialogue journals in a preschool setting in order to engage families in meaningful ways. It also encompasses personal experiences of using the family dialogue journals to open opportunities in other family engagement practices including parent letters, home visits, Parent and Child Together Time (PACT), and family education nights. In addition to the extension of family engagement, the family dialogue journals encouraged endeavors to nurture language and literacy through the use of children’s native language, cultural connections, authentic literacy experiences, and collaborations with families to promote multilingual literacies.

Kaitlyn Allen

Social and Behavioral Sciences

Impact of Race and Childhood Maltreatment on Fat Distribution in Caucasians and African Americans

Childhood maltreatment (CM) has been shown to affect metabolic profile, notably visceral adipose fat (VAT). An increase in VAT increases risk for diseases such as cardiovascular disease or diabetes. However, it remains unknown whether the effect of CM on VAT is race-specific. Furthermore, little is known regarding impact of race on other obesity measures in regards to CM. This experiment was designed to determine whether race affects CM and fat distribution. One hundred and ten participants (Caucasians=59, African American=51) completed the study, giving demographics, anthropometric measurements, and depressive state. We assessed CM using the Childhood Trauma Questionnaire (CTQ), and participants fell into two groups, CM and non-CM. Total fat, trunk/total fat ratio, VAT, and VAT/trunk ratio, were measured through Dual Energy X-Ray Absorptiometry (DXA). Caucasians with CM had increased VAT (p=0.024) and VAT/trunk ratio (p=0.039). However, other measurements, including body mass index (BMI) and waist-to-hip ratio (WHR), did not differ. There was a positive correlation between CM and trunk/total fat ratio (r=0.310, p=0.023). For African Americans, there were no significant differences between CM and non-CM groups on any obesity measures and no correlations.
Results suggest that there is a relationship between CM and VAT only present in Caucasians, not African Americans. These results suggest that CM and obesity have different mechanisms between races, and that diagnosis and treatment of obesity may need to take into account possible influencing factors such as CM and race.

Angela Y. Chieh, Yang Liu, Sarah K. Sweatt, PhD, Li Li MD, PhD
Poster Presentations

Arts and Humanities

Black Minds Matter: A look at mental health in the black community

As I person who experienced mental health issues before I came to college, I always questioned why black people did not really believe in it and why was it not taken seriously. It falls under the umbrella of mental health as a whole although when discussing mental health within the black community, there are different factors that must be included. In researching this topic, I interviewed my African American studies professor to get his input, along with my personal experiences, and my parents to find out a reason for the lack of understanding about mental health. I hope to present this research to bring awareness to this issue that affects our people just as much as issues of police brutality.

Kameryn Thigpen

Effect of Race and Poverty on College admissions

Our group decided to research the effects of Race and Poverty on college admissions. Upon beginning our literature-based research, we determined that students of color and students living in poverty are more likely to start behind their more affluent and white peers in early academics. This gap in academic achievement increases each year, as children who have lower family income or are a minority tend to go to schools that are under-resourced and have more obstacles to overcome. Particularly, students in poverty are at risk to missing school, which causes them to fall behind and perform at a lower rate. People can discriminate against minorities, which can make it more difficult for minority students to excel. This lower level of performance can cause their school to receive lower ratings and less resources, creating a problematic cycle. Students of color are also more likely to be in poverty. All of these factors lead to students of color and impoverished students having higher dropout rates and struggling to get into college because they lack the resources to help them excel in K-12 education. The students who manage to get into college despite their barriers often times still struggle due to being unprepared because of this lack of resources available to them throughout their earlier education.

Dawson Miles, Anna Horn, Hannah Kindervater, Hannah Goymer, Sujitha Peramsetty

Biological and Life Sciences

IGFBP-3 Localization and Function in Melanocyte Stem Cells

Melanocyte stem cells (McSc) play an important role in the phenotypic signs of aging. These somatic stem cells can be very informative in answering the question, why does aging occur? Stem cell maintenance and self-renewal is important in maintaining homeostasis in the body. As the body ages, stem cells lose the ability to prevent differentiation and are lost. Graying mice is a good model organism for studying these cells. One way to locate McSc is to use antibodies and immunolabeling; different antibodies can be used. McSc are located around bulge region of the hair follicle and the loss or differentiation of these cells causes hair graying, one of the most evident signs of aging. McSc can go into quiescence, under certain conditions. This is a reversible non-growing and non-proliferating state. There are many different factors that could potentially maintain quiescence in melanocytes. The Insulin-like Growth Factor Binding Protein-3 (IGFBP-3) is one of these factors that has a promising gene expression pattern. In a recent study, quiescent yeast have increased levels of this protein and in mice with IGFBP-3 knocked-out have phenotypic pigmentation. IGFBP-3 regulates the Insulin Growth Factor-I (IGF-I), and has other IGF-independent functions in cell proliferation. IGF-I is important for normal hair
growth and plays a role in differentiation. IGFBP-3 modulates cell proliferation by acting as an antagonist of IGF-I during the hair growth cycle. This study will demonstrate the immunolabeling of IGFBP-3 in the hair follicle, its possible role in McSc, and if it helps McSc maintain quiescence.

**Shautoria Coleman**

**Hgs Gene Is Vital for Synaptic Transmissions at the Neuromuscular Junction**

Disruptions in endosomal sorting have been linked to many neurodegenerative diseases such as spastic paraplegia and Charcot-Marie-Tooth disease. HGS is a critical protein involved in the ESCRT. In addition, a spontaneously occurring mouse mutation in its gene Hgs, called teetering (tn), results in severe neurological deficits. The study measured synaptic transmissions at the NMJ by using a two-microelectrode voltage-clamp system on extracted muscle tissue in wild-type and mutated Hgs mice. In addition, the study counted the number of endosome-like structures by examining cross sections with an electron microscope. As a result, the study found that the tn mice showed an increase in proliferation of endosome-like structures and produced fewer synaptic transmissions at the NMJ that are necessary for motor movements and sensory neurons. Therefore, the study proved that Hgs is required for synaptic transmissions at the NMJ and that the tn mice produced more endosome-like structures because synaptic vesicles were not being released from the neurons. Hgs also proved to be necessary for proper myelination within the peripheral nervous system.

Hgs: hepatocyte growth factor regulated tyrosine kinase substrate
ESCRT: endosomal sorting pathway required for transport
NMJ: neuromuscular junction
tn: teetering

**Hanh Huynh, Sakar Prasain, and Patrick Orman**

*Research Liaison: Tina Tian
PI: Scott Wilson*

**Investigation of the Transcriptional changes caused by Ionizing Radiation in Melanocyte Stem Cells.**

Hair graying has long been an indication of aging in mammals. This phenomenon is associated with the depletion of melanocyte stem cells (McSCs), which reside in the hair follicle. As one approach to understanding stem cell maintenance with age, we have focused on evaluating the gene regulatory networks of acute hair graying mouse models. One of these hair graying mouse models is exposure to ionizing radiation (IR). Bioinformatic analysis of McSCs isolated from mice treated with ionizing radiation demonstrated a decrease in the epigenetic regulator Ying Yang 1 (YY1). Our goal was to assess YY1 as a possible candidate for regulating McSC maintenance. To validate these observations our approach was to first confirm IR-induced down-regulation of YY1 in a melanocyte cell line in vitro. However, preliminary analysis suggested no effect on YY1 gene expression or any of its targets. This led us to question the efficacy of our IR treatment. Due to the retirement of irradiators utilizing radioactive materials, previous bioinformatics data was based on mice treated with IR from a cesium source, while the in vitro cells were treated with IR from an X-ray source. Thus we present data here comparing the efficacy of the two sources in inducing IR-related DNA double-stranded breaks, McSC differentiation and hair graying. We find that despite similar sub-lethal dosage level, X-ray as a source of irradiation is not as effective at inducing the cellular characteristics associated with hair graying caused by a Cesium-based source.

**Giang Le**
Heavy Smoking in Midlife and Risk of Alzheimer’s Disease and Vascular Dementia

Smoking has been previously studied in regards to Alzheimer’s Disease (AD), but these studies were not thorough enough to be conclusive. We intend to provide more conclusive evidence to support or deny the relationship between neurodegenerative diseases and smoking. In this cohort study, 21,123 people from different ethnic backgrounds took part in a medical health survey that included their smoking habits. The development of neurodegenerative diseases was recorded for this group as they aged. We hypothesize that long-term smoking can increase the risk of dementia, AD, and vascular dementia. Out of the 21,123 people observed in the study, 5,364 people, or 25.4% of the population, were diagnosed with dementia over a 23 year period. These people were categorized based on the amount that they smoked, if any. Among the smokers, those who smoked more than 2 packs a day had the highest risk of dementia, AD, and vascular dementia (VaD), while those who smoked less than 0.5 packs per day had a risk comparable to non-smokers. These results were adjusted based on multiple environmental and social factors. The results of the study showed that long-term smoking increased the risk of dementia, AD, and VaD by more than 100%.

Sydney Whitt, Payton Downey, Patrick Caughran, Suki Chen, Mateen Ibrahim

Testosterone’s role in the α-2a adrenergic receptor signaling pathway in rat pre-frontal cortex

Impulsivity is implicated in psychiatric disorders such as ADHD, addiction, and suicide. The mechanisms by which chronic testosterone abuse influences impulsivity are unclear. This project aims to understand how testosterone influences impulsivity in a rodent model both from behavioral and molecular levels. In this study, rats were either only gonadectomized or gonadectomized and injected with supraphysiological levels of testosterone. Their relative impulsivity levels were assessed using the go/no go task. The testosterone-treated group displayed a significantly lower go/no-go ratio, indicating they were highly impulsive compared to the gonadectomized group. Rats were then sacrificed and RNA was extracted from the prefrontal cortex. mRNA transcript levels of the alpha-2a adrenergic receptor gene and its downstream signaling molecules, particularly the protein kinase A subunits, were tested using quantitative PCR. Alpha-2a adrenergic receptor and protein kinase A subunit gene expressions were significantly upregulated in the testosterone treated group. These results were then re-evaluated on the translational level through western blotting. These results suggest that chronic testosterone abuse plays an important role in influencing impulsivity and elevating protein kinase A levels in the pre-frontal cortex. Broader implications for this study include increasing research into how chronic steroid abuse can influence psychiatric illnesses through the noradrenergic system.

Juhee Agrawal, Birgit Ludwig, Yogesh Dwivedi

Efficacy of LRRK2 Inhibitors at Preventing Neurodegeneration in a Novel Preclinical Model of Parkinson’s Disease

Parkinson’s disease (PD) is the most common neurodegenerative movement disorder. PD is characterized by the loss of dopaminergic neurons (DN) and fibers in the substantia nigra pars compacta (SNpc) and formation of proteinaceous aggregates primarily composed of alpha synuclein (Î±-syn) protein. Animal models of PD are used to test novel PD therapeutics prior to clinical trials. Current preclinical models such as MPTP and 6-hydroxydopamine do not fully recapitulate pathology seen in PD. Absence of preclinical models that show pathological phenotypes is likely the reason many therapeutics fail in clinical trials. Alpha synuclein preformed fibrils (PFFs), generated from recombinant Î±-syn, are
able to induce the formation of protein aggregates. Furthermore, the G2019S mutation in leucine rich repeat kinase (LRRK2) is the most common genetic cause of PD. Additionally, this mutation has been shown to exacerbate PD neuropathology and inhibition of this kinase has been shown to be neuroprotective in past studies. The objective of this study was to develop and characterize a novel preclinical model for PD, and test the efficacy of LRRK2 inhibitors at preventing neurodegeneration in this model. In order to induce PD pathology, we injected 49nm PFFs into the SNpc of wild type (WT) and transgenic BAC G2019S-LRRK2 rats. We report progressive cell-to-cell transmission of abnormal Î±-syn aggregates, progressive degeneration of dopaminergic neurons, a partial decrease in tyrosine hydroxylase positive cell innervation of the striatum, and LRRK2 inhibitors show neuroprotection in G2019S-LRRK2 rats.

Vedad Delic, Sidhanth Chandra, Xianzhen Hu, Tyler Maltbie, Nicole Bryant, Hisham Adelmotilib, Valentina Krendelchtchikova, Andrew West, Hunter Scott

The role of T cells in cystic kidney disease progression
Cystic kidney diseases are the fourth leading cause of renal failure, yet currently only palliative treatment options exist. Dysfunction or loss of the primary cilia, through heritable genetic mutation, results in cystic kidney disease. Previous work has highlighted an important role for macrophages in human and murine models of cystic kidney disease; however, the involvement of other immune cells remains unknown. Hypothesizing possible downstream activation of T cells, we looked for association with disease by performing confocal immunofluorescence microscopy on control and cystic disease patients. We observed a marked increase in T cell (CD3+) populations in renal tissue, often surrounding cysts and in close association with macrophages. T cells can polarize into pro-inflammatory (IL-17a+ Th17 cells) or anti-inflammatory (IL-10+, CD25+ Treg cells) cytokine producers depending on the local microenvironment. To determine the contribution of pro- and anti-inflammatory T cells to human cystic disease, we performed flow cytometry on human kidney samples and ELIZA on serum isolated from control and polycystic kidney disease (PKD) patients. Our flow cytometry data showed increased T effector cells (CD8+) and T helper cells (CD4+) in cystic kidneys. Further, end stage renal disease patients have increased CD25+ CD4 Treg cells. ELIZA of samples isolated from human serum shows increased IL-17a+ protein in patients under 30 years of age, whereas patients over 30 years have minimal IL-17a+ protein. Collectively, these data suggest a T cell phenotype shift during disease progression and that T cells may be an attractive therapeutic target for cystic kidney disease.

Gonzalez, Nancy Mize; Zimmerman, Kurt A.; Song, Cheng Jack; Revell, Dustin Z.; Yoder, Bradley K.; Mrug, Michael

Validity of Self Report Data
The accuracy of self-reported information from human behavior studies has demonstrated significant deviation from actual behavior. The purpose of this secondary analysis study is to determine the reliability/validity of self-reported capillary ketone values in older HIV+ adults enrolled in a 12-week diet intervention. Participants (N = 13) were randomly assigned to either: 1) ketogenic diet (KD) (i.e., <50 grams carbohydrate) or 2) control (no diet restrictions) group. Adherence to the KD was assessed via capillary ketone monitoring. Participants were instructed to journal the value of each ketone test. Monitor/testing strips were provided to all participants and food was provided to persons in the intervention group. A live demonstration of the testing process was completed at baseline. Ketone testing instructions and a monitor user™s guide were also provided in written form. Data from each
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device was recorded at study conclusion. Of the 13 participants, four individuals returned the written log but only one of the four logs was similar to the monitor’s recorded history. Three participants returned monitors that contained no data and three participants reported misplacing the monitor. Overall, two participants recorded values similar to the monitor’s history. Diet interventions that require a participant-initiated, multi-step data collection procedure may require greater assistance by the research team, particularly among older, cognitively impaired adults to achieve greater adherence.

Shannon Morrison, Rye Shiver, Dalton Scott

Methods of the Characterization of the DNA Damage Response in Prostate and Colon Cancer

DNA damage repair pathways are critical in maintaining chromosomal fidelity after environmental and endogenous insults. A key regulator of the DNA damage response (DDR) is the Ataxia-telangiectasia-mutated kinase (ATM). ATM coordinates the repair of DNA double stranded breaks (DSB). ATM is recruited to the site of DSB by the MRN complex. We measured protein-protein interactions to assess the ability of novel small molecules to interrupt ATM binding with a constituent of the MRN complex, NBS1. Abrogating ATM-NBS1 interactions can be of clinical use because it can induce radio-sensitivity. A potential downstream target of ATM is the Speckle-type Poz Protein (SPOP). SPOP is mutated in 8-14% of prostate cancer patients, suggesting it plays a role in prostate cancer genesis. We probed the impact of a naturally occurring SPOP mutant in the DDR. We also investigated the impact of deleting the nuclear localization sequence (NLS) of Protein-serine O-palmitoleyltransferase porcupine (PORCN) in HT1080 sarcoma cells. We hypothesize that PORCN has a role in the DDR. Mutations in the second two proteins were tested and analyzed for changes in protein localization and expression, along with ATM kinase activity to determine the effect that these mutations have on the DDR. We observed that the SPOP mutant makes the DDR inefficient, which increases the cells’ susceptibility to DNA damage, and that the porcupine ΔNLS mutants have a delayed DDR. Understanding DDR is significant as it is both a cause of, and is a frequent target in the treatment of cancer.

Janica L. Harris

EZH2 Methyltransferase Activity Regulates Fear Memory Reconsolidation via Pten expression and mTOR signaling pathways

The memory reconsolidation process has arisen as a potential therapeutic strategy for the treatment of maladaptive memories associated with many anxiety disorders. This process requires increased protein synthesis which is mediated by Protein Kinase B â€“ a mammalian target of rapamycin (AKT-mTOR) pathway. However, it is unknown how activation this pathway is regulated during the reconsolidation phase. We tested whether EZH2, a histone H3 lysine 27 trimethylation (H3K27me3) methyltransferase, coupled to regulation of the protein phosphatase Pten gene expression and was necessary for AKT-mTOR signaling during the reconsolidation of a contextual fear memory. We used siRNA-mediated knockdown of Ezh2 to reduce H3K27me3 levels in area CA1 of the hippocampus in vivo prior to retrieval. We then analyzed H3K27me3 levels at the Pten gene region using chromatin immunoprecipitation and mTOR phosphorylation levels using western blotting. We found that memory retrieval increased H3K27me3 and decreased PTEN protein levels in CA1. Increases in H3K27me3 binding and DNA methylation across the Pten promoter and coding regions indicated transcriptional silencing. Additionally, knockdown of Ezh2 in CA1 of the dorsal hippocampus eliminated retrieval-induced increases in H3K27me3, prevented decreases in PTEN levels and reduced increases in the phosphorylation of AKT and mTOR following fear memory retrieval. This shows that EZH2-mediated
H3K27me3 plays a critical role in the repression of Pten gene transcription necessary for retrieval-induced AKT-mTOR activation and fear memory reconsolidation. This suggests that targeting EZH2 histone methylation mechanisms may prove a useful strategy for reconsolidation-based therapeutic strategies designed to treat maladaptive memories associated with many anxiety disorders.

Katrina Hatch, Timothy Jarome, Gabriella Perez, Rebecca Hauser, Farah Lubin

**Rat Pkhd1 and Pkd2 genes do not engage in a major cystic kidney volume-regulating interaction**

Polycystic kidney disease (PKD) is the fourth leading cause of end-stage renal disease in adults (PKD1+/- or PKD2+/- mutations) and children (PKHD1-/- mutations). Genetic interaction between PKHD1 and PKD2 genes was proposed based on few severely affected patients that co-inherited mutations in both genes. To test the validity of such interaction in animal models, we crossed the Pkd2A873*rats (Pkd2+/-) with Pkhd1PCK/PCK rats (Pkhd1-/-). Both models have increased total kidney volumes (adjusted for body weight; TKV/BW) by 14 wks of age. Rats with viable combinations of Pkd2 and Pkdh1 mutant alleles (n=33) were generated in two crosses: Pkhd1+/-,Pkd2+/- x Pkhd1+/-,Pkd2+/-, and Pkhd1+/-,Pkd2+/- x Pkhd1+/-,Pkd2+/-+. As expected, at 14 wks the observed MRI-based TKV/BW ratios were mildly increased Pkd2+/- (vs Pkd2+/+) rats (12.51 vs 12.44 mm3/gm; Pkd2 allele F[1,27]=5.012, p=0.034). Similarly, TKV/BW was increased in Pkhd1-/- vs Pkhd1+/- vs Pkhd1+/+ rats (14.816 vs 11.021 vs 10.743 mm3/gm; PKHD1 allele F[1,27]= 40.951, p<0.001). The effect of interaction between Pkd2 and Pkhd1 mutant alleles on TKV/BW was not significant (Pkd2 * Pkhd1 interaction F[1,27]=2.478,p=0.127). Similarly, gender had no effect on TKV/BW in this model (F[1,27]=0.306,p=0.585). BWs were not affected by Pkd2 or Pkhd1 alleles or their interaction in these crosses (F[1,27]=0.922, p=0.346 for Pkd2 and F[1,27]=0.867, p=0.431 for Pkhd1). In summary, we did not observe a major interaction between the PKD2 and PKHD1 genes in rats. These gene may exert their effects on renal cystic volumes through independent pathways.

Neil K Goel, Dan Shan, Gabriel Rezonzew, Ronald Roye, Sean Mullen and Michal Mrug

**Development of a Syngeneic Orthotopic Xenograft Tumor Model Using UN-KC-6141, a Mouse Pancreatic Ductal Adenocarcinoma Cell Line**

Pancreatic ductal adenocarcinoma (PDAC) is a lethal malignancy commonly resistant to chemotherapy and represents a significant therapeutic challenge. PDAC is an epithelial tumor that arises from the pancreatic duct. Laboratory models used to develop new treatment modalities, in part, use human PDAC tumors transplanted into athymic mice. This study establishes a PDAC model in mice with intact immune systems. A syngeneic orthotopic xenograft PDAC protocol would provide a model in which immune interactions in the establishment, progression and treatment could be investigated. The most common PDAC mutation is in the proto-oncogene, K-RAS. UN-KC-6141, a mouse PDAC cell line, was developed from a pancreatic tumor isolated from the KrasG12D (KC) transgenic mouse. The survival rates of 12-14 week old female C57BL/6 black mice were assessed after orthotopic implantation of UN-KC-6141 into the pancreas at various concentrations (1x106, 5x105, 1x105 and 5x104). The highest survival was observed in mice with 5x104 UN-KC-6141 cells. These data ensured survival during gemcitabine treatments. Gemcitabine is an anti-cancer nucleoside that inhibits DNA synthesis. One week after implantation of UN-KC-6141, either 100mg/kg of gemcitabine or saline vehicle was intraperitoneally administered every three days for two weeks and tumors harvested on day 28. Most tumors had metastasized to various organs: liver, spleen, small intestine, and peritoneal wall. Further, mice treated with gemcitabine as compared to vehicle controls showed a slight reduction of tumor size.
albeit not significant. These studies indicate a syngeneic orthotopic xenograft mouse model that will allow for the application of cancer immune manipulation strategies.

Hayley Nichols, Sydney Byrd, and Kari J. Dugger

**Vitamin D Receptor in a mouse model of Huntington Disease**

Huntington Disease is a devastating neurological disease. Currently, there are very limited therapeutic options once diagnosed with this disease. Our lab is interested in understanding pathways that are neuroprotective. We focus on a particular protein that increases intracellular cysteine and leads to increased glutathione. The increase in glutathione helps neural cells resist stress. One regulator of this process is Vitamin D. In order for Vitamin D to exert its' effect it needs a receptor, the Vitamin D receptor (VDR). In collaboration with Dr. Michelle Gray's lab we will use an animal model of Huntington Disease. The mutant mice have a similar long-term course as adults. Therefore, we will use these animals to determine if the VDR is changed in Huntington Disease (HD) over time. We will investigate whether this important protein is altered in different regions of mutant HD mice. Our hypothesis is that the VDR will be altered in mutant HD.

Ramya Nyalakonda, Dr. Michelle Gray, Dr. Brian Sims

**Shrinkage of Functional Field of View In Glaucoma**

Glaucoma is a leading cause of irreversible blindness worldwide, characterized by progressive loss of retinal ganglion cells and the resultant visual field defects. While visual acuity or visual-field testing is the most common measure of visual function in glaucoma, it does not directly translate to everyday visual function. Thus, to bridge the gap between clinical visual field assessment and daily functional vision, we have developed a novel method to assess functional field of view (i.e., the spatial extent of visual scene that can be reliably recognized at a glance). This was assessed with a letter recognition task in which single letters or triplets of letters are presented in a testing location adjusted with an adaptive procedure. A subject is asked to recognize the middle letter in the triplet or the single letter and compare it to the letter displayed at the central fixation region. Our study included young subjects with normal vision (n=13), normal old subjects (n=9), and subjects with glaucoma (n=11). While no significant difference was found between the normally-sighted groups, a significant difference was found in both conditions between the normal old and glaucoma subjects, with a difference of 48% in the crowded condition and 56% in the single letter condition. Our results show that people with glaucoma suffer from a significantly reduced functional field of view (FFOV). Our findings further suggest that both decreased visual sensitivity and increased visual crowding (i.e., inability to recognize target in clutter) appear to contribute to the shrinkage of FFOV in glaucoma.

Joanne Jacob and Bobby Ijeoma

**Effect of progressive resistance exercise training-based post-surgical rehabilitation on muscle volume and mobility restoration in knee or hip replacement arthroplasty patients.**

Physical activity in general and exercising in particular had been known to have a beneficial effect on the well-being of healthy people. Also, specifically designed training is prescribed for recovery after a number of illnesses including post-surgery care for knee or hip arthroplasty (replacement, THA/TKA) patients. A large number of people who undergo hip or knee replacement surgery suffer tremendous amounts of pain, limited mobility, and muscle atrophy. With these complications, the quality of their lives decreases significantly. Specially designed physical activities for these patients are known to
increase their muscle strength and mobility and release them from the pain which greatly improves the quality of the patients’ lives. However, the exact cellular mechanism by which the exercise-based rehab affects myogenesis is not well understood. The goal of this project is to detect exercise-induced molecular changes in the muscle tissue and their effect on myogenesis in order to design exercise-based rehabilitation therapies. Previously researchers in the UAB core muscle research laboratory detected that local muscle inflammation in THA patients correlated with impaired muscle regeneration. They identified this condition as Muscle Inflammation Susceptibility (MuIS) and hypothesized that MuIS positive (MuIS(+)) phenotype may be responsible for impaired post-surgery recovery of THA/TKA patients due to its anti-anabolic pro-inflammatory environment which suppresses muscle re-growth. This study was designed to test the hypothesis of a therapeutic effect of the progressive resistance exercise training (PRT) as a pro-anabolic intervention after THA/TKA on restoration of muscle volume and function.

Kenneth Paik

**Computational Analysis of Skeletal Muscle Long Non-Coding RNA (IncRNA) Datasets Reveals a Propensity Towards Coding Open Reading Frames (ORFs)**

Long noncoding RNAs (IncRNAs) play a crucial role in the regulation of gene expression. Recently, IncRNAs have shown to be critical regulators of myogenesis and skeletal muscle regeneration in normal and diseased muscles. Many IncRNAs are significantly dysregulated in expression levels in human neuromuscular diseases, including Duchenne muscular dystrophy (DMD) the most common form of muscular dystrophy worldwide. Additionally, there is growing recent evidence that many IncRNAs can produce coding open reading frames (ORFs) that can function downstream to activate or repress signaling pathways essential for the regulation of muscle growth and responses to stress stimuli. We hypothesized that IncRNAs in skeletal muscles might be responsible for a significant proportion of these IncRNA coding polypeptides based on the large amount of diversity and evolutionary clustering of IncRNAs around transcriptional ATG start sites among muscle structural genes. We collected publically-available IncRNA datasets of skeletal muscles and muscle stem cells isolated from mouse and human samples. Key characteristics such as the number of open reading frame, size of open reading frames, and distance from IncRNA transcriptional start sites were analyzed separately and in combination for all datasets. In addition, other factors were also analyzed such as the IncRNA sizes, distances from ATG transcriptional start sites of nearby coding genes, and evolutionary conservation between mice and humans. In summary, we identified a significant number of coding open reading frames in nearly all of the muscle IncRNA datasets compared to non-muscle datasets. Further analyses will determine IncRNA function and expression regulation in neuromuscular diseases.

Manuela Portilla, Dr. Mathew Alexander

**Synaptotagmin-9 Affects Early Phase Insulin Secretion**

The progression of type 2 diabetes (T2D) is marked by a decline in the rate of insulin secretion. Thus, understanding the mechanism of secretion is crucial to understanding T2D. Tomosyn-2 binds to syntaxin1A. However, it is not yet established whether Tom-2 binding to syntaxin1A limits the formation of the Soluble NSF Attachment Protein Receptor (SNARE) complex at the plasma membrane and exocytosis. Our preliminary data show that in addition to syntaxin1A, Tom-2 binds and co-fractionates with synaptotagmin-9 (Syt- 9) in a sucrose density gradient under conditions of high glucose and elevated calcium concentrations. Syt-9 protein is a calcium sensor and is known to regulate the
formation of the SNARE complex. However, its role in regulating insulin secretion is not yet well characterized. We observed a significant increase in in vivo insulin secretion at 5-minutes and 15-minutes post-glucose challenge in 10-week old male Syt-9/- vs. control mice - suggesting that Syt-9 regulates early phase of insulin secretion from beta cells. Interestingly, islets of Syt-9/- vs. control mice have reduced tomosyn-2 protein abundance by 50% without altering the levels of other key t-SNARE or v-SNARE proteins. These results indicate that the reduction in Tom-2 protein abundance leads to an increase in insulin secretion observed at early time points in Syt-9/- mice. We hypothesized the role of Syt-9 is in chaperoning or localizing Tom-2 protein from the cytosol to the SNARE complex to regulate insulin secretion. Herein, unpublished data describe a critical role of Tom-2 in regulating early phase of insulin secretion modulated by Syt-9 protein.

Huynh T, Gupta R, Nguyen D, Bhatnagar S.

IPX-750, a glycoconjugate of dopamine, attenuates symptoms of Parkinsonâ€™s disease in primates
Parkinsonâ€™s disease, the degeneration of dopaminergic neurons in the substantia nigra, leads to a deficiency in dopamine in the striatum and nigra and a decrease in dopaminergic neurons. The most common treatment for Parkinsonâ€™s disease, levodopa, has multiple side effects and crosses the blood-brain barrier (BBB) poorly. Prolonged levodopa therapy shortens periods of beneficial response, requiring more frequent dosages, an increase in levodopa-related motor fluctuations/dyskinesias, and is incapable of treating symptoms that develop as the disease progresses. These limitations illustrate the need for drug development with greater efficacies and decreased side effects. Using a glycoconjugate of dopamine (IPX-750), studies showed that it crosses the BBB, binds dopamine receptors types 1 and 5, increases the expression of tyrosine hydroxylase, attenuates the aggregation of Î±-synuclein in neurons, and eliminates symptoms of Parkinsonâ€™s disease in rodent models. A study was then conducted in marmosets that assessed the efficacy of IPX-750. Four monkeys were treated with a Parkinsonism-causing agent, for 5 days with injections on days 1, 4, and 5 followed by recovery for two months. During recovery, the animals developed Parkinsonian symptoms. After recovery, the animals were treated with IPX-750 at 160 mg per day for 4 weeks followed by a 4 week washout period. Results showed upon treatment, animals improved in bradykinesia, hypokinesia, balance, gait/climbing, freezing and tremor symptoms. Effects persist even during the washout period. Therefore, IPX-750 appears to be a good candidate for treating Parkinsonâ€™s disease.

Chris Burton, Isabella Mazzei, Hayley Nichols, Gregory Williams, Jamie Shatz

Left Atrial Enlargement and Systolic Failure is Related to Presence of Chymase in Patients with Mitral Regurgitation and Preserved Left Ventricular Ejection Fraction
Left ventricular ejection fraction (LVEF) is an unreliable predictor of outcome after surgery for mitral valve regurgitation. Chymase presence is increased in the left ventricle (LV) in multiple animal models of a pure volume overload (VO). Chymase has direct protease actions that activate matrix metalloproteinases (MMPs) and degrade extracellular matrix proteins. Left atrial size is an independent predictor of outcome in patients with isolated mitral regurgitation (MR). Here we test the hypothesis that chymase presence is related to the severity of VO in the left atrium (LA) and left ventricle (LV) of patients with isolated MR and LV ejection fraction of &gt; 60%. Serial short axis MRI was acquired of the entire heart in 10 normal volunteers and 16 patients with isolated MR to calculate LA and LV volumes. LA appendage biopsies were collected at the time of mitral valve repair surgery. MR left ventricular end
diastolic volume was increased nearly 2-fold, and LVEF did not differ from normal. LA volume was increased 3-fold, while left atrial ejection fraction was decreased 50% below normal. Aligning to previous studies of MR in the LV, transmission electron microscopy (TEM) of the LA appendage demonstrated mitochondrial disarray, blurring of z disc, myofibrillar breakdown and electron dense accumulations consistent with lipofuscin. Immunohistochemistry demonstrates chymase within LA myocytes and TEM immunogold localizes chymase in the z disc and myofibrils and within mitochondria. In the face of LVEF >60% with isolated MR, LA size is markedly increased with severe dysfunction and is related to the presence of chymase. In addition to its extracellular actions, this study identifies a potential novel intracellular chymase-mediated degradation of cardiomyocyte structural proteins and severe LA dysfunction in isolated MR.

Brittany Butts, Pamela Powell, Ryan Wong, Louis Dell'Italia

Investigating the Role of Microphthalmia-associated Transcription Factor (MITF) in Autophagy and Melanogenesis

This study aims to evaluate the role of microphthalmia-associated transcription factor (MITF) in autophagy and melanogenesis. Recently, autophagy has become a hot topic in the area of aging. Malfunctions in the formation and transport of autophagosomes is known to be correlated to cancer formation, neurodegeneration, and the progression of aging. Coat color defects have been observed in mice that are lacking in genes that regulate autophagosome formation and genes that control autophagosome turnover (Ganesan, A. K., et. al., 2008). Patients with tuberous sclerosis, a condition in which one of two genes regulating mTOR, a kinase that inhibits autophagy, is mutated and knocked down, also demonstrate hypopigmentation (Jimbow, K. F. et. al., 1975). Understanding the regulators of autophagy remains a goal in understanding aging and cancer. This study utilizes transmission electron microscopy (TEM) to assess the morphology and quantity of autophagosomes and melanosomes. Gene knockdowns using siRNA in Melan-A cells, an immortalized mouse melanocyte cell line have also been performed. Transcriptional and post-transcriptional regulation has been assessed in these knockdowns using qPCR and western blotting, respectively.

Roshan Darji, Zoya Anderson

Business, Financial, and International Studies

Strategic Analysis of Depuy Synthes

Blazer Strategy Consultants set out to examine the strategy of Depuy Synthes, a Johnson & Johnson company. Our findings are invaluable to Depuy Synthes and provide them an outside perspective on how they are doing as a company and their areas of needed improvement. We aim to uncover past, present, and future flaws in the strategy of the company and from our research and applied knowledge suggest the most helpful, and applicable solutions. First, we took a broad look at Depuy Synthes and examined their product offering, their structure, and where they are presently positioned in relation to their rivals in the medical device industry. From there, we used multiple approaches and models to determine where they should intend to go as a company and the best strategy to get there. Where is Depuy Synthes? Where do they want to go? How do they get there? We determined Depuy Synthes strategic intent and competitive position by using various tools. For example: Macro-environmental Analysis, Five Forces Model of Competition, Dynamic Industry Analysis, Strategic Group Mapping, Competitive Intelligence, Key Success Factors, Industry Prospects, and more included in our full report. Depuy Synthes is a top contender in the medical device industry; however, changing regulatory and
political climates will require future innovation to not only be focused on products, but also costs reduction. The future of the industry will be dominated by the companies who can best adapt to the new environment.

Zach Plunket, Frank Chambers, Daniel Reeves, Josh Pearson

**Strategic Analysis of the Industrial Development Board of the City of Birmingham**

The city of Birmingham has recently seen an influx of interest from large businesses and corporations, such as the most recent, Amazon, to move its operations to the city. In recent years, Birmingham has invested more time and effort into economic development so that the city can grow and become a more attractive place for these businesses. To do this, there are many different people, companies and factors that are needed to make this possible. This semester we conducted a strategic analysis of the Industrial Development Board of the City of Birmingham (IDB) to see if there is any recommendations that can be made that will give the city of Birmingham a more substantial competitive advantage against major competing cities. Birmingham’s Industrial Development Board functions to bring about new ventures and opportunities that will allow Birmingham to thrive economically. The Industrial Board is a non-profit, public corporation that is made up of representatives living within different districts of Birmingham. The Industrial Board is governed by a Board of Directors. Throughout the strategic analysis we conducted, we defined why it is important the IDB has a strategy, concluded what the company’s direction and mission is, analyzed both the internal and external environment and evaluated its resources, capabilities, and competitiveness in the economic development market. This enabled our group to find recommendations that can strengthen the company’s competitive position which in turn will increase the competitive position of Birmingham.

Rachel White, Riley McCown, Lloyd Hicks, Adam Kidd, Eric Henderson

**European Team-Based Learning**

Our group will be presenting on the nonprofit, called European Team-Based Learning Community. Our nonprofit partner is actually a branch of the larger “parent” nonprofit, called Team-Based Learning Collaborative. Like the name states, the ETBLC focuses on educators and students in Europe using team-based learning, supporting said groups, and displaying the benefits of team-based learning. Our service learning partner has given us the following project aims: 1) Identify who is using team-based learning across Europe and create a database of educators identifying their institution and discipline and capturing their contact details 2) Identifying the needs of TBL educators in Europe and based on this feedback suggest ideas for developing and improving the ETBLC 3) Identifying educational conferences to present at. We have successfully began working on our database and have created a survey to identify the needs of TBL educators in Europe. This is our service learning project.

Grace Ward, Will McKoy, Mishka Naiker, Zach Batzy

**Competitive Aggression in Leadership: What is the Impact on Students Emotional and Mental Health?**

This a study that focuses on the emotional and mental associations of students in competitive environments. To sculpt the relationship between competitive aggression and its impact on students, current UAB students of various majors, classifications, and backgrounds were surveyed. As future leaders of their communities, UAB students are subject to self-implemented stressors, as well as those from family, professors, and organization and community members. Individuals possess varying levels of
competitive aggression, depending on personal experiences and expectations, which allow this study to be representative of students who identify as being on the lower, middle, or upper level of the competitive spectrum. Healthy competition can lead to healthy stress, but for students who experience the negative implications of high competition-high stress environments, what can institutions do to minimize adverse effects?

Kristal Mayfield

Education
Senior

One of the challenges of teaching is developing activities to keep students engaged and focused while they are at school. It may be difficult for disinterested students to work hard while they are at school. Finding something that meets the needs of all students can be a challenging task. This study focused on defining an interactive science learning journal used with kindergarteners in an urban summer enrichment program. The teacher researcher planned inquiry-based science experiments and activities for students to include in their journals each day. Students’ wonderings, questions, and ideas were dictated into their journals, along with photographs documenting their experiences. Findings show that science learning journals kept students engaged in their own work. Students were able to describe the activities they completed each day, and all of the information they discovered was organized on each page. Teachers should include science learning journals into their curriculum so students can freely explore nature and the natural world through art work, close observation studies, cooking, and science experiments.

Anna Rape

What Type of Impact Could Charter Schools Have on Rural Schools in Alabama

This research aims to identify some of the issues surrounding charter schools, particularly in rural Alabama. Charter schools can provide more educational opportunities and diversity. However, there may be financial, administrative, and infrastructure problems that could impede the success of the charter schools. This project examines the aspect of school choice as charter schools are in the process of being established in Alabama and provides an analysis on how they might impact rural traditional public schools there. This research also addresses how charter schools could influence re-segregation and educational inequality. Hale County, Alabama was used as a possible scenario for a rural location for charter schools. Overall, we will compare and contrast the different viewpoints of national organizations for and against charter schools to determine whether they would benefit students in rural Alabama.

Mary Ann Jimenez, Rochelle Tuazon, Katie White, Angie Bradley, and Allie Haynes

The Effect of Legislation and Governmental Policies on Effectively Providing Nutrition Access for Needy Students in Schools

A factor that hinders the success of students is the issue of hunger caused by poverty. This research was conducted in order to see how effective government policies have been at fighting the hunger that is prevalent and prevents students from reaching their potential in American school systems. The data was obtained from scholarly research focusing on different government programs and the results of these programs on the nutrition of children in school.

Alexandra Milton, Abhi Arora, Julia Battles, Lily Mowery, Tessa Luttrell
**Evalutating Student Performance and Distribution of Academic Materials in America's Low Income Communities and Public Schools**

Education is an essential factor of our idealistic American Dream which says one can accomplish anything if they are willing to work hard enough. It is supposed to level the playing field for everyone, but other factors such as poverty have proven to lessen its effectiveness in doing so. Studies have shown an achievement gap between students based on income. Students from families of lower incomes have performed less well than students from families of higher incomes on multiple measures of academic success, particularly in respect to standardized test scores, high school completion rates, and college enrollment. Why does this income achievement gap continue to occur? How can our public schools work to make socioeconomic status less of a factor in our students’ education? States need to implement policies that work towards providing adequate school resources and programs that promote early-childhood cognitive and social development if we are to develop a comprehensive strategy to close this income achievement gap.

*Ashleigh Hancock*

**The Project Approach: A Case Study**

Differentiation of instruction, especially for students with instructional support needs, is a constant battle in K-12 classrooms. In the first week of my student teaching, I noticed a student that was easily frustrated with the work he was tasked with, especially if he felt it was too challenging. This student has an IEP and 504 Plan to address his speech difficulties and modification of learning materials. This case study seeks to provide insight on the use of the project approach with an individual instructional needs student while aligning tasks with 4th grade standards. I used field notes, tracking student engagement, during this research. I also collected work samples from the student to track the stages of the project approach, which are pictured below. I relied on the parameters of the Project Approach; Beginning the project, developing the project, and concluding the project. I concluded that the project approach was an effective approach to differentiating instruction and increasing student engagement and achievement for a student with instructional support needs. The student took more initiative in his learning and was generally always engaged when working on the project. Students must take a personal interest in what they are learning for it to have meaning. This interest should lead to engagement, prompting autonomous action and decision-making. Given proper and consistent implementation of the Project Approach in classrooms, all students would be included in the learning process and lifelong discovery and investigation would be fostered. This would prepares them to be inquisitive, action-minded citizens.

*Aldenero Dixon*

**A Comparative Case Study: School Resources, Student’s Socioeconomic Background, ACT Performance**

The ACT can be a tough test; it tests a student’s knowledge by giving each student a time limit to answer many questions in four different core subjects. While it can be tough, students are open to options that may help them increase their score and better prepare for the test, such as paid tutoring. However, not all students are prone to such preparation; and it is not necessarily their faults, either. In our case study, we are looking into ACT scores in local counties, and dissecting the statistics and results in order to see if the preparing for the ACT has a wider spectrum than simply studying and praying for the best. Specifically, we are observing the socioeconomic background of students who took this test,
while also looking into parental incomes and pondering whether each student is adequately provided with the resources in order to better prepare themselves for these tests of such high magnitude. ACT preparation helps students familiarize themselves with the test, while also learning test-taking strategies and practicing questions in order to place themselves into situations for them to improve their scores. Students with access to such tutoring have higher ACT scores, and are more likely to attend highly selective colleges around the country. It is crazy that such a thing like school funding is all that seems necessary to better prepare a school’s students for the future. All in all, we are here to prove that high-stakes tests read more than just knowledge.

Caleb Probst, Anna Parker, Kaitlyn Willis, Lindsey Reid, Charity Davis

How does music influence student involvement?
One problem that has often plagued school systems is low student engagement. Problems frequently stem from the educational environment, the educator’s teaching philosophy, and the students’ attention spans. The issue of student disengagement is problematic, because it affects student retention rates and overall success in the school system. The purpose of this research study was to better understand how music in the classroom affects student attentiveness, productivity, and understanding of the topic being taught to them. We began with the question, “How does music influence student involvement?” We conducted our research in two different school systems within the Birmingham area. Study participants included twenty pre-kindergarten students and twenty-five elementary school students with ages ranging five to eleven. We observed and worked with individual students, small groups of students, and the entire classroom to monitor any change in student behavior while background music was playing during their activities. Key findings in our research indicate that while most students could engage in their activity better while the music was playing, there were students who were completely distracted by the music all together. It should be understood that if teachers are going to play music in classroom, he or she needs to be aware of the type of genre, tone, volume, and length of music they are selecting. Music selection has an effect on the way his or her students are able to engage in the classroom.

Alex Washington, John Underwood

Engineering
Senior Design Project
The UAB Electrical and Computer Engineering department’s Senior Design project is being sponsored by Atlas and uses drone and RFID technology. Atlas currently deploys RFID tags, to be attached to equipment being stored in yards, and vehicle-mounted RFID readers, to later determine the location of the equipment by scanning for the RFID tag in sweeps of the yard. This technology could be improved with a drone-mounted device, to minimize time and effort and provide increased personnel safety, especially in cases where sweeps are manually performed using manual tablets and walking in different environmental conditions. The purpose of the project is to design and build a weather-proof, drone-mounted device that can collect and store reads of RFID tags operating at 433 MHz and provide a GPS location for each of the RFID tags within 10 meters of their actual physical location. The device supports two multiple antenna types, so two antennas were tested and compared. The device was tested at heights of 15, 25, 35, and 45 meters to determine the ideal flight altitude of the drone. The device provides a file output in CSV format which includes RFID tag number, RSSI value, latitude, longitude, altitude, horizontal dilution of precision, horizontal error, and date/timestamp.
Elizabeth Adams, Randall Walden, Jerry Smith, Daulton Smithson, Waleed Alshehri, Shijun Xia

**Oscillatory tensile forces as a mediator of breast cancer epithelial cell behavior**

Pathologic mechanical forces within the breast tumor microenvironment are emerging as potent regulators of cancer progression. Tumor growth can create a complex three-dimensional mechanical scenario of elevated compression, stretching (tension), and fluid flow. Though in vivo and in vitro reports suggest that pathologic mechanical forces play a role in the development and progression of breast cancer, little is known about how time-varying (oscillatory) forces modulate tumorigenesis. While response to oscillatory forces on embryonic, skeletal, cardiac, and vascular cells is well-studied, there are no studies examining how oscillatory forces regulate changes in gene expression of breast cancer cells. We hypothesize that oscillatory forces play a significant role in the gene expression of breast cancer cells. These forces may regulate cancer cell signaling in a way not observed with in vitro studies utilizing constant mechanical forces. We tested this hypothesis by imparting oscillatory tensile strain to breast cancer epithelial cells and monitoring changes in gene expression. RNA sequencing was done for each gene and expressed as fold changes significantly different from the controls. Results showed significant fold changes in expression for 27 genes when comparing constant to oscillatory strain, 11 genes for oscillatory to zero strain, and 8 genes for constant to zero strain, and significant upregulation of genes related to tumor migration and metastasis. These data suggest mechanosensitivity to oscillatory force in a breast cancer cell line. Subsequent analyses will seek potential pathways modulating cell function under these conditions that may contribute to growth and invasion of breast cancer.

Paige Severino, Derek Van Vessem, Tess Vessels, Kenneth Hough

**RFID Payload for Tag Detection and Drone Deployment**

In large-scale construction businesses, there are many moving parts, and those parts must be found in the stockyard and brought to the work site. To keep up with the pace of modern industry, a modern solution for locating and cataloging these vast amount of parts was created through research in engineering. By utilizing and combining existing technologies like drones, ultra high frequency antennas, radio frequency detection devices, and microcontrollers, a tag cataloging system attached to a drone was crafted in order to detect, log, and locate tags on construction equipment quickly and efficiently.

Evan Black, Isaac Reed, Solomon Hatcher, Vuthy Bou, Matt Riddle, Nitish Chauhan

**Health Sciences**

**Hypertension Free is the Way to Be**

In partnership with Urban Kids, the group identified the need to educate the children on healthier behaviors to prevent hypertension. The teaching focused on the hidden sodium in different foods and the importance of exercise. The goal of the project was to promote awareness of a healthy lifestyle through healthy snacks, sodium intake management, and exercise. The healthy Halloween party taught the children that healthy eating can be fun and tasty by making crafts out of fruits and vegetables. The sodium content awareness helped the children visualize the sodium they were eating. Zumba taught them how to prevent hypertension with exercise. The project had a positive outcome. The children learned fun ways to prevent hypertension by making healthy snacks, being aware of sodium content, as well as learning a new way to exercise. With brainstorming and teamwork, the group was able to come up with a project that incorporated ideas and topics that the director
mentioned as problems. This project was rewarding in its interactive nature. The children were excited to learn something new in order to develop a happier, healthier lifestyle. The learning aspects from this project were developing patience, flexibility, and determination.

Key'Yonnah Farrow, Baylee Gilchrist, Lanesia Martin, Presley Willoughby

Obesity has limited effects on local and systemic immune responses in subjects with clear cell renal cell carcinoma (ccRCC)

Obesity is a common comorbidity in subjects with ccRCC, but its effects on anti-tumor immunity and prognosis are still not fully understood. Our investigation seeks to understand how obesity alters the immune landscape in subjects with ccRCC by examining leukocyte phenotype and function in the systemic vasculature and local tumoral environment. Human RCC subjects and healthy controls were consented into a prospective study (n=218). Subjects were categorized into cohorts by BMI and Fuhrman grade status. Blood and tumors were collected for flow cytometric and multiplex analyses. Gene expression of the tumoral immune landscape was determined using extracted RNA for Nanostring analysis. Obesity did not change the percentages of activated CD4 or CD8 T cells in the blood, or plasma levels of IL-6, IL-8, TNF-a, MCP-1, or VEGF-A. Nanostring revealed that only 37 out of 522 genes were differentially expressed including IDO1, TGFB, and CSF1R which were all increased in subjects with obesity. The expression of all three genes is associated with poor prognosis in ccRCC (The Human Protein Atlas). In conclusion, we surprisingly found very limited effects of obesity on the immune response to ccRCC in both the vasculature and tumor environment.

Katlyn E. Norris, Gal Wald, Shannon Boi, Claire M. Buchta-Rosean, Debbie Della Manna, Laura A. Bertrand, Lewis Thomas, Jennifer Gordetsky, Kenneth Nepple, James A. Brown, Lyse A. Norian

Faculty Flu Shot Campaign

We used Hochbaum and Rosenstock’s Health Belief Model to implement a flu shot campaign. Research was completed on the background of both the flu virus and flu vaccine. We interviewed faculty and staff asking them about the 6 factors of the Health Belief Model: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. Interpersonal approaches were also discussed in the interview process. Their responses influenced our strategies in making an effective flu shot campaign. We spoke at both the Health Care Organization and Policy Faculty meeting on October 20 and the Building Services Meeting on October 17 with flyers with the dates and times of the free flu shot clinics. We spread the word to our own professors by talking to them individually about the free flu shot clinics on campus. Through making contact with the Collat School of Business, our email talking about the flu shot campaign was forwarded to all the faculty and staff of the Business School. Although we cannot directly measure how our specific campaign contributed to the overall faculty flu shot campaign, we do know that last year 1,000 shots out of 3,000 were unused and this year, there is less than 800 left to give out, thus making a successful campaign.

Tara Weisberg, Mary Kate Watkins, Kane Smith, Ash Tyler, Tracie Skinner

The Effects of Psychological Stress on the Immune System

People today are significantly more stressed than they were thirty years ago. Scientists are looking for a correlation between psychological stress and the immune system. Stress is a physical, mental, or emotional factor that causes bodily or mental tension. Small amounts of short term stress can be good for the body. Psychological stress is stress that exceeds the person’s perceived ability to cope. We
hypothesize that psychological stress negatively affects the immune system. To prove the hypothesis we studied scientific articles researching the correlation between stress and the immune system. The data from the articles showed that psychological stress was associated with an increased susceptibility to infectious diseases, decrease in cellular immune response and antibodies, and increase in duration and severity of the illness. People under increased or long-term stress showed a significantly smaller amount of time between exposure to an infectious agent and infection compared with people under less stress. From these results, we conclude that psychological stress depresses the immune system. We would like to further explore ways to prevent psychological stress. Newer scientific article: This article used a variety of subjects from mice to elderly people and med students so they limited the selection bias. There was a study that specifically looked for healthy people without describing what they considered to be as “healthy”. This could be a possibility of selection bias. There was a study where they used a stress index that could have caused misclassification of bias. There was a lot of self reported stress levels which allows for human error.

Emily Haigh, Alexa Lee, Marissa Spivey

Behavioral Change Theories Prompt Uptake Response to Influenza Vaccinations

Last year, Occupational Medicine provided 3,000 free flu shots for all UAB Faculty and Staff. However, the uptake response to these vaccines was disappointing. Occupational Medicine tasked our group with creating a campaign to achieve a better response. To base our campaign, we interviewed our target audience to learn potential motivators to receive the vaccine. The feedback we incorporated into the campaign’s developmental process included emphasizing the shot as convenient, well-publicized, and beneficial since people focus on barriers. Through researching different behavioral change theories, our group developed strategies to encourage more faculty and staff to participate. We relied heavily on the Theory of Planned Behavior, focusing on attitudes and perceived behavioral controls, and the Health Behavior Model, focusing on perceived benefits. To implement these findings into our campaign and to motivate faculty and staff to receive the free vaccination, our group spoke at five faculty/staff meetings, prepared and sent a blast email reminding them about the flu shots, created flyers and posted them around campus, and contacted the digital media staff at the Hill Student Center and Recreation Center to get our advertisement on the monitors. The results of this campaign are pending but have shown a substantial increase in the number of faculty and staff who received the shot. This finding demonstrates how behavioral science theories present in today’s public health practices and input from our target population are particularly applicable in enhancing the campaign’s relevance and appeal and in determining people’s motivations to receive the vaccination.

Morgan Epps, Mary Katherine Grondin, Juan Gordillo, Leah Holtam, Maddie Looney

The Effects of Maternal Pre-Pregnancy Obesity on Child Birth Defects

Obesity has become increasingly prevalent in the United States without assurance of being resolved in the near future. Not only does obesity negatively impact the individual, but it also causes health problems for the fetus of an obese mother. We hypothesize that maternal pre-pregnancy obesity can cause several health problems in the child before and following birth. We identified potential health complications from two previous studies: a case-control study based in Atlanta and a Belgian cohort study. The Atlanta study used subjects from surrounding counties and phone interviews were conducted to obtain the mothers’ health history. The Belgian study measured telomere lengths in cord blood and placental tissue in mothers with varying BMIs. Compiling information from these studies, we gained
a comprehensive understanding of the effects of maternal obesity on the newborn’s health. The studies showed an increase in birth defects, specifically spina bifida, omphalocele, heart defects, and shortened telomere length, associated with a higher BMI. Each kg/m2 increase in pre-pregnancy BMI is associated with a -0.50% shorter cord blood telomere length and a -0.66% shorter placental telomere length. For mothers who were obese pre-pregnancy, there was an odds ratio of 3.5 for spina bifida, 3.3 for omphalocele, and 2.0 for heart defects. Other birth defects studied had less significant or inconsistent results. The results confirmed that obesity negatively impacts the child of an obese mother. There is need for further research on the prevention of pre-pregnancy obesity.

Emily Andrews, Anveetha Matta, Scott Nguyen, Allie Stamper, and Perri von Seebach

Addiction to Processed Foods
By 2030, more than 85% of Americans are expected to be overweight, leading researchers to investigate why this could be happening. Food addiction is one proposed mechanism explaining why American’s are becoming obese so rapidly. The concept of food addiction was investigated through several studies that used the Likert Scale, YFAS, personality tests, neurocognitive task studies, and fMRI scanning. We assessed the issue by looking at different aspects and comparing results. We believe that highly processed foods share similar pharmacokinetic properties with drugs of abuse. We hypothesize consumption of highly processed foods leads to addictive behaviors, such as increased impulsiveness. We found BMI to be strongly associated with YFAS count; the most highly processed foods are more associated with addictive behavior. Evidence from multiple personality test studies implies comparable impulsivity profiles in obesity and addiction to substances (lower self-control and a tendency to make impulsive decisions in response to mood). Neurocognitive task studies support this, showing obese and addicted individuals are similar in higher impulsive decision-making and attentional bias in response to drug or food cues. Additionally, fMRI studies claim the existence of shared neural composition associated between those that are obese and addicted. Evidence determines that highly processed foods lead to addictive behaviors and supports a comparison relationship between substance addiction and obesity. The next step to further understand is to research why these foods cause addictive behaviors on a biochemical level. Understanding how exactly foods affect neural functions can lead to better treatment and prevention plans.

Levi Parker, Heather Stafford, David Russo, Mikayla Peterson

Flu Vaccination Campaign
Our honors seminar group aided in promoting a flu vaccination campaign for occupational health. Last year they had a large number of leftover vaccinations, so we used our campaign to aid them in increasing their administration. The first step in planning our campaign was to educate ourselves on the basics of the influenza vaccination, and then use this knowledge to interview a few different members of the faculty and staff on their perspectives of the benefits and barriers of receiving the shot. After conducting the interviews, we decided the best way to execute our campaign was through the use of the Health Belief Model, the Theory of Planned Behavior, and the Theory of Reasoned Action. We attended a faculty meeting to speak about the importance of receiving the free vaccination, and had a member of the staff mention the times and dates of the shots at a meeting. Next, our group created a slide featuring the dates and times of all available vaccinations to be displayed on the televisions in the Chemistry and College of Arts and Sciences buildings. Lastly, we created fliers for the last three available dates and posted them around different buildings frequented by faculty and staff. Through this
campaign we were able to aid in occupational health in administering a greater number of vaccinations thus helping to increase the overall health of the campus.

Katie Reese, Kendra Seeley, Elizabeth Matta, Yasmin Madison, Christian Skinner

Bridging the Gap Between Water Resource Education and BAMA Kids

For several years, the residents of Wilcox County have struggled to sustain a safe and healthy environment. More recently, residents within the Wilcox community raised concerns about the local accessibility and quality of drinking water. A community-based organization within the Wilcox County, known as BAMA Kids, collaborated with a recurrent partner, the UAB School of Public Health (SOPH), to address these concerns. This pre-existing relationship granted the UAB SOPH access to work directly with the residents of Wilcox County. During the summer of 2017, 8 interns and AmericaCorp VISTA volunteers from the UAB SOPH travelled to Wilcox County to work directly with over 100 K-12 students. A health education curriculum was created to focus on the acknowledgement of water sources and the importance of water safety. The program included highly interactive activities such as water filtration, mural painting and commercial water testing. The water testing activity became the most prominent due to its practicality and relevance to water safety. For this activity, a collection of water samples was taken from personal homes in Wilcox County, Wilcox county schools and the Wilcox County courthouse to detect contaminants in the local water supply. The results from the water testing activity as well as the concerns from the Wilcox community earned a response from professionals at Georgia Tech University, UAB Schools of Public Health and Pediatric Medicine to conduct medical testing for parasites. The purpose of this project was to address the concerns regarding water safety within the Wilcox community through community-based efforts.

Carmen Rainey, Samantha Sheffield, Arianna Siler, Megan Couture, Subria Spencer, Molly Robinson, Tessa Graham, Charolette Boles, April Hoge, and Amy Badham

Association of Maternal Activity with Postpartum Adiposity

Postpartum weight retention is relatively common and increases the risk for obesity. Maternal physical activity is a potentially important factor influencing maternal adiposity postpartum. This study tested the hypothesis that women who are more active will have lower percent body fat at 4 weeks postpartum. Participants were healthy, exclusively breastfeeding mothers (N=19) enrolled in an ongoing study of postpartum determinants of breastmilk composition. Maternal body composition was assessed using bioelectrical impedance analysis. Mothers were given an accelerometer and instructed to wear it around their waist for at least 3 days. Maternal step count, activity-related energy expenditure, and percentage of time spent sedentary were derived from the accelerometry data and averaged across days. Pearson and Spearman correlations were used to examine whether maternal step count, activity-related energy expenditure, or time spent sedentary were associated with maternal percent body fat at 4 weeks postpartum. Results showed that the average number of steps taken per day was inversely associated with percent body fat (r = -0.54, P&lt;0.05). However, activity-related energy expenditure was positively correlated with percent body fat (r = 0.54, P&lt;0.05). These results suggest that taking more steps, regardless of intensity of activity, is associated with less adiposity in the early postpartum period. Longitudinal studies are needed to examine whether early postpartum activity is predictive of subsequent fat mass changes. Surprisingly, activity-related energy expenditure was positively associated with percent body fat. As such, further studies should look at energy intake, as it may offsetting increases in activity-related energy expenditure.
Aundrea L. Harrison, Camille R. Schneider, Jessica S. Bahorski, Makenzie Callahan, and Paula C. Chandler-Laney

**Runx2 activity is critical for precise closure of cranial suture and fontanelle**

During skull development, bone plates are joined together by a unique cell population that resides in the various suture line. Sutures facilitate proper formation of calvaria to accommodate brain growth during postnatal development. Disruption in suture lines cells leads to Craniosynostosis, a condition in which the skull plates fuse prematurely causing developmental abnormalities and cognitive impairment. This premature suture closure is commonly noted in individuals with Down syndrome. On the other hand failure or delayed closure of sutures leads to Cleidocranial dysplasia (CCD), a condition characterized by open fontanels and teeth abnormalities. CCD is caused by haploinsufficiency of the Runx2 gene. Runx2 is a nuclear transcription factor essential for skeletal and cartilage development. The role of Runx2 in suture cells for intramembranous bone formation especially cranial bones is poorly understood. The purpose of this study is to identify role of Runx2 gene in suture and fontanelle osteoblasts and chondrocyte. Runx2 gene was deleted in osteoblasts using Cre-recombinase driven by the Collagen 1a promoter and in chondrocytes by the Collagen 2 promoter. Gene expression profile at the junction of suture and fontanelle in wild type and Runx2 mutant mice was assessed by real-time PCR. Histological analysis of the skull from wildtype, Runx2 heterozygous and homozygous littermates are ongoing to establish cell specific contributions of Runx2 during postnatal closure of fontanelle and cranial sutures.

Alyssa Patel

**Association of Notch-4 with Lean and Fat Mass in Children**

One in five school children between ages 6 to 19 years old are obese, as defined by excess body fat in relation to height. Since 1970, the number of children with obesity in the United States has tripled. Obese individuals have increased risk of heart disease, diabetes, and non-alcoholic fatty liver disease (NAFLD). Understanding mechanisms contributing to obesity would improve health outcomes. Fat deposition, which requires de novo adipogenesis and crosstalk with the vasculature, is a key step in obesity development. The Notch-4 receptor is known to regulate vasculature development, however, little is known about the role of Notch-4 in processes of fat acquisition and accumulation throughout the lifespan. The purpose of this study was to evaluate potential contribution of Notch-4 to body composition parameters in a multiethnic sample of Birmingham metropolitan children. Measures of fat, lean and bone mass were determined by dual-energy x-ray absorptiometry (DXA) as well as height and weight. Genotypic data was obtained from the Metabochip consisting of 200,000 SNP markers across the human genome. Our results show statistically significant genetic associations of SNPs in Notch-4 chromosomal region with lean and body fat, particularly with SNPs rs9267833, rs430916, and rs2071279, at an alpha level of < 0.001. Given that Notch-4 is known to regulate vasculature through VEGF and other mechanisms, our data suggest that both lymphatic and circulating vascular development are required for fat deposition at early stages of the lifespan.

Jaelynn A Lawrence, Jose R Fernandez, PhD; Fred E Bertrand, PhD

**Community Health Behavior Change Flu Shot Campaign**

Last year, Occupational Health supplied 3000 flu shots for Faculty and staff; however, only 1000 of them were delivered, leaving 2000 to go to waste. This year, our Honor’s Seminar on How People Change dealt with the psychological processing behind motivating the faculty and staff to participate in the Flu
Shot Clinic. Because of the extensive nature of this project, we had a substantial planning process to best develop an effective campaign to motivate the entire UAB Faculty and Staff to get vaccinated. We began by doing interviews with a faculty and a staff member to fully understand our target audience and what their opinions were on the best ways to approach this endeavor. Next, we developed a plan of action to be prepared for the series of weeks the clinics would be active. Our group went to multiple faculty and staff meetings to spread the word in person to faculty and staff of different schools in UAB, made a connection with the Commons’ staff to inform them of the clinic schedule, and broadcasted the schedule through multiple blast emails and other electronic medias through each of the school in an attempt to boost the quantity of shots given this year. This season, 1435 flu shots were given thus far.

Kaitlyn Cox, Douglas Dapp, Cody Cook, Hunter Curtis

Effects of Family Size on Safety Knowledge in Uganda

Unintentional childhood injury is a serious and escalating global health concern, particularly in low and middle-income countries (LMIC) where 98% of these injuries occur. Proper supervision reduces children’s injury risk. In LMIC, children are frequently supervised by siblings. This study explored predictors of siblings’ supervision knowledge in Uganda. 206 sixth-graders were recruited from three rural Ugandan schools. They completed a demographics questionnaire and assessment of supervision knowledge (multiple choice quiz assessing supervision techniques and responses to specific hazards). Demographic predictors of supervision knowledge were analyzed using multiple regression. Maternal education ($t(204)=-2.46, p=.015$), and household adults ($r=-.204, p=.003$) and children ($r=-.148, p=.034$) were related to knowledge about supervision. Further, the association between total adults and children varied by school attended and maternal education. Hierarchical multiple regression assessed the ability of adults in the household, children in the household, and their interaction to predict supervision knowledge after controlling for school and maternal education. The total variance explained by the model was 10.3%, $F(6, 199) = 3.796, p=.001$. Adults in the household and school attended significantly accounted for unique variance in supervision knowledge ($t=-2.419, p=.016$; $t=2.474, p=.014$, respectively). Sixth graders’ supervision knowledge is partially predicted by the school they attend and the number of adults in their household. Additionally, among children whose mothers have more than a primary education, fewer total adults in the household is associated with higher supervision knowledge.

Miles E. Erbe, Marisa Swanson, Jennie B. Rouse, & Dr. David C. Schwebel

Flu Shot Campaign

This year, we worked to implement a flu shot campaign in efforts to maximize the number of participants to receive a flu shot. We began by researching pros and cons of the flu shots, along with learning about various health behavior theories that could be applied to our campaign. In addition, we were able to gather information from UAB staff and faculty through interviews. Generally, the responses were that accessibility was a major factor when going to receive a shot. Upon gathering this preliminary information, we began to implement our campaign through emails, flyers and speaking at faculty/staff meetings with the research and responses from interviews. The Health Belief Model was our primary theory to encourage staff and faculty to get a flu shot. Because the choice of receiving a flu shot was the individual, we chose the Health Belief Model to target individuals’ perceptions of the flu shot. Addressing common misconceptions (perceived susceptibility/severity), the benefits of the flu shot (perceived benefits), as well as the small costs, all played a factor into messaging provided at staff/
faculty meetings. To address the accessibility issue, we passed out flyers of dates, locations, and times of all the flu shots that were to be administered.

Elizabeth Choe, Lily Bond, Abby Chaplin, Ciara Cameron, Charity Cheese

Physical and Applied Sciences
Manganese-52 Production Cross-Section Measurements via Irradiation of Natural Chromium Targets

$^{52}$Mn ($t_{1/2} = 5.6$ d) is a novel positron emitting isotope with the potential for molecular imaging of longer biological processes or investigating manganese-specific applications. Our aim is to investigate the cyclotron production of $^{52}$Mn, and impurities by measuring the cross-section for proton energies between 16-24 MeV through the natCr(p,x) reaction. The majority of previously published $^{52}$Mn cross-section measurements are for proton energies less than 16 MeV. Our work will expand these measurements to higher energies. A stack of natural chromium target foils and copper monitor foils were placed in a niobium coin target holder. The Nb holder is two-millimeter thickness to fit in the UAB TR24 cyclotron coin target, with a one-millimeter divot. Each target stack included two natural chromium foils (54 mg ≈ 95μm thickness), with two natural copper foils (14 mg ≈ 20μm thickness). The first copper foil faced the proton beam was used to measure the energy. Varying energies between (16-24 MeV) were used for target bombardment. After bombardment, the foils were allowed to cool for at least two days and measured using a high-purity germanium detector. The $^{52}$Mn cross-section reached its maximum at 16 MeV with a peak of 82 mb. $^{54}$Mn was found to have a relatively low cross-section with a maximum of 9mb at 16 MeV. $^{51}$Cr production started at 16 MeV with a 22mb cross-section, which increased to reach 770 mb at 19 MeV. Our results contribute to the existing data set for optimized cyclotron production of $^{52}$Mn at higher proton energies.

Retta El Sayed, Adriana Massicano, Suzanne Lapi

Service-Learning
Does Affirmative Action Ensure Educational Opportunities to Underrepresented Students?

Affirmative Action was created to favor those who suffered from acts of discrimination and provide equal opportunities for minority group members. By examining historical examples and famous court cases, this study investigated whether Affirmative Action serves as positive or negative discrimination against students. Data demonstrated that current affirmative action policies are counteractive, giving preference to minority students and therefore, increasing discrimination against non-minority students. While student body diversity is the ultimate goal of affirmative action, current policies have not benefited students in the college admissions process. Instead, Affirmative Action policies have taken away opportunities from students who may be more prepared for elite colleges, but not necessarily considered a minority student due to their advantages. Upon entering colleges, many of these minority students are not able to succeed in more rigorous classes or integrate successfully in high-pressure environments, as they have been admitted to a college majorly based on their race rather than merit. Thus, Affirmative Action has proven counteractive to its original purpose, because it has failed to promote diversity or classroom integration and clashes with the concept of merit-based achievement in the college admissions process. After conducting this investigation, research showed that it would be beneficial if higher education institutions assessed students on numerous other factors, through an evidence-based approach. This approach would be better justified, as it would express sensitivity to
multiple dimensions of disadvantage, such as socioeconomic factors, rather than solely giving preference to race-based minority groups.

Neha Balachandran, Ashley Gish, Anna K. Presnall, Tanya Shenoy, Tanvee Sinha

**Therapeutic Tailgating: Serving Homeless Men through Planned Recreation**

The Firehouse Shelter addresses the complex needs of chronically homeless men. The shelter provides: safe lodging, meals, clothing, and social. Although the shelter meets basic survival needs, it lacks programs for healthy recreation to build social skills and self-confidence. To provide opportunities for Firehouse Shelter clients to experience relaxation and positive social interactions through participation in games, movies, and structured discussions. Based on Alabama’s seasonal college football culture, weekly sessions incorporated classic tailgate activities, table games, and a film series built around a football or family theme. Activities were designed to relieve stress, allow for self-reflection, encourage discussion, reinforce self-worth, develop personal goals, and build hope. Client response was evaluated at the end of each session using structured interviews to gauge satisfaction and solicit recommendations for the next group of activities. Clients engaged positively with a preference for film and discussion. Interactions were relaxed and clients spoke freely about their life experiences, families, and aspirations. These findings are consistent with the benefits of recreation to the homeless reported in the literature. It was a challenge to build trust. This challenge was met by using therapeutic communication techniques that emphasized positive engagement. This experience resulted in a deeper understanding of the effects of homelessness and developed the team’s empathy for homeless men.

Austin Byrd, Hannah Haley, Devin Lovett, Ariel Williams

**Diabetes - Don’t Sugar Coat It**

Alabama Community Care (ACC) is a non-profit organization that provides care and education to participants with chronic health conditions in Tuscaloosa and surrounding counties. The student group identified non-compliance and lack of education about diabetes as a problem within this population. The purpose of this project was to make diabetes information more accessible and user-friendly for the staff and clients at ACC to improve the clients’ knowledge of the diabetes diagnosis. The group observed home visits and discussed educational challenges with the staff, identifying diabetes patient information was lengthy and difficult for patients to understand. A concise handout of Medicaid approved diabetes education was developed. The handout included information about foot care, nutrition, blood sugar monitoring, hypo and hyperglycemia, and tips and tricks specific to diabetes for use during home visits. Specific questions to assess client understanding of diabetes were asked before and after client education using the handout. The staff perceived the pamphlet as beneficial for their educational purposes. The group educated three clients using the pamphlet. Client’s verbalized a better understanding of their diabetes diagnosis after the intervention, stating the document would be a helpful reference. Medicaid approval is often a challenge and was overcome by the student group through use of only Medicaid pre-approved materials. The pamphlet will provide ACC staff a resource to improve the education for clients with diabetes. The knowledge gained through this experience prepared the student group for effective communication with vulnerable populations in the community.

Danay Clark, Courtney Schill
The Rural Cook and Southern Cooking Done Light
Project Horseshoe Farm day program promotes health and combats the social isolation of rural living among adults with psychiatric disorders and cognitive impairment. It provides a place for companionship and access to a wellness clinic. Due to their rural lifestyle, members of this community often suffer from disorders that arise from obesity; particularly diabetes, hypertension, and heart disease. To help participants explore ways of adopting healthier versions of favorite foods and engage in positive physical and social activities. Program participants were surveyed to determine their food preferences. Recipes were adapted to ensure that they were affordable and reduced in calories, sugar, saturated fats, and sodium. In addition, nutritional value in terms of fiber, lean protein, and vegetable content were maximized. Participants worked with the team to prepare the food. They also engaged in activities that reinforced healthy eating, celebrated the cultural aspects of food, and encouraged physical movement. Effectiveness was evaluated qualitatively from staff feedback and by direct observation of participant satisfaction. Participants enthusiastically took part in cooking and other activities. Cost per serving was less than $2.00. Feedback from participants was positive and most approved of the lighter versions of favorite foods. Communication with some participants, particularly those with cognitive impairment, was a challenge. Using a familiar schedule to structure activities improved communication and helped participants understand their roles and expectations.

Ansbea Brock, Kodi Cooper, Madison Hollingsworth, Gretchen Schnader

Healthy Snacks for Tiny to Tot
Nurse Family Partnership (NFP) delivers home visits to vulnerable first-time mothers and their families, providing parenting education and basic health care. Lack of proper nutrition in low-income families is a major issue in this population. The purpose of this project was to provide nutritional education to first-time mothers on cost effective snacks. The group discussed with the staff the needs of the first-time mothers, determining nutritional knowledge as a major issue. Research was conducted about the foods covered by Women Infants and Children (WIC) and food stamps, including prices of approved items at Walmart. The deliverable was a “Healthy Snacks from Tiny to Tot” cookbook including: (1) items covered by WIC and food stamps; (2) food prices from Walmart; (3) feeding tips per developmental stage; and (4) steps to read a nutrition label. The group provided each nurse at NFP a laminated and bound cookbook for use doing home visits along with a printable pdf for delivery to each client. Each nurse has a case load of 25 clients with an estimated outcome of educating 75 first-time mothers per calendar year with the cookbook. Staff response was positive, regarding the usefulness of this educational tool. This service experience reinforced class material providing the group an opportunity to educate on accessibility of fresh fruits and vegetables and child feeding practices. The social determinants of health played a major role in understanding dilemmas faced by clients in the community.

Ciara Spencer and Teyana Taylor

Vaccination Proclamation: Homeless Edition
Urban Ministry serves the low income and homeless population of Birmingham with “Compassion and Wholeness.” This population is at increased risk for the flu, so they will be provided with free vaccines, information, and flu kits in order to reduce risk of infection. The aim of this project is to promote wellness by providing flu vaccines and education to a vulnerable population. Supplies and information regarding the flu vaccine were gathered to provide to the homeless population of...
Birmingham. Administration was performed at Safe Haven and Linn Park where flu vaccines, flu kits, and information were provided. Data was collected about individual’s risk factors. The goal was to provide preventative measures for this vulnerable population by making vaccinations accessible and providing preventative information regarding the flu. The flu clinics took place at Safe Haven, a permanent supportive housing location for mentally ill persons who were once homeless, and Linn Park, a popular location for transient homeless. At Safe Haven, 14 flu shots and flu kits were administered. At Linn Park, one shot was administered but seven kits were provided along with additional teaching. At Urban Ministry, nine flu shots were provided to clients and staff. The population reached was thankful for the opportunity to be vaccinated. They enjoyed the items in the flu kits even if they chose not to get the vaccination. During time spent with the homeless, the group learned to be nonjudgmental and open-minded.

**Jasmine Grady, Sydney Surret, Jamie Wood**

**Our Rivers Run Deep: Implementing Outreach to Advocate for the Coosa**

We partnered with Coosa Riverkeeper for our Service Learning project. While partnering with this non-profit organization we were required to assist in informing the community of water quality, fish advisories, and how they relate to public health. Our initiative was to create infographics to show how water quality is a growing issue and Coosa Riverkeeper’s involvement within the community. We created field trips that were designed for elementary and middle school-aged children which included Alabama State learning standards for science class topics such as soil and erosion, water use and pollution, and biodiversity. Our goal was to educate the community of Coosa Riverkeeper’s mission to protect our rivers as well as use quantitative data to show the trends of water pollution in our state. For instance, in 2017, Coosa Riverkeeper monitored 20 sites for 20 weeks out of the year, increased text message alert subscribers by 220%, and patrolled the river over 40 times. Informing the public of these issues will not only help create healthier communities, but will also allow Coosa Riverkeeper to receive more funding for future projects and increase their outreach.

**Angela Monahan, Mark Austin Merritt, Aidan Ryan, Haneen Mohammad, Laken Grissom, Mickeah Hugley, Therese McCaw, Jamia Haynes, Miles Erbe, Raven Johnson, Ingrid Chapman, Allyshia Hinton, Chase Bower, Bijal Vashl, Lynnette Burton, Katie Schlotman, Ramon Jeter, Tyler Hill Whatley, Trevor Darnell**

**Influenza prevention in UAB service workers through vaccination education**

UAB Occupational Health & Safety was established to provide safety measures to employees who are exposed to hazardous wastes and materials. OH&S offers vaccinations to laboratory researchers and building service workers. The gap in knowledge among the population regarding the benefits of vaccination limits the ability of OH&S to protect the community and has created a need for proper education on the annual influenza vaccination. The goal of this project was to create an educational pamphlet with information about the influenza vaccination which could be distributed throughout the community. An educational pamphlet, consisting of information about the influenza virus and common misconceptions surrounding the vaccination, was produced. The pamphlet was targeted towards UAB campus employees, specifically building service workers and laboratory researchers serviced by Occupational Health & Safety. The pamphlet was designed as a teaching tool that could be used to decrease vaccine hesitancy and misinformation among this community population, as well as provide dates and locations of local flu clinics. Copies of the pamphlet were placed adjacent to the sign-in sheets.
at ongoing flu clinics and the effectiveness of the pamphlet was examined through a survey of the clinic participants. Twenty clinic participants were given a two-question survey regarding the effectiveness of the educational pamphlet. All twenty participants agreed that the pamphlet was easy to read and to understand. Seventeen out of twenty participants agreed that the pamphlet cleared up possible misconceptions about the influenza virus and/or flu vaccine. The overall response to the pamphlets by the Occupational Health & Safety staff as well as the community staff was positive. The survey demonstrated the pamphlet’s effectiveness in presenting information and misconceptions about the influenza virus and the influenza vaccination in simplified terms.

Danielle DuBay, Emily Warren

Moving and Grooving with First Light
First Light is an emergency shelter for homeless women and children. It also provides permanent housing to a group of women with long-term psychiatric disorders. To encourage sedentary older women with mental illness to become more physically active and socially engaged through exercise. A seven week exercise program consisting of line dancing, chair exercises, and Wii games was designed to improve balance, endurance, strength, and flexibility. Social engagement was supported by including the women in activity choices. Evaluation of program effectiveness was measured qualitatively through a 5-question survey along with direct observation of participant response to exercise. Nine women ages ranging from 40-85 with mental illness participated in the exercise program. Seven out of the nine women participated every week for six weeks. All seven women reported feeling a raise in heart rate and feeling refreshed after exercising for 30-60 minutes. Two of the women reported downloading music to perform line dancing and stretches independently beyond the program each week. Most of the women enjoyed the program and would like to continue doing it. However, the two women that didn’t participate in the program had personal activities outside the facility. It was a challenge to get all the women to participate consistently each week due to competing personal obligations. The team built positive relationships with the women and observed warm and supportive exchanges among them. First Light staff will sustain the program as designed.

Sade Beck, Ashley Mealer

The Importance of Utilizing the Influenza Vaccine
Cooper Green Mercy Health Services, located in Birmingham, Alabama, provides ambulatory care to eligible patrons of Jefferson County. Their goal is to provide clients with resources and knowledge about preventable illnesses and teaching the importance of managing their personal health. Providing information about the influenza vaccine will, in theory, decrease the occurrence of illness in the population and aid in preserving the client’s overall primary health. The goal of the service project is to inform consumers about benefits of the influenza vaccination, ultimately increasing vaccination rates. The project team plans to target and serve the consumers at Cooper Green by providing them with a brochure answering common questions about the vaccination. The objectives are to educate consumers about the influenza vaccine and provide resources to obtain it. They plan to implement this by handing out an educational brochure, with the goal of increasing education about the vaccine and ultimately increasing vaccination rates among this population. The collected data revealed that education provided to the consumers of Cooper Green resulted in a better understanding of the flu vaccine, but in turn, would not be enough to go to their primary care provider or outside source to receive a vaccination due to limitations, including transportation and financial status. In conclusion, after education was provided
to the consumers about the influenza vaccine, they had a better understanding about the flu, the vaccine and the myths surrounding it, but ultimately were not inclined to receive a vaccination for themselves.

Caroline Concannon, Mary Hulcher, Madison Millsaps, Megan Smith, Whitney Pollio MSN, RN

Healthy Food Choices
Eaglesâ€™ Wings (EW) is a non-profit organization providing social opportunities and care for people with chronic disabilities age 21 and older. A problem facing participants is obesity secondary to unhealthy eating habits. The purpose of this project was to educate participants on healthy food options and promote better independent food choices. The group administered a survey to eight EW participants, assessing eating habits, preferred foods, and healthy options. A teach-back lesson plan demonstrated: (1) healthy food group choices; (2) interpretation of a food label; and (3) cooking easy recipes. The lesson was delivered in small and large sessions. After the lesson, the group went to restaurants and guided participantsâ€™ menu choices. The second part of the project was a grocery store scavenger hunt. An identical post-test survey was administered to eight participants (six took the presurvey) following the lesson and scavenger hunt. Participants chose healthier food options independently in restaurants after the lesson. Throughout the scavenger hunt, participants demonstrated how to analyze food labels. There were significant differences between the six participants in their responses on pre-and post-survey with most showing improvement. This project demonstrated the value of educating people with chronic disabilities about the importance of healthy eating. The experience impacted the group by providing an understanding the situations this population faces and how nurses can improve their health.

Sarah Kisling, T’Yanna Walker, Averi Warren, Matthew White

Beyond the Border: A Nation of Immigrants
Our American Literature class explored the idea of America as a nation of immigrants through literature, such as _My Ántonia_, _We Need New Names_, and _Song of Myself_. To further explore the immigrant experience outside of the literature classroom, our class split into groups and volunteered with elderly ESL students at the Collat Jewish Family Services. These students were Jewish immigrants from Russia and Ukraine who left their countries due to persecution of their religion. Our volunteer experience included a lesson utilizing their new Kindles, where we were able to help them navigate through several new apps and functions. We then returned to conduct StoryCorps interviews with two of the students. We were able to hear first-hand their stories about coming to America and their overwhelming love for their new country after their immigration. In addition, the interviews were sent to the Library of Congress to preserve their voices and stories indefinitely. These interactions allowed us to meet and communicate with immigrants and compare their experiences with the ones found through literature, expanding on our knowledge of what it means to be in a nation of immigrants.

Hanna Howard, Tate Pollock, Morgan Lafoy, Kelton Brown, Justin Randall, Nick Thrower

Two Steps to Staying Alive: A Hands-Only CPR Approach
The Birmingham Fire Rescue Service (BFRS) provides emergency medical services to the residents of Birmingham and responds to numerous cardiac arrests each year. Residents suffering a cardiac arrest may not receive cardiopulmonary resuscitation (CPR) intervention until medical personnel arrive on scene, but they could have benefited from laypersons intervening. Currently, there is a lack of
knowledge in the Birmingham community about how to perform CPR which decreases the likelihood a knowledgeable layperson will witness the cardiac arrest and intervene. The purpose of the service project is to educate the community on Hands-Only CPR and its benefits. The Hands-Only CPR education will be offered at a booth during the Birmingham Fire and Rescue Expo targeting all ages. The booth demonstrates Hands-Only CPR to individuals attending the expo by utilizing CPR Manikins. The goal for this interactive teaching method is to increase knowledge and confidence regarding CPR performance among laypersons. The desired goal is to educate as many people as possible on the benefits of Hands-Only CPR. The project instructed over 100 laypersons on how to effectively perform Hands-Only CPR. This project served to overcome a knowledge deficit in the Birmingham community on performing Hands-Only CPR and its life saving effectiveness. Through the exposure of the expo over 100 individuals were trained on Hands-Only CPR. The level of community interest supports the conclusion that expanding a project of this nature will increase knowledge and confidence in the performance of CPR and increase the number of lives saved.

Matthew Walker, Michael Williams, Adam Wilson

Stay Alert-Don't Get Hurt!
Cornerstone Elementary School is an International Baccalaureate School in the East Lake community of Alabama. In order for Cornerstone to reach its full potential, the school administrators desire to inform their personnel on the proper protocol for emergency responsiveness to comply with Department of Human Resources regulations. Knowledge deficits on emergency responsiveness were identified through a school personnel self-assessment. In the Community Impact Project, the objective is to educate all school personnel on Cornerstone Elementary School’s emergency response policies and demonstrate proper medication administration. PowerPoints, posters, and first aid supplies were utilized in the community group to provide an educational seminar on emergency response policies for school personnel. The PowerPoint presentation includes information on anaphylaxis, asthma, diabetes, seizures, Cardio Pulmonary Resuscitation, and Automated External Defibrillator. After educating the school personnel, there will be enhanced knowledge on emergency responsiveness as evidenced by self-assessment scores. The project goal is to increase knowledge and confidence levels for school personnel regarding emergency response policies. School personnel demonstrated an increase in knowledge of emergency responsiveness as evidenced by improved scores on the self-assessment. School personnel reported an increase in confidence regarding emergency responsiveness. On average, confidence levels for school personnel increased by 57% following the educational seminar. School personnel were allowed 30 minutes to attend the emergency responsiveness educational seminar, which restricted the depth of explanation for each topic. In the future, it would be optimal for school personnel to attend a 45-minute educational seminar to permit more in-depth presentations.

Allison Carter, Chad Mendiola, Kimberly Peek, Sirena Rabb

Culture Shock: The International Student Experience at UAB
Our motivation for this project is to test the hypothesis that the perception international students (along with anyone moving to the states for prolonged periods) have of the United States can affect their student experiences. We approached this idea with an "expectation vs. reality" focus, in order to qualitatively analyze the international student experience at UAB. The Kolbs Experiential Learning cycle was utilized by meeting with the international students on a weekly basis, and using their personal experiences for our data. From this, we noted changes in their independence and personal growth,
comfort (language barriers, building relationships, etc.), family values, and expectations. To conclude, we also drew parallels between their personal experiences and the global perception of the US.

Odion Ovbiagele, Megan Dubansky, Gracie Carmichael, Sade Gabier, Kaylee Cowart, Lyndsey Shelton

Discovering Traidhos: The App vs. The Platform
For our Service Learning project, we were supposed to create and give recommendations for an App to support marketing to schools around the world for Traidhos Three-Generation Visiting Schools Program in Chiang Mai, Thailand. We were expected to research styles of apps and review, critique, and make recommendations on how they could improve their online presence. Once we began this project we determined that it would be easier if they did not create an App, and instead if they just focused on improving their social media presence as a way of marketing the Visiting Schools Program. We thought it would be better financially if they improved their social media, mainly Instagram and Facebook, as this is a relatively inexpensive way of increasing their presence online and becoming more visible to potential customers. We transpired that in order to increase their social media presence, the company can encourage their previous and future customers to like their pages as part of the booking process and encouraging parents to stay up to date on their children’s activities through the company’s social media. We also recommended that the company should be posting relevant and enticing images and videos on their social media profiles. In the future once they have built a social media presence, then the organization can reevaluate whether creating an app is best for the company.

Maggie Johnson, Rudi Hunter, Tori Smith, Demi Mayweather

Pre-school Health Screenings
New Rising Star Church provides a preschool education program that provides educational, cultural, spiritual and personal enrichment for each child. Health is an important factor in sustaining educational development. BlueCross BlueShield recommends annual health screenings for children four years and up. The project will provide health screenings for preschoolers to increase their potential in educational achievement. The focus of the project is twofold. Firstly, the project team (PT) will perform early detection of vision, growth, and weight abnormalities for ages 4 to 6 years. Secondly, the PT will provide a demonstration of correct dental hygiene. The objectives will identify students with health abnormalities, educate faculty, and inform parents of the findings. The project will be beneficial in detecting potential health complications. Objectives will be implemented by performing health assessments including height, weight, BMI, vision, and scoliosis screening and teaching proper dental techniques with disclosing tablets, toothbrushes, and toothpaste. The children were split into stations for the screenings and dental activity. After screening seventeen children, the PT discovered one child needed referral from optometrist. Ten children assessed had a BMI under 18, which classified them as underweight. One child assessed had a BMI of 23, which classified them as overweight. One challenge the PT faced was that the children could not read; the PT used a Kindergarten Eye Chart that included different shapes. The project team was rewarded by improving a child’s educational journey. In conclusion, health screenings help to avoid future health complications and support educational development.

N’Dea Brooks, Tanner Masters, Karen Salanguit, Carrie Sudderth
Smoking Cessation for Mothers
The Aletheia House mission is to, “empower individuals, and the communities in which they live, with skills and services they need to be responsible for their own well-being.” An issue identified among the residents is smoking during pregnancy. The goal is to address smoking cessation during pregnancy and the negative effects of smoking on the mother and baby. An educational session on smoking during pregnancy, and techniques of smoking cessation was presented. Healthy alternatives, handouts, and free resources were provided. Healthy snacks and water were offered. The program began with a twenty-five minute Zumba class, followed by a thirty-minute session on the harms of smoking and techniques for quitting. During the session other alternatives were provided. The teaching included a pre-test and post-test. After the session twenty-five percent more of the questions were answered correctly. The clients discussed ways they had tried to quit and learned ways to get support. Handouts were provided describing techniques and resources available to quit smoking. There were three women that expressed interest in immediate smoking cessation. One of the biggest challenges was the fact that some of the women were in their third trimester and did not want to engage in exercise. Future sessions could include implementing other healthy alternatives such as yoga. Three women expressed plans to quit smoking after this session. Knowledge related to smoking cessation education and addictive behavior were increased in this clinical group.

Meg Jefferson, Salome Maganga, Hayley McGowan, Ashlee Price

Educating on Women's Health at Jessie's Place
Jessie’s Place is the women and children’s shelter of the Jimmie Hale Mission. It is a haven for homeless women and children seeking shelter while preparing to reach self-sufficiency. While these women face many obstacles, lack of knowledge concerning common women’s health issues is the problem this project will focus on. The project goal is to provide a curriculum brief to educate Jessie’s Place residents on common women’s health issues. The staff at Jessie’s Place will be using this curriculum brief to create educational lesson plans. This community partner is being served by students creating a curriculum brief about common women’s health issues to use in lesson plans. Women residing at Jessie’s Place are the target population. The objectives for this project are for the women to overcome a knowledge deficit regarding common women’s health issues. The staff at Jessie’s Place will implement the lessons. The hope is to support increased awareness about women’s health, prevention strategies, and resources for medical services in the Birmingham area, if needed. The results of the project will not be determined until the students leave their community clinical. The desired effect of the curriculum brief is to support the residents of Jessie’s Place to become knowledgeable about common women’s health issues, healthy lifestyle choices, and illness prevention. It was a rewarding experience to interact with the residents at Jessie’s Place and learn more about their lifestyle and how students could better serve them through providing education on women’s health.

Kendra Spain, Miranda Hobbs

You, Your Baby, and Stress
The Greater Alabama Health Network (GAHN) serves vulnerable pregnant women in West Alabama to ensure prenatal care through Medicaid. After birth, new parents often experience stress, leading to an increased risk of neglect and child abuse. The purpose of this project was to educate new mothers on techniques to address parental stress often associated with the care of a newborn. Programmatic intake
of new mothers is the first step to initiate prenatal care at GAHN and the student group noted mothers experiencing stress during this process. Staff reported pamphlets are a useful educational tool. The group developed a pamphlet for new mothers to be distributed in the initial intake materials. The educational objectives of the pamphlet were: (1) define stress and Shaken Baby Syndrome; (2) identify ways to relieve stress; and (3) recognize cues of newborn distress. The pamphlet will be distributed to each expecting mother during intake at GAHN and staff were positive about the stress educational tool. This project enabled the group to learn about the different stressors rural mothers face and how nurses can address this problem. Stress is an important issue that most new parents experience. The group hopes the pamphlet will provide new mothers with healthy coping mechanisms and reduce the occurrence of neglect and child abuse resulting from parental stress.

**Sharice Dodson, Jamie Long**

**Expanding Community Participation through Interactive Nutritional Education in the East Lake Community**

The East Lake Market PEER Inc. exists to create a community center for the under-resourced community of East Lake by hosting incentive programs around fresh food. The East Lake United Methodist Church provides affordable lunches during the week to promote community involvement and access to healthy food. The community lacks access to healthy foods and has a knowledge deficit about the relationship between nutrition and health. Our purpose is to provide nutritional education for the under-resourced participants in the East Lake United Methodist Church's incentive program to support healthy food choices. The plan is to reach out to the elderly population at the church and create programs that would encourage community participation each week. A three-week blood pressure screening and nutritional bingo game hosted at the church supports the goal to provide nutritional education. The objective through these activities was to educate participants on healthy food choices, encourage program participation, and foster interaction with other community members. The community was informed of these activities through flyers and word-of-mouth. Over the three-week period, 15 community members got their blood pressure taken. During the nutritional bingo games, at least three members came to play bingo and communicated a great deal of interest in changing the way they eat. The biggest challenge was getting community members to stay after lunch to participate in activities. At the end of the project, it was encouraging to see an increase in participation and members verbalizing their intent to eat nutritious meals.

**Ridley Brown, Andrew Doumar, Alannah Hill, Anna Rasavong**

**Improving Police-Community Relations in Birmingham, Alabama**

Impeded police-community relations is a current American issue of national importance, but an especially prevalent issue here in Birmingham, where the police force has been misused over the history of our city. This project seeks to open dialogue between targeted Birmingham neighborhoods the police bureaus of that district. By opening dialogue and fostering positive relationships between police officers and community members, we hope to humanize both parties to one another in an effort to reduce aggressions and misunderstandings on either side. Partnered with Alaquest Collaborative Education and their existing Communisafe program, we organized meetings in one neighborhood that has previously held a Communisafe event and two new neighborhoods. We organized a roundtable discussion with members of local police departments and key members of the given community (chosen through application completed by community participants). We developed a curriculum for the evening and will
lead a guided discussion designed to break down barriers between the parties. Two of our three Communisafe events will take place in the coming weeks, but already we have identified a key challenge: having the issue recognized and legitimized without involving existing political agendas. The current state of our national politics have made some participants weary of participating due to anticipated political significance or backlash. This project is a key strategy in eliminating the growing hostility in our culture. The findings and further use of this project will add to the other ongoing strategies to curb this issue plaguing American society.

Megan Dubeansky

Promoting Healthy Eating and Physical Activity in Preschool Children

“Building a foundation for the future,” the mission of the YMCA, is integrated into the Kindergarten Readiness program. The Kindergarten Readiness program focuses on school readiness skills for a mainly Hispanic preschool population. Obesity prevalence among preschool children is 20%, with higher rates among minority (African American, Hispanic) children residing in rural areas. Promoting early adoption of healthy habits (nutrition and physical activity) in preschool children is important, because it reduces risks of developing cardiovascular disease in adulthood. To provide educational sessions for preschoolers on the importance of healthy habits at a young age, and that being healthy can be fun. Physical activity and nutrition concepts were introduced to the children using three activities. The educational activities, incorporating developmentally appropriate strategies, focused on healthy fruits, exercise games, and a “know your body” style activity. The lessons were interactive. Three 20 minute educational sessions were held during the regular program session, and 16 children participated (94% minority, 11 girls, 5 boys). The activities were hands-on, including tasting and feeling fruits and coloring worksheets. Girls were more likely to engage in the activities compared to boys; however, both groups appeared disinterested in the activities after 10 minutes. Lifestyle habits, such as physical activity and nutrition, are learned early in life. Preschool children can participate in educational sessions to learn physical activity and nutrition health habits. The challenge is, however, parental reinforcement of these habits is needed.

Briona Burden-Knox, Krystina Santos, Andrea Street

Connecting Inmates to Families

Partnering with AIM, we went to Julia Tutwiler State Prison and videoed the inmates as they recorded holiday messages to send to their families and loved ones. We did this because research shows that inmates that keep in touch with their families through visitation and other contact show a reduced chance of recidivating (Mears, 2011). We went on October 31st, and spent several hours videoing 150+ women. We took 1-5 minute videos of the women as they gave short holiday messages to their loved ones. Some women wanted to only say Merry Christmas, and would record a short video, while other women wanted to record longer messages and go into more detail about their lives. We then spent the next several weeks burning the videos to DVD’s and sending the DVD’s to the inmate’s families.

Paul Alverson, Brianna Luria, Ben Hixon, Zach Wilson

Parenting From Prison

By partnering with AIM, Aid to Inmate Mothers, our project looked to help inmates stay connected with their families by making holiday videos. Through extensive research, it has proven that when inmates
stay more connected with their family throughout their sentence, it helps with the reintegration process when they are released. For our project, the inmates got the chance to record a video telling their loved ones happy holidays so they could be together in spirit. The videos help keep a relationship between the inmate and their families to help prepare for their release. By visiting the inmates, we got to observe first hand just how much being incarcerated has an effect on families. Not only was it helpful for us to see these prisoners as actual people, but it helps the inmates shift their perspectives about people on the outside caring to help.

**Allison Guilbert, Adrien Parker**

**Video Wishes**

2,323 females are incarcerated in the state of Alabama. Many of these women have families they have not seen in months or even years. Through a non-profit organization, Aid to Inmate Mothers (AIM), we visited Julia Tutwiler Prison for Women and gave the inmates an opportunity to send videos to their families. These women were very appreciative that they were able to reach out to their families this holiday season.

**Ashlynn Arnold, Jada Hutchins, Cathy Jenkins, Jalesha Burney**

**Women in STEM**

Women in STEM was created in the Fall of 2016 with the purpose of bringing attention to the inequalities that women often face in STEM careers such as the difference in wages and discrimination. Women in STEM aims to help women get to the professions they desire through a mentoring system that pairs a graduate school student with an undergraduate student. This system provides an open forum for women to voice their opinions and ideas through guided discussions. Previously, the mentoring system has had a fairly low retention rate, with only about 20 undergraduate and 20 graduate school students involved. In addition, the discussion events had very poor attendance, with an average of 5-6 people coming to each event. After an assessment of the semester and through surveys, it became apparent that these issues could be attributed to minimal publicity, rare communication between the mentors and mentees, and a lack of organization of the speakers of the discussion in advance. Using this information, the organization was redesigned to increase publicity, improve attendance and satisfaction at each discussion event, and increase involvement in the mentoring system by both mentors and mentees. The remodeled organization now has discussions that are led by students, a family mentoring system that includes two to three undergraduate students per graduate student, and an Instagram account that showcases the stories of different women in STEM. These changes in the system have led to an increase in the average involvement in the mentoring system, an increase in satisfaction at the discussion events, and a much improved social media following.

**Zena Banker, Katie Cook, Kendall Curtis, Aakansha Gosain, Ashish Kaushik, Shreya Malhotra, Cerissa Nowell**

**New Insights Lead to Successful Second UAB Middle School Math Tournament**

After a successful first year, the UAB Middle School Math Tournament, a leadership project of students in the Science and Technology Honors Program, was held again on October 28, 2017. The goals for the second annual tournament were to increase community participation through the use of social media and the tournament website and to continue the first tournament’s legacy and mission of promoting
a lifetime love of mathematics through the spirit of competition, teamwork, and enthusiasm. The path towards a successful tournament began in the Spring 2017 semester, and from then, the planning process included reaching out to local companies and organizations for sponsorships, writing and editing tests, compiling competition materials, recruiting volunteers, and inviting and registering participants from area schools. Over 400 students arrived to compete in a written test and ciphering rounds, where students were challenged to apply problem-solving skills with accuracy and speed. Additionally, we provided breakfast for coaches and teachers, snacks for competitors, and t-shirts for volunteers. Success and improvement of the tournament was measured by student, coach, and parent surveys, which had positive responses with suggestions for improvement in certain aspects of planning, such as test clarity and schedule organization. The responses in this year’s surveys were also compared to last year’s to see how this tournament improved or differed from the previous one. Overall, the tournament yielded fantastic results, and the repeated success and leftover funds will support the continued growth of the tournament in the UAB community.

Aleksandra Foksinska, Alicia Mulqueen, Marrielle Santiago, Cosby Burnet, Dan Nguyen, Jacob Skiles

Into the Life of INTO
This service learning project focused on exploring the thematic ideas of our Language Immigration Honors Seminar. These themes were centered around the question of how language shapes culture and language. Thus, the most important investigation being how these factors affect those entering the United States today. For this project, our seminar class paired with the INTO students of UAB to create culture partner groups. We socialized on a weekly basis with our groups and learned first-hand the experiences of our students. After compiling the experiences of the three culture partner groups, we were able to deduce five major themes. One of the most important themes was the language barrier between these students and their new surroundings. The three INTO students our group was assigned to spoke a range of English and expressed varying degrees of difficulty relaying ideas and understanding us. The next two themes were social immersion and the desire for familiarity. We observed the ways our culture partners were adjusting to their new environments such as socializing only with people of like culture. The last two observed themes are scholastic experiences and homeland culture. Our partners seemed to have faced various challenges in adjusting to different schooling and conveyed their reasoning for coming to the states and their desires, if any, to return home to their previous cultures. Overall, we found this experience to be extremely enlightening in understanding the impact that a new society and its associated language and culture has on students immigrating to new countries.

Diana Bucio, Dominique Carnes, Kenzie Dixon, Elijah Walls, Madison Mann

How Blazer Kitchen is Addressing Food Insecurity in Students at UAB
Food insecurity is a phenomenon in which people do not have consistent access to healthy foods. The health consequences of this reduced access to food are myriad, ranging from underdevelopment in undernourished children to chronic diseases such as diabetes and cardiovascular diseases in “overnourished” persons. A common cause of food insecurity is a lack of sufficient funds, which can result in individuals and families to choose between food and other expenses. On college campuses, this problem is much more prevalent as college students have extra expenses and lower employment rates than the regular population. Blazer Kitchen was created to combat this hardship for students and staff on UAB’s campus. The on-campus food pantry provides shoppers with access to meats, fruits, vegetables, and starches which allows food insecure students and staff to eat well-balanced meals.
Blazer Kitchen has recently launched a survey aimed at the student population in order to assess hunger among students on UAB’s campus. The survey asks questions about how often the student runs out of food or worries about the availability of food. In addition, a few demographic questions are asked such as age, number of hours per week the student works, and whether the student is international or domestic. Approximately 1000 surveys have been disseminated, and the data has been analyzed. Preliminary analysis suggests that a portion of UAB students are food insecure.

Courtney Abbott, Sarah Busby, Laneisha Campbell, Indica-Sha Depriest, Peri Hanson, Luke Martin, Diana Martinez-Garcia, Rene Murphy, Anna Nguyen, Tamera Sims, Sidni Smith, Phonchit Soukhamneut

Language Without Barriers: Closing the Gap
Foreign language learning, specifically in childhood, has been proven to improve analytical, problem solving, communication, and vocabulary skills. Through foreign language learning, students also experience positive cultural and personal growth and develop an educational drive. Language Without Barriers strives to spark a language passion in younger generations to build the foundation of foreign language learning so that cultural and linguistic barriers can be bridged. The past semester, Language Without Barriers has worked with after school programs in the Birmingham area to spread voluntary foreign language learning for primary and secondary school children. Currently, the group is working with the YMCA of Greater Birmingham weekly to teach American Sign Language, Japanese, and Spanish. Both quantitative and qualitative data has been collected to support the claim that foreign language education improves the language skills and the personal opinions of students on different languages. The group continues to work with these students and hopes to expand to other locations as well as incorporate other language opportunities for students.

Karly Casey, Kenneth Davis, Omar Jones, Austin Walker

How does the current housing status of the homeless youth population affect their overall nutrition and health status in the long term?
One Roof is a non-profit organization located in the Northside area of Birmingham, AL. The purpose of the community site is to offer assistance to the homeless population. This organization helps provide homeless people with shelter, medical care, and other beneficial resources that will help end homelessness. Based on the existence of multiple day programs located around the community that serve the homeless youth population, the main focus of the project is the nutritional value of their diet. The plan was to interview multiple members of the homeless youth population in order to collect information pertaining to their current nutritional status. After learning about their usual diets and analyzing eating patterns and habits among the homeless youth, a list of healthier food options that are available to them was discussed with the population. Finally, there was discussion of how they can easily access an affordable, yet nutritional diet. While collecting data for the project, many challenges were faced such as a lack of participation from the homeless youth and a lack of resources from the main community site. Being able to provide information about a nutritional diet and healthy eating habits to the homeless youth population was highly rewarding for the group. Despite all of the barriers that prevent the homeless youth from maintaining a healthy diet, this project benefited them by educating them on foods that can be easily accessible, yet also nutritious.

Cherese Hunter, Lacy LeMaster, Diamond Robinson
Raising Awareness of Illiteracy in Developing Countries and Increasing Access to Elementary Level Books

Books without Borders is an organization that focuses on improving education in underprivileged regions. Our aim is to increase awareness of illiteracy in developing countries and provide support for schools in the form of books and money. This year, we have chosen to aid a school in an underprivileged area of India. At the start of the year, we held a movie night showcasing He Named Me Malala to expose our audience to the power in receiving an education. We were able to collect survey responses from our audience and assess the data. This semester we also hosted a talent show to provide a fun event that coupled facts about literacy that discussed the state of education worldwide. We had a successful turnout; over 25 people attended the show. In addition to increasing awareness of the education situation both on the local and global scale, some book and monetary donations were collected. We had a successful year, and we plan to host more events dedicated to helping neglected schools across the world.

Lauren Buchan, Nellie Baghaei, John Gotham, Taylor LeClair, Cameron McPhail, Om Patel, and Riddhi Patel

Buddies Not Bullies

Better Basics serves as an afterschool program at CJ Donald Elementary that provides activities designed to have a positive influence in elementary school children. Bullying is a major problem affecting children in the school environment. Addressing bullying in young children can raise awareness and facilitate relationships with each other. The purpose of our Community Impact Project is to address the prevalence of bullying and help the students become more proactive when bullying occurs. The goal is serving the community partner by coordinating activities about bullying, which allows each student the opportunity to voice their opinion and responses to bullying. This target population consists of students from kindergarten until the 5th grade. The objectives are to define bullying, discuss the awareness of bullying in their school, and take steps to prevent bullying from occurring. Grouping the students by their age before initiating the lesson for the week allows the students to better understand the activities. Strategies used include utilizing games and activities that hold their attention while educating them. The objective was to bring a positive light to bullying and facilitate uplifting relationships among the children. Results were collected by asking the students:
Did you have fun? 12/15, 80% yes / 20% no
Did you learn anything? 10/15, 67% yes / 33% no
Challenges include holding the childrenâ€™s attention as well as having a short period of time with them. Rewards included engagement with the kids and learning how to adapt with a different community of individuals. Serving at CJ Donald provided the opportunity to impact a younger generation by raising awareness on bullying.

Annie Binnix, Tierra Black, Britton Clough, Madison Taylor

I am Your Neighbor and I Have Dementia

The Encore Respite program at Canterbury Methodist Church in Mountain Brook, Alabama serves adults living with dementia through enriching and creative social activities. Along with the day program, the church also provides the participantsâ€™ caregivers with respite and group support. To educate the general population, decrease the stigma surrounding the disorder, and promote positive interactions with those who have dementia. An informational video that discussed the experiences of living with
dementia and provides suggestions for how to interact with people with this disorder was created. The video included an interview with a person living with the disorder and showcased abilities that remain intact. The video will be distributed online and used by the Encore program to raise awareness among community members. Viewer response was evaluated qualitatively through focus groups. Viewers of the video ranged in age, gender, and life experience. Viewers responded positively to the content. Viewers expressed more knowledge in their comfort and ability to interact with persons living with dementia. Suggestions for improvement include more interviews and more factual information. The team found that people were willing to unselfconsciously share their experiences for the purpose of educating others. The video provided a nonthreatening and easily understood medium to encourage discussion of the disorder. The video provides an accessible and permanent resource that remains with the agency at the conclusion of the team’s partnership.

Kaya Acfalle, Krystal Mozzarella, Sarah Shaneyfelt, Bailey Stein

Blood Pressure Control and Health Inequities in Women
The Wise Woman program, sponsored by the Shelby County Public Health Department, provides cardiovascular disease risk factor screening to uninsured, low income women ages 40 to 64 years of age. The program provides health screenings, and risk reduction counseling. The goal of the program is to reduce cardiovascular disease risk factors in a high-risk population of women. The aim was to instruct women on blood pressure control through a one-hour interactive educational session. A one-hour interactive educational session was held for women enrolled in the Wise Women program. The staff distributed flyers as well as placing information on the Wise Women Facebook page. The primary goal of the education session was to convey information on blood pressure management. Blood pressure monitoring with home monitors was demonstrated on the women. We presented nutritional information demonstrating how alternative seasoning used in salsa would reduce sodium intake.

Participants participated in a brief Zumba class. Using a pre-and post-testing, we surveyed the participants about normal blood pressure numbers, and how to accurately measure blood pressure at home. Twelve women participated, with one Caucasian, two African Americans, and 9 Hispanic women. Findings from the pretest found 90 percent of the women reported a normal blood pressure reading was higher than 120/80, and the majority did not know how to accurately measure blood pressure. The majority of the women (11 out of 12) sampled the low sodium salsa, and reported a positive response to incorporating the reduce sodium ingredients in cooking. The participants all stated they enjoyed the one-hour educational session. They all participated actively in the session, and asked questions about blood pressure management. For future sessions more, advanced advertisement is needed.

Marleah Kitchens, Shavonne Milhouse, DaKiyyah Page, Kathryn Ramos

Exercise and Mental Health
The South Highland Presbyterian Church Mental Health Outreach Project (SHOP) provides socialization through a faith-based program for Birmingham residents with mental illness. The program fails to incorporate physical activity and exercise as an essential factor in improving mental health. The aim of the program is to provide a way to evaluate the impact of physical exercise related to mental illness for the members of SHOP. A twenty-minute exercise program was implemented for two weeks to assess the impact of physical exercise on adults with mental illness. The program consisted of a dance routine and a yoga session. A pre-survey and post-survey were completed to measure the effectiveness of the exercise program. The goal was to improve the mental well-being of participants by improving physical
health. Those who participated in the exercise program had a very evident reaction to the dance session. Members' moods visibly changed, many wore smiles and appeared more energized. Many verbalized they "felt good" and enjoyed the session. The results of the program support the positive impact that exercise can have on mental illness. Full participation was difficult to achieve. Due to fatigue, many participants did not engage in the session through completion. It was rewarding to witness the effect that the program had on their mood and outlook. The program showed the members that exercising can affect their mood and be fun! Exercising allows those with mental illness to take an active role in their recovery and management of their illness(es).

**Jaclyn Canada, Kody Chambers, Carly Minor, Linze Slay**

**The Citizen Science Approach to Measuring Birmingham Air Quality**

The city of Birmingham, known for its prominent industrial development, has an infamous history of poor air quality related to particulate matter pollution. During the prime of Birmingham’s industrial boom, the health of many residents was greatly compromised due to the heavy influence of particulate matter. Particulate matter is defined as fine particles that are both invisible and highly concentrated in areas near construction zones and industrial plants. Furthermore, particulate matter has the potential to induce the onset of cardiac disease, stroke, and other respiratory diseases. GASP is a non-profit advocacy organization hoping to establish a citizen scientist initiative in order to raise health awareness and empowerment to the Birmingham community. GASP works diligently to improve ambient air quality by partaking in data collection and implementing the use of two air monitors: Air Beam and Purple Air. The focus of the study is to determine the quality of the air monitors, as well as assessing PM 2.5 concentrations at prime locations including: nursing construction site, Helena, Alabama, the Birmingham Metropolitan area and various locations on UAB’s campus. The data collected will be used to support GASP’s advocacy efforts to encourage highly regulated industrial practices that will reduce the emission of hazardous air pollutants. The overall purpose of this project was to help GASP determine the practicality of the monitoring devices to promote their vision of creating citizen scientists as well as improving ambient air quality.

**Alexandria Warren, Arianna Siler, Devan Carmichael, Jeffrey Franks, Kelcie Schlensker, Kendra Harwood, Kuheli Mitra, Larry Mosely, Leahgrace Simons, Sarah Machado, Shane Dees, Zieandrea Briggs, and Yanyu Chen**

**Hepatitis C and Recovery: "C" the Options**

**Abstract**

Hepatitis C: Disease Progression and Treatment Options for Young Adults in Recovery

**Braxton Busby, Kathleen Dexter, Katelynn Melton, Whitney Pollio**

**The Foundry**

The Foundry is a community outreach that provides recovery programs for addicts. In communities of injection drug users, the incidence of Hepatitis C is increased due to sharing needles and other personal items potentially involving blood contact. It was discovered that the residents are medically underserved in terms of patient teaching and treatment options for HCV. The service project goals are to 1) increase awareness of the virulence of HCV by explaining less commonly known methods of contraction, and 2) alleviate stress associated with obtaining generally unaffordable treatment by providing a contact with the ACTIVE-C program. The project includes a presentation about HCV, in hopes of achieving
â‰¥80% retention of information provided. A pre-test will evaluate previous understanding of the disease. An opportunity for questions and answers will follow the discussion, and then a post-test will evaluate the effectiveness of the teaching. The receptiveness of the teaching will be measured by assessing peer involvement in the question and answer session. Results showed that, initially, most (96%) of residents had heard of HCV and could name at least one symptom. After teaching, the number of participants that could name two or three symptoms increased from 12% to 81%. There were measurable increases in the number of understood modes of transmission as well. The experience was gratifying knowing that this community was provided with valuable, relevant information. The relief expressed by the group after informing them that a very expensive treatment could be free to them made the outreach immensely more rewarding.

Braxton Busby, Kathleen Dexter, Katelynn Melton

YouAB Learning Pathfinders
Many underprivileged students lack resources and connections that could aid them during their path towards higher education. Students want to know what to expect from college, how to get there, and what opportunities are open to them along the way. This is why the Pathfinders project was created by YouAB Learning. This project aims to reach out to underprivileged 8th grade students through a pen-pal system which enables the students to have one-on-one connection with a student at UAB. Through these letters, the middle school students are given an opportunity to ask the UAB students any questions they have about college. In return, UAB students provide advice to the middle schoolers on how to best take advantage of their time in high school. The purpose of the letters is to ensure that the middle schoolers understand that through hard work they have the ability to reach their goals. As a measurement of the impact of the mentoring system, a survey was initially given to determine the studentsâ€™ opinions about higher education. Another survey has been designed for distribution at the projectâ€™s completion to determine how the letters have changed the studentsâ€™ perspectives about college.

Reagan Andersen, Simone Cedotal

Building Bridges Volunteer Program Expansion to South Health and Rehabilitation Senior Living Facility
Building Bridges is a student volunteer organization aimed at combating social isolation in senior populations by pairing college students with an elderly person in a â€œbuddy systemâ€ fashion. Prior to this project, it only existed in one senior living facility. The purpose of this STH 250 project was to expand the Building Bridges program to another senior living facility. In order to achieve our goal, we compiled a list of nearby facilities, made calls, and narrowed the list to the most optimal facility in terms of location and need: South Health and Rehabilitation. We then recruited volunteers by hosting an interest session and sending emails with an application. We selected and trained volunteers to begin volunteering at the end of October. To collect data, we made pre- and post-volunteering surveys to assess the volunteersâ€™ change in perspective after volunteering. We found that the program nearly doubled in number of volunteers. The volunteers became increasingly comfortable and patient with seniors and those with dementia. They also became less nervous interacting with seniors. We also had more accountability due to a sign in sheet and regular contact with the South Health and Rehab volunteer coordinator. In the future, we hope to incorporate more of a technology-teaching aspect into
the program as well as expand into more senior living facilities. We think that technological literacy and increased program breadth will aid in empowering seniors and mitigating social isolation.

Juhee Agrawal, Victoria Miller, E.J. Aloria

Can High School Students Lead Efforts to Address Low Dietary Health Literacy?
The incidence of diabetes, hypertension, heart disease, and stroke in rural Hale County, AL, is higher than the national average. Dietary practices, low health literacy, and limited access to health information contribute to this problem. To prepare students from the county vocational high school to lead informational grocery shopping tours sponsored by the federal program Cooking Matters at the Store. Partnered with West Alabama Area Health Education Center (WAAHEC) to teach students how to read a nutrition label and basic principles of good nutrition with a focus on calorie, sodium, fat, and fiber intake. Students were also instructed in how to lead tours and were provided an opportunity to rehearse. Student knowledge and performance were evaluated by formal testing and via direct observation by the student mentors and faculty. Tour effectiveness will be evaluated using pre-tour surveys to measure participant health literacy and post tour surveys to determine participant behavior change. Students performed well during the tours. Pre-tour surveys revealed inadequate dietary health literacy with average scores 2.7/10. Post-tour surveys revealed a 443% increase in dietary health literacy with a 9/10 average score. Tour participants were excited about the opportunity to improve their health without having to spend more resources. Both students and tour participants enjoyed the experience with students stating it increased their interest in the health science. Increase in participant knowledge demonstrates that the students are effective tour leaders. Federal approval for teaching materials and other resources is pending.

Jennifer Janowiecki, Rachel King

Kids in the Kitchen
The Horseshoe Farm after-school program provides academic assistance and teaches life skills that support employment to rural youth who are at risk for continued generational poverty. To mentor adolescents in positive communication and inter-personal skills while developing cooking skills that increase nutritional value of favorite foods. The teens identified their favorite meals. Recipes for these foods were adapted to stress good nutrition practices. This includes restricted sodium, increased fiber, increased vegetable intake, decreased sugars, healthy fats, and lean proteins. The teens participated in food preparation and were mentored in safe food handling, how to use a recipe, and how to cooperate with one another in the kitchen. Cooking provided a recreational break from tutoring and homework. Effectiveness was evaluated through direct observation of the adolescents’ responses and qualitatively from weekly feedback from the Horseshoe Farm staff. The teens successfully followed instructions and cooperatively worked to complete the recipes. Some teens were initially hesitant about participating or expressed skepticism about the foods that were prepared. The primary challenge was convincing the students to engage with the team. This was overcome by positive communication and increasing rapport with the adolescents. The team gained insights regarding the impact of family dynamics on adolescent behavior and the difficulty of accessing resources in a rural community.

Urshula Edwards, Natalie Jesson, Elizabeth Martin
Assisting International Students with Barriers Experienced while Transitioning to the U.S.
Many international students often have difficulty acclimating to the United States in college. We took on this project to help UAB’s™ international students through the INTO UAB program transition in their first semesters in a United States college. International students tend to face challenges due to language barriers and cultural differences. Some students do not like to ask for help in fear of being ridiculed by their peers and professors. Language competency also affects how well the students are able to learn. Students face challenges becoming involved on campus, especially those that have never experienced life on a college campus or life in the United States. Through setting up meeting times weekly to go complete activities around Birmingham while sharing our cultures, we have attempted to help our international student partners cope with their difficulties. Some of these difficulties include an enormous language barrier, differing social constructs, overall fear of rejection within a new society, and adapting to life on an American college campus. We talked to them about their individual struggles both with school and social life on campus, hoping to form a bond and assist with these problems by acting as a resource for questions or assistance. In our experiences, we discovered the difficulties our culture partners were facing in their classes and campus life. Most said they had difficulties with not understanding what is being said in class or with getting involved on campus or with those not in INTO.
Christine Zayas, Gracie Nemec, Katrina Whitten, Skye Causey, Cindy Tran, Carolina Rodriguez

One Roof Furniture Donation
For our project we evaluated the most common problems faced by the recipients of One Roof’s services and established a plan of action to address the most common need they face, getting furniture to their housing options. Our project is to partner, One Roof with UAB so that UAB’s unwanted furniture can be donated to One Roof’s housing for their clients. We have established the contacts and resources needed to implement this project.
Thatcher Chapman, Alexis Bahr, Katie Sanders, Jack Dillard, Mustafa Sumadi, Desmond Parrish

Tackling Hunger with Blazer Kitchen
The UAB community is wide and diverse, but despite all of our differences, there are some similarities that stretch across the whole community. Partnering with Blazer Kitchen has allowed me to see how many people in our area have food insecurity and need help. It also allowed me to see that despite the demand for help, there is also a surplus of people willing to give that help to those in need. I helped sort, weigh, and distribute food and toiletry items at Blazer Kitchen. They have served over 10,000 meals in just over several months and have been a huge help in the fight against hunger in the UAB community. When we look around, we often forget that the people around us have hidden needs, but with organizations like Blazer Kitchen, everyone in need can have somewhere to go without judgement or question.
Rachael Emretiyoma

Supporting Stress Relieving and Health Promoting Activities in the Older Adult Population
The Shepherd Center is a senior center located in East Lake. Barriers to stress management and health are limited access to health care, a high crime rate and lack of community resources related to poverty. These circumstances make stress and health key elements that the population finds difficult to address. The project goal is to provide health-promoting activities and lower stress in the geriatric population of the East Lake community. The project will encourage participants at the Shepherd Center to actively
participate in health promoting activities. Stress-relieving activities such as video games, card games, bingo, crocheting, quilting, chair exercises, and art activities were combined with health promoting lessons such as nutrition and fall prevention. The participants rated their stress level before and after playing bingo, and included the number of activities they participate in. On a scale of zero being no stress, and five being extreme stress, the group averaged a level of 2.35 before bingo. After bingo the average stress level decreased to 2.05. On average, each senior participates in two activities per week at the center, and 17/20 participants enjoy bingo. The predetermined schedule of the participants was challenging. The participants refused to stop their normal activities to participate in activities provided by the UAB School of Nursing. Educating on preventing falls and eating healthy was very rewarding. Reflecting on this project, the participants at Shepherd Center are partaking in a great program. Stress reducing activities, nutrition education, and health promotion are all beneficial features of the Shepherd Center.

Stephanie Haddock, Rachael Palmer, Octavia Rayford

Promoting Diabetes Self Care in an Uninsured Hispanic Community

Introduction: The Community of Hope Clinic, located in Pelham, provides health services for uninsured Shelby county residents. Poorly controlled diabetes and diabetes related complications are prevalent among clinic clients. The clinic primarily serves adults with no insurance, and Hispanics being a large proportion served. Poor diabetes management knowledge and skills was identified as a major problem by the clinic providers. To provide an interactive diabetes management session for Hope Clinic clients. Two diabetes education sessions were conducted, with content focusing on foot care, hemoglobin A1C, blood sugar monitoring, and medication administration (insulin). Advertisements for the session were distributed by the Community of Hope, and the Shelby County Health Department staff (social media, flyers, and word of mouth). All information was presented in both English and Spanish. A total of seven participants (Hispanic, African American). In the classes, 72% spoke Spanish with the remaining 18% with English as their primary language. 57% of the participants had type two diabetes, 29% had pre-diabetes and the 14% were there to learn about diabetes. 86% of the participants reported increased diabetes management knowledge. The aim was to educate patients about how to access the diabetes healthcare resources to improve their HgA1c. Some obstacles encountered were finding relatable information for the Hispanic population as far as cooking and family practices. Other obstacles include communication and attendance. Clinic hours are weekdays, and many patients have trouble attending weekday appointments. Future sessions should focus earlier advertising and providing sessions at alternate times.

Kayley Lai, Tiffany Laserna, Amanda Norniella, Karen Nunez

The Youth Movement Against Alzheimer’s

The purpose of this poster presentation is to showcase our experience in beginning a new youth advocacy project for Alzheimer’s disease at UAB. Part of a nationally registered non-profit organization, the Youth Movement Against Alzheimer’s is the leading youth organization seeking to bridge the gap between the young, old, and all in between of those affected with the disease. The organization seeks to bring volunteering opportunities to our youth, in order increase awareness for the disease and get rid of the blind-eye stigma. We seek to bring research opportunities to our members through scholarships funded by our organization, in order to initiate action in helping to prevent the disease. Finally, we seek to fundraise for the disease through our youth advocates, with the money going towards research and caregivers. With these three pillars, we hope to accomplish our mission: To promote a greater
understanding of Alzheimer’s among youth and young adults by providing opportunities to help those affected by this disease; and to craft our vision: a culture where our youth embrace aging and alleviate the impact of Alzheimer’s Disease. As a brand new organization, we have held our first meeting and have recruited around 20 members for the organization. We are in the works of planning our first fundraising event and have partnered with the Alzheimer’s of Central Alabama where we have held 2 volunteering events. We have also attempted to diversify youth involvement organizations and have data representing the distribution of college majors in our organization.

Baraa Hijaz, Yazen Shihab, Sameen Ali, Pratheek Bobba, Kishan Patel

American Literature through the Eyes of Immigrants

This semester in our American Literature class, we studied literary works with a focus on immigration and worked with immigrants as a service learning outreach project. The literature allowed us to take a deeper look into what many immigrants experienced many years ago as well as what they experience now. Works included Song of Myself, My Antonia, We Need New Names, and short immigrant fiction. Along with literary works, we also spent time working with students at the Collat Jewish Family Services through its English as a Second Language program. During our visits, we read with the students and discussed their lives before and after coming to the country. The experience allowed us just a small glimpse into the day to day struggles that immigrants face. Language barriers have proven to be the biggest trial that these students face, as well as adapting to the ever changing American culture. However, their determination and optimistic spirits made each visit memorable.

Ayanna Day, Ashlynn Berry, Amber Miller, Sarah Holifield, Jajuan Arnold

Our Immigration Nation

This semester we have had the pleasure of not only learning about the immigrant experience through American literature but also meeting with immigrants who, in order to escape religious persecution in their home countries, made the incredible journey to America. As a literature class, we have read what it means to be an immigrant, analyzed humbling stories of immigrants’ trials and tribulations within America, and have discussed our own personal immigrant stories. We have taken this semester to empathize with immigrants and understand that each story is so different yet, in some special ways, are all the same. Reading stories of immigrant experiences, as well as taking the time to research and uncover our own immigrant histories, prepared us for our Service Learning project this semester. Our various readings about immigrant American experiences transcended into reality when our group was able to visit and meet with Russian immigrants through the Collat Jewish Family Services. These men and women’s lives are tales of ambition, dedication, fear, and unmeasurable perseverance. Although from our readings and discussions we know this fact to be true, we found ourselves faced with obstacles that did not allow us to delve deeper and inquire specifically how each immigrant’s life mirrored the lives of those we read about. As a team, we worked to overcome each obstacle and make our time spent with them worthwhile for not only them as senior citizens, but for us as young adults. Overall, this semester has taught us to employ empathy, sympathy and understanding for those individuals who, including ourselves, make up our immigration nation.

Kristina Adkins, Zaharia Anderson, Joseph Blalock, Christina Collins, Johanna Popp, Makayla Smith
Citizen to Stranger: Transforming Identities of American Immigrants in Literature and Life
The theme for our class this semester was immigration, and our task was to interact with immigrants from Russia at the Collat Jewish Family Services Center. Once a week, a group from our class would visit the community center and construct a lesson plan for the students. Each student had a Kindle Fire, and we showed them stories we were reading in class, reading aloud to help practice their pronunciation. Some of the immigrant characters we read about were from Bohemia, South Korea, China Syria, and Zimbabwe. Each story expressed a unique experience, and the students were able to relate to these stories on a personal level. After our initial visit, we sat down with them a second time to speak about their immigrant experience. We used an App called StoryCorps to record their interview. By hearing an immigrant story first hand and seeing how much impact moving to a new country can have on a person’s life, we were able to appreciate immigration on a whole on a new level. By incorporating service learning into our literature class, we were all able to work as a team, as one unit, rather than working as individuals. We were able to hear real stories, from real people and to fully understand immigration.

Naldo Flowers, Meghan Ballard, Jared King, Roman Bryant, Katrina Ransom, Audrey Moore, Prince Story

A Global Community: Challenges of Immigration
The purpose of this service learning experience was to assist a classroom of elderly Jewish immigrants to have practical experience using English as a second language. These individuals immigrated from Russia and other Eastern European countries and do not currently speak the best English. Many of the students are highly educated despite their language difficulties, and their education has given them a desire to learn. Visiting the Collat Jewish Family Services allowed us to interact with the ESL students and other members and visitors of the community center. Our first visit, we taught the class how to use their tablets, which were provided by a donor to facilitate their English learning experience. We used the tablets for games such as WordPress, Google Maps, analyzing the news, and watching videos. During our second visit, we used the Story Corp app to conduct an interview with a gentleman from South Africa who currently lives in Birmingham. In our literature class, we studied American literary works entailing many facets of the immigrant experience such as, the struggle to learn English, the struggle to adapt to American culture, and the joy of new opportunities. Using novels such as _My Antonia_ and _We Need New Names_ as a reference, we could better understand some of the hardships that the ESL students faced as they immigrated to America, and through our interaction with them, learned about their unique stories on a more personal level compared to reading about immigrant stories in our novels.

Kiara Chew, Sedarian Copeland, Donald Ho, Warren Large, Kendyll Smith, William Wright

Translating Technology from Generation to Generation: Becoming Better Writers Through Serving Seniors
For our service learning project in English 101, we visited the Levite Jewish Community Center on a weekly basis to teach senior citizens how to use various forms of technology. The senior citizens brought their laptops, cell phones, and other technology to the center, and we assisted them by answering their questions and walking them through the steps of their answers. Not only did we help the seniors keep up with today’s world, but we also learned some valuable lessons ourselves on patience, cooperation with other generations, and the benefits of volunteering. In the classroom setting, we
discussed generations and the generation gaps due to technology while reading Alone Together by Sherry Turkle and They May Not Mean To But They Do by Catherine Schine. We related our experiences with the Cyber Seniors to the ideas in the books through several analytical essays, helping us to develop a better understanding of differences in generations and the gaps technology creates between them.

Jessica Robinson, Maggie Phillips, Megan Newton, Katie Best

**Bridging the Technological Gaps Between Generations**

In her 2011 book Alone Together: Why We Expect More from Technology and Less from Each Other, Sherry Turkle presents concerns about technological interactions taking the place of genuine, meaningful communication with one another. She argues that technology which was designed to bring people closer together has wound up pushing people further apart. Through our Honors English Composition class, we have found that much of our generation, a generation that has grown up with cell phones and touchscreens and instant messaging, takes some offense to such a notion. We roll with the tides of our ever-changing society seamlessly, but we are quick to dismiss people who are unwilling or unable to do so as simply being behind the times. Through our service learning component of the course, we had a change of attitude. Every Wednesday, we visited the Levite Jewish Community Center for a program called Cyber Seniors in which we helped senior citizens learn how to operate their electronic devices. While our practical task was to teach the person we were paired with to perform basic technological functions, we were challenged in other ways as well. Cyber Seniors prompted us to think about how divides between generations are widened by technology and how we can bridge that gap. We grew in patience and empathy through our experiences with our seniors, and we drew on these experiences in our analytic writing about the elderly and technology.

Ashleigh Hancock, Jacob Wong, Logan Mavar, MacKenzie Crow

**Inter-generational Connections Through Technology**

Our research centers around the Levite Jewish Community Center, where we helped seniors use their technology and improve their skills. Our objective was to encourage seniors to connect with others, bridge the gap between generations, and ultimately disprove stereotypes about seniors’ inability to use technology. As a part of our research, we read and analyzed books related to both the elderly and technology’s effect on the user, including Alone Together by Sherry Turkle and They May Not Mean To, But They Do by Cathleen Schine. We volunteered once a week with the Cyber Seniors program, and after each visit we reflected on our experiences through journal entries and several analytical papers. Through our assigned readings we discovered that authors such as Sherry Turkle have concerns regarding technology’s ability to isolate senior citizens; however, in works such as Schine’s and through our own experiences we discovered that technology has a far more beneficial effect. Additionally, we built relationships with them that enabled better accessibility and introduced a more modern perspective. The seniors learned to connect with distant relatives through apps such as GroupMe and Skype, and utilized entertainment capabilities through services like Netflix and Amazon. Through the combination of our in-class and volunteer work, we discovered that the partnership between an older generation and a younger one improves the quality of life for seniors and provides an insight into technology’s potential to help the most vulnerable in our society. This program would be beneficial if implemented on a widespread scale.

Alison Rocco, Lyndsey Shelton, Rogan Sullivan, Genevieve Tillman
“None of this stuff works”: Helping Seniors Adapt to the New Age

In our Freshman Composition class, we have learned how to develop critical thinking skills and to write professional papers, learning to weave our personal experiences into our writing, making the service learning portion so much more important. For the past several weeks, we have spent our Wednesday mornings teaching these students how to use their devices and how to deal with technical issues they may have, in a program called Cyber Seniors. We found that they were not the only ones learning a thing or two. As we shared our personal experiences with the seniors, we learned many things about them as well: not only did they learn how to use these devices, but they shared many of their own personal experiences through their lives, allowing us to have a sort of looking glass into the past. The students helped us in our writing because we would discuss the teaching process and the things we did with them every day in our reflection journals.

Zach Dickerson, Jordan Denty, Lyric Portilla, Dalton Turner

Give a Squat in Youth Homelessness

Public Health’s 220 course partnered with One Roof for their service learning project. The class, broken into 13 teams, was challenged to raise awareness about youth homelessness in Birmingham, while tying it back to specific public health factors affecting this population. One Roof asked students to design a way to challenge and educate students and others on the University of Alabama at Birmingham campus about these issues. One Roof began by challenging PUH 220 with their own homeless simulation, Cardboard City, which students were asked to make improvements. PUH 220 students were then required to gain firsthand experience of homelessness by volunteering with an agency that served the homeless population for a minimum of three hours. One Roof’s project included creating infographics about youth homelessness for them to use to educate the overall public as well as creating a 60-90 second public service announcement, again to increase the public’s awareness of youth homelessness and public health factors. The event that class chose to organize for campus awareness was a “Squat In” in honor of World Toilet Day. This event was to expose students and others to the invisibility of youth homelessness. Students used social media, games, and demonstrations. Facts on cardboard scraps were to simulate stereotypes of someone homeless. Like in the “real” world, participants were often ignored and found it challenging to get UAB folks to even stop and listen. The overall lesson for PUH220: It is easier to ignore a problem than to act on it.

Carlie Chappell, Brandy Crawford, Sydnee Gowens, Samuel Moss, Cathy Nguyen

GASP Citizen Science, AirKeeper Project

Gasp is a non-profit, health advocacy organization whose mission is to reduce citizens’ exposure to air pollution, educate the public on the health risks associated with poor air quality, and encourage community leaders to serve as a role model by advocating for clean air and clean energy. Students are challenged with designing the following materials and systems Gasp can utilize, including, but not limited to: Create the Citizen Science Volunteer Training Presentation. Before someone can sign up to become a volunteer AirKeeper, it is imperative that they attend a training to learn: the vision of the program, protocols for taking samples, how to use the monitor(s), overall expectations for their participation. Further develop the take-home, Citizen Science AirKeeper Guide to accompany the training. The guide’s purpose is to serve as a reference document for the volunteers when completing the training. Make recommendations on how to best manage the data from the monitor in the future.
Jonathan Warner, Joe Carter, Jake Massingill, Tim Holder

Blazer Kitchen Culture
FLL 120 SL Foreign Cultures Service Learning requires students to volunteer a minimum of three hours per month at one of three community partners. Students may choose to volunteer their time to the efforts of either the Language Partners program of INTO UAB, the Wayfinding program of UAB Hospital, or Blazer Kitchen. This poster presents the work of Blazer Kitchen and connects that work to themes of the course, by showcasing how Blazer Kitchen interacts with texts such as Anne Fadiman’s The Spirit Catches You and You Fall Down and Chinua Achebe’s The Education of a British-Protected Child as well as in-class discussions. Work in the Kitchen informs and reinforces students’ perspectives on not only the important role food security plays in every person’s life but also the way in which different foods can offer more than simply sustenance to those with different cultural backgrounds. Based on time spent serving with Blazer Kitchen, a new program that would work with the current system that could emerge would look into foods and meals that are representative of the cultural diversity of Shoppers that are served. From vegans to international students, having foods that offer a level of comfort while still providing healthy options is a great way to ensure security for those in need as well as offer the opportunity for others to potentially learn about and experience an aspect of a different culture. In its first nine months, Blazer Kitchen has strived to achieve its goal of combating food insecurity by providing for UAB’s multi-national and multi-cultural students and faculty.

Jonathan Stoney

Team Hope Walk Tuscaloosa
Team Hope Walk is part of the Huntington’s Disease Society of America (HDSA). The goal of HDSA is to raise funding for research while simultaneously spreading awareness of Huntington’s Disease and the progress made by researchers in the field across America. Team Hope Walk engages the not only the Huntington’s community but also exposes the community where the walks take place. Thriving walks take place across the nation including one here in Birmingham. For a year, the Tuscaloosa Team Hope Walk organizers were unable to host the walk. After a year, the Birmingham walk sought out volunteers to host the Tuscaloosa walk. While bringing the awareness and the walk back to the community, Team Hope Walk Tuscaloosa was able to raise over $3,000 for Huntington’s research. The day of the event, walkers from as far as South Georgia participated. A fun, lively group walked a mile in support while sipping coffee on the chilly fall day. While UAB shows support for HDSA, little about the organization is known at the University of Alabama. The goal moving forward will be to continue to involve the Tuscaloosa community as well as start raising awareness on the University of Alabama campus. The University of Alabama is a key part of the Tuscaloosa community, but there was little involvement from the campus. The Tuscaloosa team will continue to work closely with HDSA representatives to take this year’s success and build upon it.

Zac Moseley, Micah Armstrong, Bragan Swindle, Alex Ray

Project Literacy: Surveying the Agency Impact of The Literacy Council of Central Alabama
This project was designed to address and monitor client and volunteer satisfaction as well as the level of progress made by individuals participating in the Literacy Council’s adult reading program. The goal was to collect information on current clients’ (students’) and volunteers’ (tutors’) experience in the program as a means of best determining the Literacy Council’s impact on the
community. Two surveys were established, one for the students and another for the tutors; they were either distributed orally, by hand, or electronically. The distribution was and will continue to be done on site as this project is currently ongoing. From data collected thus far, survey participants, particularly the students, have shown significant satisfaction with the Literacy Council, promising progress in learning to read and write, a sense of newly found confidence, and a deep appreciation for the effort and patience of the Literacy Council and its tutors. In the long term, these surveys are expected to be used for years to come as a means of continually assessing the value and success of the Literacy Council and any needs for improvement.

Nate Turner, Benjamin Foushee, Nuha Hamid, Chamiya Mixon, and Emily Kincaid

Social and Behavioral Sciences

How to Stop a Nuclear War: Presidential Rhetoric and the Success of Deterrence

Does hostile rhetoric by policymakers lead to actual hostility? With the current tensions between the US and North Korea, it is important to examine the impact that hostility of rhetoric has on nuclear deterrence. On one hand, increased hostility may increase deterrence by making the consequences of noncompliance seem more extreme. On the other hand, increased hostility may cause deterrence to fail by channeling the mindset of necessary military action. To better understand this relationship, we used a multi-method approach consisting of discourse analysis and case studies; specifically we analyzed the 1992-94 nuclear crisis between the US and North Korea and the 2002-03 crisis between the US and Iraq. For our discourse analysis, we treated each paragraph of presidential rhetoric as a unit of analysis, rating each unit on a hostility scale of 1-4 with 1 being the least aggressive. To measure deterrence success or failure, we used a two-tier rubric. The first tier determines whether a deterrence strategy has failed by assessing if there has been a military action by one actor against the other. The second tier, examining situations without military action, assesses whether the deterrence strategy prevented military action or was an unrelated factor. Using these methods, we found that less hostile rhetoric towards North Korea corresponded with successful deterrence. At the same time, more hostile rhetoric towards Iraq corresponded with deterrence failure. Therefore, we conclude that hostile rhetoric may in part be responsible for deterrence failure.

Chien, Lillian; Edge, Steven; Haraway, Ben; Spearman, Matthew

Highlighting the Mobilization of Immigrant Groups & its Effect on the Political Reform through the Case Studies of HR 4437 & SB 1070

In this project we examine the relative success of immigrant groups in influencing public policy in the United States. The U.S. is a melting pot of other cultures and immigrants from all across the world. It is important to understand whether these individuals that migrate to the United States are able to effectively voice their opinions in policy making that impacts their day-to-day lives. We posit that a key element of success of these groups is their ability to engage the community in protest, rallies, and non-violent actions. Our principle hypothesis was that if the level of mobilization of immigrants is high then they will be able to influence the politics of their host county. To test our hypothesis we systematically examined news coverage related to two specific movements, against SB 1070, an Arizona bill and against HR 4437, a federal bill. Solely based off of mobilization tactics we are unable to conclude that there is a correlation between higher levels of mobilization and higher levels of political response.

Selina Cervantes, Victor Englert, Alik Key, Elaina Skala
Social Media and Electoral Wins
The effects of social media and political mobilization is a phenomenon has been changing the dynamic of political campaigns. The research focuses through the lens of political process theory. This theory provides support that social media does influence political campaigns, through utilizing available data, on this theory, we discuss specific ways in which social media effects political campaigns. Specifically, the theory argues social media helps provide political movements exposure. The hypothesis for this is to test does social media increase the likelihood of electoral victory. Through qualitative and quantitative analysis, we employ comparison case studies utilized to examine social media effects on political mobilization. The 2012 Obama campaign and 2016 Trump presidential campaigns were the case studies examined for our hypothesis. In regards to the Trump and Obama campaigns, we compared the similarities of their social media usage and overall success in there, respective, elections. Specifically, the case studies showed the candidates utilized social media to energize their base and for fundraising purposes. However, there are major differences between the usage of social media between the campaigns. The Trump 2016 campaign has shown the dark side of social media where he inflates his followers through bots and promulgated fake news on his social media. Through analysis and assessment of social media and political campaigns, the hypothesis is verifiable. The Obama and Trump campaigns both utilized their social media following to mobilize mass support and donations, towards their campaigns, to secure their winning seat as President; proving our hypothesis.

Carson Carter, Vincent Rames, Ian Macleod, Paeden Mapp

Women's Rights and the Resource Curse: A Comparative Study
In this study we examine the linkage between resource wealth and women’s well-being. Specifically we posit that if a government is more dependent on the profit of natural resources, we suggest that it is less likely that there will be the accountability towards the promotion of equality and participation of women in all sectors of society. Using a comparative case study between Rwanda and Nigeria, we examine the differences in GDP, the percentage of resource rents in GDP, and the percentage of fuel in merchandise exports between the years 1980 - 2015. In these countries we also compare different measurements of women’s rights such as education, healthcare, political involvement, and economic participation. We find that there is a negative relationship between the resource curse and the growth of women’s rights in these developing countries. Overall, countries in the resource curse have less institutional equality for women. The results show the lack of governmental accountability towards gender equality which inhibits the development of women’s rights. We suggest that creating a more equitable society will push towards a more stable government.

Cammie Cornett, Catherine Bates, Jenia Parker, Collier Fernekes

Predictors of Successful Bicycling Infrastructure within U.S. Cities
There is a growing need to understand the motivations driving levels of bicycling as a mode of transport as issues in public health, sustainable urban development, and environmental science gain increasing importance. However, there is not much literature to suggest what common characteristics of cities may be tied to the success of their bicycling infrastructure. To measure success of bicycling infrastructure, we utilized Bike Score, which is a metric that measures the conditions of bicycling infrastructure in 94 municipalities among the United States, Canada, and Australia. We used one sample group of cities in the United States that have the top five ranking Bike Scores and a sample group of the median five ranking Bike Scores. Our research presents a cross-sectional comparison of the sample groups’
common conditions (variables) that may drive cycling levels in successful bicycling infrastructure. The variables examined are average hours of daily traffic congestion, rates of urbanization, and average daily air quality index number (AQI). Our results show that higher levels of urbanization, a higher AQI average number, and more hours of vehicle congestion are predictors of higher Bike Scores.

Ly, Jessica; Gordon, Evan; Hawker, Trey; Hicks, Michael.

Mild cognitive impairment is related to clinical pain severity and physical functioning impairment in individuals with or at risk for symptomatic knee osteoarthritis

Mild cognitive impairment and chronic pain are important risk factors for functional decline in aging adults. However, relatively little research to date has examined the interplay between cognition, pain, and physical functioning in adults with chronic musculoskeletal conditions. Therefore, the present study sought to examine whether mild cognitive impairment was significantly related to knee pain severity and physical functioning in 180 older adults (aged 45-85 years) with or at risk for symptomatic knee osteoarthritis (OA). Mild cognitive impairment was assessed using the Montreal Cognitive Assessment (MoCA), which yields a total score ranging from 0 to 30 based on seven subcategories designed to examine executive function, visuospatial abilities, naming, attention, language, abstraction, delayed recall, and orientation. Participants then self-reported their experience of clinical knee pain and degree of physical functioning on the Western Ontario & McMaster Universities Osteoarthritis Index (WOMAC). Using previously published normative data, participants were categorized as either having normal cognitive performance (MoCA ≥ 26) or mild cognitive impairment (MoCA < 26). After controlling for race, age, gender, negative affect, and pain catastrophizing, participants with mild cognitive impairment reported greater pain severity [F(6, 172)=18.81, p<.02] and poorer physical functioning [F(6, 173)=21.58, p<.05] than participants with normal cognitive performance. These results highlight the importance of considering cognitive function when studying clinical pain severity and physical function in people with or at risk of knee OA. Whether mild cognitive impairment is a driver of clinical pain severity and poor physical functioning, or a consequence, is a topic in need of further longitudinal investigation.

Erin Ross, Kathryn A. Thompson, BS, Josue Cardoso, BS, Laurence A. Bradley, PhD, Roger B. Fillingim, PhD, Burel R. Goodin, PhD, and the Understanding Pain and Limitations in Osteoarthritic Disease (UPLOAD) Study Team

What's Safety Worth? Parents' Willingness-to-Pay for Child Restraint Installation Support

Motor vehicle crashes are the leading cause of death for American children (CDC, 2017). Child restraint systems (car seats) greatly reduce risk of serious injury and death in young children, but parents install restraints incorrectly at extraordinarily high rates (70-100%; Berg et al., 2000; Beringer-Brown, Pearce, & Rush, 2005). Advice from a certified CPS technician, either live or via remote interactive virtual presence, improves the accuracy of child restraint installation significantly (Schwebel et al., in press), but implementation of such service requires substantial funding. Currently, live assistance is provided by SafeKids and a few other entities, usually without charge, but availability of such services is inadequate to meet demand or need. We considered parents' willingness-to-pay for support in child restraint installation services, including how that willingness varies by socioeconomic status. From an applied perspective, this research informs both the public and private sectors on how to price child restraint installation services to maximize twin goals of expanding access to improve safety outcomes and handling budget/revenue needs. Forty-eight parents (85% female, 71% Caucasian, 17% African-
American) in the Birmingham, Alabama area completed a brief questionnaire including items on annual household income, willingness-to-pay for a hypothetical remote service in which a certified technician assisted with child restraint installation, and willingness-to-pay for an in-person live child restraint installation service with a certified technician. Participants also estimated likelihood of child injury in the event of a crash. Annual household income was coded as follows: 1=$39,000 or below; 2=$40,000-$79,000; 3=$80,000-$119,000; and 4=$120,000 or above. Willingness-to-pay was expressed in amount of US dollars. Likelihood of child injury was estimated on a 5-point scale (not at all likely, a little likely, somewhat likely, quite likely, very likely, scored from 1-5). Per our analysis, no significant differences emerged in willingness-to-pay across socioeconomic statuses (F(3, 42)=0.35 for remote and F(3, 44)=0.52 for in-person). Mean willingness-to-pay for remote and in-person installation services were $7.65 and $10.77, respectively, suggesting the participants ascribe lower value to safety relative to discretionary purchases such as dining out ($36/person per Zagat) and IMAX movie tickets ($19.69/person per AMC). This was true for the wealthier participants as well as those with lower household income. Low willingness-to-pay may be due partly to perceived low risk of child injury. On average, the participants rated the risk of injury as 2.6 (2 signified “a little likely” and 3 “somewhat likely”). Perceived injury risk correlated significantly with willingness-to-pay for in-person installation (r=0.36, p<0.05) but not remote installation (r=0.12, ns). Parents reported low willingness-to-pay for child restraint installation services across all socioeconomic statuses, perhaps partly due to low perceived risk of child injury from crashes. Limitations of our research include small sample size and participants recruited from a single geographic region. Nonetheless, there is compelling evidence from our findings that further public education on the risks of poor child restraint installation is needed and that efforts to convince parents proper installation might be purchased for a reasonable cost would be worthwhile.

Xiayang Yu & David C. Schwebel

Impact of Gender on the Relationship between Early Life Stress and Proinflammatory Markers

Recent research has identified a positive association between levels of TNF-Î± and early life stress (ELS), however, effects of ELS on TNF-Î± levels between genders remains controversial. The current study was designed to examine the effect of gender on the relationship between TNF-Î± levels and ELS. One hundred twenty-two healthy participants were enrolled and completed the study. History of ELS was measured by the Childhood Trauma Questionnaire (CTQ). Based on the subscales and total scores of ELS and gender, participants were divided into 4 groups, i.e. male-ELS, female-ELS, male non-ELS, and female non-ELS. Blood samples were collected for the measurement of TNF-Î± levels. Significant differences were observed in levels of TNF-Î± across ELS-Gender groups (p=0.009). Compared with the female non-ELS group, TNF-Î± levels were significantly elevated in the female ELS group (p = 0.002). However, TNF-Î± levels in female non-ELS group were much lower than in male non-ELS (p=0.032). No differences were observed in other comparisons, including male-ELS vs. male non-ELS. Our results suggest that the association between ELS and elevated TNF-Î± levels is gender-specific, i.e. elevation in females but not in males. Further research is called upon to further explore potential mechanisms and the impact of gender on the relationship between ELS and other proinflammatory cytokines, including IL-1Î² and IL-6.

Yang Liu, Angela Chieh, Li Y Li
Exposure Based Treatments of Phobias
Phobias affect 5%-10% of children and adolescents throughout communities, affecting academic abilities, social and personal distress that can persist into adulthood. 196 children of both genders, ages 7-16, that fulfilled inclusion criteria in Virginia and Sweden were randomized into groups that received education support therapy (EST), one session exposure (OST), and wait-list control (WLC). There were 70 children assigned to EST, 85 to OST, and 41 to WLC. Additionally, the children had to be mentally healthy excluding the phobia and certain other disorders (e.g. obsessive-compulsive disorder, social anxiety, etc.), have a phobia lasting more than 6 months, and rate at least a 4 on the clinician severity rating (CSR) pretreatment. In both countries, there was a higher success rate of children being reported as diagnosis free in both the OST and EST groups in comparison to the WLC group posttreatment. Six months after the study, there was a higher percentage of children being declared as diagnosis free in the OST group than in the EST group. This research may prove to help these adolescents by lowering severity of their specific phobias. It also supports the idea that memories are labile and that, with treatment, may not cause an individual fear to a particular stimuli. Further research should be done to see if this type of treatment works with adults and if multiple exposures to a stimuli further decreases CSR.

Stacie Terry, Jungwoo Kim, Johnathan Bailey, Robert Morgan, Catherine Danielson

Extraction of Sweat and Saliva from T-shirts and the Effects of Antiperspirant on DNA Analysis
Trace DNA has been successfully collected and analyzed from different articles of clothing, revealing the identity of the wearer. Research studies have shown that this analysis can be inhibited by certain substances on clothing, such as fabric dyes. However, the effects of antiperspirant on trace DNA extraction and analysis is unknown. In this study, DNA was extracted from saliva and sweat stains, and the effects that antiperspirant had on the extraction and amplification of DNA were examined. Saliva stains were created by pipetting known quantities onto a T-shirt. Sweat was collected from five volunteers who followed a suggested exercise routine two times, once while wearing antiperspirant and once while not wearing antiperspirant, wearing a different T-shirt each time. Antiperspirant was applied to a portion of the saliva and sweat stains also. DNA was extracted from each sample using a QIAamp DNA Investigator Kit. All of the saliva samples were amplified using a custom multiplex STR kit, and all of the sweat samples were amplified using the Ampflstr Identifiler PCR Amplification Kit. All amplified samples were analyzed using the Applied Biosystems 310 Genetic Analyzer with the GeneMapper program. The results indicated that antiperspirant reduced the peak heights of amplified alleles. Antiperspirant may prevent the amplification of alleles, particularly in samples with small amounts of DNA, making it more difficult to analyze the DNA recovered. Further research is needed to discover the best method for recovering DNA from clothing where antiperspirant is present and to more accurately test the effects of antiperspirant.

Hope Miley, Jason Linville

Tribalism, Resource Wealth, and Military Interventions: The Cases of Iraq and Libya
Why have military interventions in the Middle East and North Africa (MENA) proved so difficult to carry out? We argue that much of the difficulty stems from the disconnect between the expectations of Western states and the cultural and political nature of the MENA region. the MENA region. As a result despite the lofty goals of military intervention, including democratic governance and increased human security, intervention has resulted in increased insecurity and instability. Through a comparative analysis
of the factional, economic, and political conditions both pre-intervention and post-intervention in 2011 Libya and 2003 Iraq, we find that the post-intervention political and economic order of both countries was negatively impacted by a combination of tribal elements in each society, reliance on natural resource wealth as an income source, and the centralized governance structure within each country.

**Jalaya Graves, Dylan Ray, Shekeydrah Robinson, Tahani Osman**

**Economic, Political, and Sociocultural Impacts on the Acceptance and Denial of Refugees in Germany and Great Britain**

In recent years, the influx of refugees in Europe has lead to intriguing changes in the social and political climate in many European countries. Through observing these changes through the lens of political history, economics, and socio-cultural values, we examine how each of these elements plays a role in the decisions of European countries to accept or reject refugees from the Middle East. We examine the influence of these variables through a structured comparative case study of how Germany and Great Britain's refugee policies have evolved over recent years. In particular, we focus on Germany’s “open door policy” along with the departure of Great Britain from the European Union, and how each of these relates to their respective attitudes towards the rise in numbers of incoming refugees. By using these examples and the variables we have chosen, we are able to observe two countries that exemplify divergence in their response to the refugee crisis while holding many other demographic factors constant. Through this study, we discerned that the factors most significantly influential to the denial of refugees can be found with regard to how generally liberal or conservative a country has been in the past.

**Liz McNutt, Ceri-Lune Renneboog, Linda Tano, Maddie Wohlfarth**

**Predictors of Adolescent Cholesterol: The Impact of Sleep Duration and BMI on Cholesterol**

Sleep is a predictor of cardio-metabolic risk, which is a main cause of high cholesterol. Studies show that decreased sleep leads to elevated BMI; however, there are limited studies examining the relationship between sleep duration and cholesterol levels. One study found decreased sleep was related to increased cholesterol levels in young adult women (age 20-46). However, there is limited research on sleep and cholesterol in adolescents. This is part of a larger study aimed at assessing the effects of a sleep and media use intervention on adolescent obesity. Twenty-three adolescents (mean age=16.0, SD=0.763; 65.2% African American, 34.8% Caucasian) who slept less than 8-hours on average on weekdays were recruited. Participants were given an actiwatch to monitor their sleep throughout the week and had blood drawn to assess metabolic data including cholesterol levels. Linear regression was performed with cholesterol as the dependent variable and sleep duration and BMI z-scores as independent variables. Demographic variables were not included because they were not significantly correlated with cholesterol. Together, sleep and BMI accounted for 35.3% of the variance in cholesterol, Adj R2=0.353, F(2,22)=6.999, p<0.01. Sleep duration (t=-2.948, p<0.01) was a significant independent predictor of cholesterol (t=-1.907, p<0.05). Sleep duration is a significant predictor of cholesterol levels in adolescents. This could be because less sleep yields a lower metabolic rate, possibly resulting in higher cholesterol levels. Interventions to increase sleep may help with lowering cholesterol. However, more research is needed to further assess the relationship between sleep duration and cholesterol levels.

**Tinnie Louie**
Examining the Role of Injustice Appraisals among Individuals with Spinal Cord Injury in an Inpatient Rehabilitation Unit

Perceived injustice--belief that one’s pain/injuries are undeserved and attributable error or negligence--has been found predictive of negative physical and psychosocial outcomes following acute injury and in the context of chronic health conditions. Individuals who sustain spinal cord injury (SCI) face multiple physical and psychological challenges that may contribute to injustice appraisals; however, to date, almost no studies have addressed the role of injustice perception following SCI. The current study examined the relationship between injustice perception and physical and psychosocial outcomes among patients receiving inpatient rehabilitation following recently acquired SCI. Of the sample (n=77; 24 females; mean age = 48.1 years), 45 sustained cervical and 28 sustained thoracic-level injuries, respectively. Participants completed measures of depression, perceived disability following discharge, and current pain intensity. Perceived injustice was positively associated with depression (r = .41), perceived disability (r = .44), and current pain (r = .23, marginal). In regression analyses, level of perceived injustice significantly accounted for variance in level of depression and perceived disability beyond demographic variables, type of injury (cervical/thoracic, traumatic/nontraumatic) and pain intensity. The study is among the first to examine the role of injustice appraisals in the context of SCI inpatient rehabilitation. Findings are consistent with existing evidence regarding deleterious impact of elevated injustice appraisals across a multiple pain/injury conditions (e.g., whiplash, fibromyalgia) and suggest that interventions targeting injustice appraisals and related psychological factors (e.g., blame, anger) may be warranted following SCI. Future studies are encouraged to examine the longitudinal impact of injustice cognitions following acute hospitalization.

Monima Anam, Kristin Entler, Dr. Zina Trost

Green Energy Growth and State Strategies

Green energy development is a growing priority in much of the Western world. In some countries, the green energy sector has already become a strong part of the economy; however, the United States’ progress in this area has been noticeably slower. Our project sought to explore why that is by performing a case study to identify what factors hinder the successful implementation of clean energy bills, specifically at the state level of government. For a more controlled analysis, we chose two state governments that have taken more progressive stances on environmental efforts: Washington and California. These states should experience similar levels of success in passing clean energy legislation, but we found that Washington has struggled to really create change. Our hypothesis was that strong lobbying efforts and government support for the fossil fuel industry were the main influencers preventing green energy bills from being passed. To test this, we sought out data displaying the allocation of state-level funding to various energy sectors and cross-analyzed these numbers with the number of green energy bills being proposed and implemented. We also looked into other potentially relevant variables, such as public support of certain energy sources, geographic setting, and policy implementation strategies. By analyzing all of these factors, we found that Washington’s failures in clean energy promotion had less to do with the power and influence of the fossil fuel industry and more with some of the other variables at play. These findings could help other state governments more effectively promote clean energy.

Abigail Adams, Kaitlyn Tarver, Hannah Bryant, Kyle Grap
Examining the Effect of School Choice Programs on Segregation while Considering the Parents Decision Making Process

School choice options for parents have been practiced limitedly in the United States. The current Secretary of Education, Betsy Devos, has been a public supporter of these options, and she has promoted their potential during her time as secretary. We examined the effect that certain school choice options, and whether they increased or decreased segregation within the school systems across the United States. Our main focuses are North Carolina’s charter school program, and Indiana’s state voucher program. By examining the demographics of these programs within their school districts, as well as comparing traditional public schools in the area, we began determining whether segregation has increased due to these specific school choice options. Our findings have shown that North Carolina’s charter school program increased segregation, whereas Indiana’s voucher program did not produce evident increase. Our research continued by researching what factors played a role in the parent’s decision-making process. Our findings could play a role in creating future school choice options that will better promote equity within each school environment, and enable parents to access better educational outcomes for their children by allowing policy makers to see what promoted segregation and what could attract parents in a way that your schools will not be racially unbalanced.

Leah Perz, Jack Popwell, Jennifer Henry, Jimmeshia Wilder, Dorcas Digha

The impact of violence exposure on the neural response to psychosocial stress

There is limited prior research on the effect of violence exposure on the neural function that underlies the emotional response to stress. However, violence exposure during adolescence can have an impact on stress reactivity later in life. Therefore, the present study investigated the relationship between prospectively measured adolescent violence exposure (average ages 11-19 years) and the neural response to psychosocial stress as young adults (average age 19). In the present study, 224 participants that had been previously assessed for adolescent violence exposure completed the Montreal Imaging Stress Task (MIST). The MIST is a psychosocial stress task designed to investigate brain reactivity to stress. Our results showed that participants rated the stress condition of the task as significantly more stressful than the no stress portion of the MIST (p < .01). Our results also showed that participants with higher rates of violence exposure, compared with participants with lower rates of violence exposure, rated the stress task as less stressful (p < .01). In addition, participants with high rates of violence exposure showed decreased differential neural activity in response to the MIST within multiple regions of the prefrontal cortex (p < .01). The present findings suggest that violence exposure in adolescence reduces stress reactivity as young adults, which may be facilitated by decreased neural activity within the prefrontal cortex.

Elizabeth S. Davis, Adam M. Goodman, Tyler R. Orem, Muriah D. Wheelock, Nathaniel G. Harnett, Sylvie Mrug, David C. Knight

Death Penalty and the Deterrence of Murder

Through the many years that the death penalty has been in place in the US, the common question has been whether this form of punishment is effective. There is no doubt that the consequence teaches the offender a lesson, though they won’t live long enough to appreciate it. The real question is whether or not it prevents further crime of the same kind: more specifically, the crime of murder as it is the most common with the penalty of death. In other words, does the possibility of the death penalty deter murder? Only around thirty of the fifty states in America practice capital punishment as it is quite the
controversial topic. It was found to be a form of cruel and unusual punishment in 1972 by the Supreme Court but was left up to the states in 1976 when it was reintroduced. Using the data from the past four decades, an answer could be formed as to if the punishment is effective as a form of social justice. If so, are there correlations between other punishments and crimes? And if not, what sort of research should be done in the future regarding death penalty research?

Dalton Thayer Turner

Virtual reality gaming intervention for chronic low back pain: Initial validation

Within the United States, low back pain (LBP) is a leading cause of pain and disability, and the most common reason for seeking medical care. While most acute LBP remits within a few weeks, up to 10% of individuals develop a chronic pain condition characterized by long-term pain, disability, and resource cost. Research has supported that maladaptive beliefs about pain and physical activity (e.g., pain-related fear) contribute to poor outcomes following back injury. The current pilot study examined the safety and feasibility of a prototype interactive virtual reality (VR) cognitive-behavioral intervention designed to challenge fearful pain beliefs and gradually promote physical activity. Thirty-four individuals (17 female; mean age 46.2yrs) with chronic LBP and high maladaptive pain beliefs completed a physician screening, as well as standard measures of pain, pain-related fear, and disability both prior to and following a 3-day laboratory-based intervention protocol. Repeated-measures analyses indicated no significant elevation in pain-related fear (F=1.4, p>.05) or disability (F=0.3, p>.05) and significant decline in average pain intensity (F=4.0, p.05). Mean scores on the Treatment Evaluation Inventory (M = 34.7, SD = 5.6) suggested above moderate treatment acceptability and overall positive interest in the intervention. Findings support the safety and feasibility of a VR gaming intervention model designed to deliver cognitive behavioral treatment for maladaptive pain beliefs while promoting physical activity among individuals with chronic LBP. The tested model represents an early prototype of the intervention, which is ultimately intended to provide a flexible interactive platform across clinical and home settings.

Caroline Spigner, Deanna Rumble, MS, Lucie Mitchell, DO1, Timothy Ness, MD, PhD, Zina Trost, PhD

Examining the role of cognitive-affective factors in the context of driving in pain: Preliminary analysis in a chronic low back pain sample

Chronic low back pain (CLBP) is among the most common and costly pain conditions in the United States and is associated with a number of deleterious physical and psychological outcomes. Individuals with CLBP report interference across numerous domains of daily function; such disruption is often exacerbated by psychological distress accompanying pain experience. While driving is a common daily task for many, there is currently little research examining the effect of pain in the context of driving experience. As part of the current study, 315 participants with CLBP (159 female, Mean age=35.16 years, SD=10.52) completed an online survey regarding their physical and psychological experiences while driving. Specifically, participants indicated the extent to which their pain was exacerbated while driving as well as the extent to which driving in pain increased their distractibility, impatience, and irritability at other drivers. Participants also reported number of collisions during the previous year. Findings indicated that individuals who reported more pain exacerbation while driving also reported greater distractibility, impatience, and irritability (râ€™s = .47 -.52, all pâ€™s &lt; .01). Distractibility, impatience, and irritability in response to pain were also highly interrelated (râ€™s = .64 -.75, all pâ€™s &lt; .01). Participants who endorsed a vehicle collision in the past year reported a significantly higher irritability and impatience responses to driving in pain than those without collision history. Participants
with collision history also reported marginally higher distractibility when driving in pain. Further study is encouraged to better understand the relationship between pain and driving experience.

Joshua Seward, Maegan Gates, Deanna Rumble, MS, Nina Attridge, PhD, Despina Stavrinos, PhD, Dave Moore, PhD, Zina Trost, PhD

Impact of Race and Childhood Maltreatment on Fat Distribution in Caucasians and African Americans

Childhood maltreatment (CM) has been shown to affect metabolic profile, notably visceral adipose fat (VAT). An increase in VAT increases risk for diseases such as cardiovascular disease or diabetes. However, it remains unknown whether the effect of CM on VAT is race-specific. Furthermore, little is known regarding impact of race on other obesity measures in regards to CM. This experiment was designed to determine whether race affects CM and fat distribution. One hundred and ten participants (Caucasians=59, African American=51) completed the study, giving demographics, anthropometric measurements, and depressive state. We assessed CM using the Childhood Trauma Questionnaire (CTQ), and participants fell into two groups, CM and non-CM. Total fat, trunk/total fat ratio, VAT, and VAT/trunk ratio, were measured through Dual Energy X-Ray Absorptiometry (DXA). Caucasians with CM had increased VAT (p=0.024) and VAT/trunk ratio (p=0.039). However, other measurements, including body mass index (BMI) and waist-to-hip ratio (WHR), did not differ. There was a positive correlation between CM and trunk/total fat ratio (r=0.310, p=0.023). For African Americans, there were no significant differences between CM and non-CM groups on any obesity measures and no correlations. Results suggest that there is a relationship between CM and VAT only present in Caucasians, not African Americans. These results suggest that CM and obesity have different mechanisms between races, and that diagnosis and treatment of obesity may need to take into account possible influencing factors such as CM and race.

Angela Y. Chieh, Yang Liu, Sarah K. Sweatt, PhD, Li Li MD, PhD

Childhood Abuse Increases IL-6 Responses to Daily Stressors in Adulthood

Childhood abuse leads to greater morbidity and mortality in adulthood. The lead lab evaluated the impact of childhood abuse on inflammatory responses to naturally occurring daily stressors. In this cross-sectional study of 130 older adults, recent daily stressors and childhood abuse history were evaluated using the Daily Inventory of Stressful Events and the Childhood Trauma Questionnaire, and blood samples provided data on circulating interleukin-6 (IL-6). Individuals with a childhood abuse history who experienced multiple stressors in the past 24 hours had IL-6 levels 2.35 times greater than those of participants who reported multiple daily stressors but no early abuse history. Elevated levels of proinflammatory cytokines become chronic to those who were exposed to early life stress.

Wendy Jiang, Nour Mough, Natalie Simpkins

Works in Progress

Industrial Development in Birmingham: Strategic Planning and Improvement

Max Morgan, Danielle Lucky, Malone Garth, Steve Peterson

Structural Defects in Photoelectrochemical Nanowires Lead to Decreased Energy Yield

Improving solar power technology will be the driving force to implementing clean energy technology, but the available technology can be improved. This study illustrates how minor structure changes in
nanowires for photoelectrochemical (P.E.C.) cells lead to drastic loss of overall energy yield. By measuring the energy emissions from different nanowires with respect to time, the lab illustrated the energy loss experienced from nanostructure infractions was due not only to type of material (naturally occurring zinc-oxide versus treated zinc-oxide coated with titanium oxide), but also an inherent shortcoming of nanowires for energy storage and emission. While the treated nanowires had better photon to current efficiency, the yield was still unsatisfactory. This result suggests that the lab should pursue a different medium for solar-to-fuel energy conversion.

Edward Huang, Topanga Fucci, Adam Gattis

Vestibular Function in Children with Cerebral Palsy (CP)
Although it is documented that children with cerebral palsy (CP) suffer from balance problems, the vestibular system’s contribution to these balance issues was never explored. The objective of this study was to compare vestibular function of 7-12 years-old children with CP with group of typically developed (TD) children aged 9-14 years. The integrity of the saccule/inferior vestibular nerve was tested with the Cervical Vestibular Evoked Myogenic Potential (C-VEMP: Sternocleidomastoid EMG response to tone bursts, compared between ears). The C-VEMP asymmetry ratio was corrected for individuals’ muscle contraction level (corrected Asymmetry ratio). Participants also completed the Sensory Organization Test (SOT) to determine ability to maintain standing balance during 6 conditions that challenged the visual, somatosensory and vestibular systems. Based on the sway score, ratios of each system were calculated (con. 2/con. 1: somatosensory ratio, con. 4/con. 1: visual ratio, & con.5/con. 1: vestibular ratio). 29 children completed this protocol (CP group=15 [Hemiplegia=10, Diplegia=5] & TD group=14). The mean ages of CP and TD group were 8.6 years (SD=1.81) and 11.29 (SD=1.44), respectively. Children with CP had significantly lower visual and vestibular ratios on the SOT (p<0.0001) when compared to TD children. On the other hand, they had significantly higher somatosensory ratio (p<0.0001) when compared to TD children. The corrected asymmetry ratio of the C-VEMP was significantly lower in children with CP (p<0.0001) when compared to TD children. This study shows preliminary evidence of peripheral vestibular dysfunction which could contribute to balance impairments in children with CP.

Warren Davison, CAS Student; Anwar Almutairi, MSPT; Jennifer Christy, PT, PhD

Bioenergetic Function Declines Due to High Levels of Adipose Tissue in a Sample of Women with HIV
Women with HIV and high levels of body fat are associated with altered bioenergetic function. To determine how high levels of body fat impacted the bioenergetic function of monocytes, 42 women Â with HIV were sorted into three different groups based on body composition. The body composition was determined with a (DXA) dual-energy x-ray absorptiometry. Blood samples were taken from each group of women and processed. The two components observed were oxygen consumption rate and extracellular acidification in correlation with impaired bioenergetic health. Once OCR and ECAR were measured, it was determined that high levels of adiposity negatively affected mitochondrial function and bioenergetic health. Therefore, it was concluded that obesity and HIV negatively impact overall body health and increase the risk for metabolic syndrome.

Filip Krutu , Benjamin Raybuck, Diane Rojas
Ex-vivo mitochondrial physiology development and analysis of liver tissue using a Krumdieck Tissue Slicer

Degenerative and chronic conditions, such as diabetes and cancer, as well as other biological processes are linked to alterations of mitochondrial function. Analysis of mitochondrial respiration is the method of evaluating the energetic capacity of a model. Most standard methods of mitochondrial respiration analysis require the removal of the organelle from the cell, which leads to a loss of the mitochondria’s tissue architecture. To address this, we are optimizing a high-throughput technique for analysis of liver energetics using Precision Cut Tissue Slicing (PCTS). This method will generate reproducible ~200 micrometer slices, which are immediately available for measuring oxygen consumption rates and evaluating mitochondrial physiology. Currently, we are investigating the effects of a glucagon analog on insulin sensitivity using a mouse model. A wild-type mouse liver is being tested against a genetically modified liver that lacks the proposed FXR receptor gene for the glucagon mimetic. In wild type vs. glucagon analog treated mouse livers, the wild type had a greater Respiratory Control Ratio (RCR) (State 3/State 4) of 7.37 compared to the glucagon analog treated, which had a RCR of 4.68. This indicates wild type model is more coupled, and therefore the electro-chemical gradient generated via the electron transport chain (ETC) is linked to oxidative phosphorylation to a greater extent. State 4 was lower (21.47 pmol mL-1s-2) compared to glucagon analog treated (42.39 pmol mL-1s-2), suggesting the latter has a higher leak rate (possible energy waste). The RCR also serves as a control assessment, and it indicates that the tissue was not damaged during the preparatory stage of the experiment, slices of optimal and similar thinness were generated, and mitochondrial function was accurately measured.

Catherina Vestri, Tejas Shekar

Resilience in the Healthcare Industry

For this research project, we will be focusing on resilience in healthcare systems and the burnout of the individuals that make up these systems. In order to do this, we have begun conducting a systematic review of the literature about this topic. This process started with an initial database search. Next, each article underwent a title screening in order to determine which ones were the most relevant to our topic. Later, the articles will be screened by abstracts and conclusions to further determine relevancy. Then, the full text of the remaining articles will be analyzed, and only the ones deemed applicable will be used as references. The topic will also be broken down into two different sections: macro and micro. The macro group will focus primarily on healthcare systems as a whole, while the micro group will focus on the individuals that make up those systems. Once this has been completed and using the common themes found in the articles, we will develop our own instrument to detect resiliency in health care professionals. This instrument will then be tested and the findings will be published. From there, it is possible that we will develop a set of tools that can be used to help healthcare organizations to become more resilient.

Kyle Fuller, Lena Carter, Mackenzie Robinson, Keytahnie Jones

One Plate at a Time: A Study Behind the Imbalances in Food Group and Nutrient Consumption in Early Care and Education Centers

In the United States, 90% of children are involved in early care and education (ECE) programs where they receive an average of two meals and two snacks per day. It is important to look at how food groups such as vegetables, fruits, grains, and dairy are incorporated in ECEs because children are receiving so much of their daily nutrition in the centers. Children’s consumption of nutrients such as sodium,
fiber, sugar, and fats are a few examples of nutrients that are incorporated into food groups that may need improvement. There is a sufficient amount of literature available concerning the nutritional imbalances in ECE centers, however, there is an insufficient amount of literature regarding interventions to improve the quality of the food being served to children in these centers. The goal of an intervention in the ECEs is to further align the consumption of these food groups with the recommendations put forth in the CACFP guidelines. We are planning on going into two centers, roughly twice per month, to observe the food that is served to three randomly selected children in a three to five year old classroom. The collected data will be shown to the center directors in order to educate them on what particular food groups need improvement. The goal is to identify the food group imbalances in the centers and devise a plan to assist the centers in providing a meal that meets the food group requirements as recommended by the USDA.

**Rachael Hildebrand, Samantha Baghal, Margaret Dixon, Kaile Allen**

**Effects of TRPV4 and PKD2 Protein-Protein Interaction on Cation Transport in Human Embryonic Kidney (HEK-293) Cells**

The TRP (â€œtransient receptor potentialâ€) family of cation channels is made up of several cation channels that either transport Ca2+, Mg2+, or both. Based on homology of their DNA and protein sequences, this large family of cation channels is divided into seven families which include TRPC, TRPV, TRPM, TRPP, TRPML, TRPA, and TRPN. Studies show that these channels play a role in regulating intracellular calcium and calcium storage in a variety of cell types. Interaction of various members of these families can have profound effects on their ability to transport of Ca2+ which, when deviated from normal levels, may form the basis of polycystic kidney disease (PKD). PKD2 is a member of the TRPP family and has been implicated in the pathogenesis of PKD. Therefore, we proposed and tested the hypothesis that TRPV4 and PKD2 interact within the cell and that this interaction alters the function of PKD2 and contributes to the pathogenesis of PKD. This hypothesis was tested in HEK-293 mammalian cells which stably co-expressed TRPV4-HA and PKD2-DYK, which were generated through homology based cloning. Immunofluorescence assays showed that the two channels co-localized to the same cellular compartments. Co-immunoprecipitation studies, in addition to Western blot assays, showed that there is some degree of physical interaction between the two channels, and with further studies, could be used in synthesis of pharmaceutical interventions for PKD.

**Paige Kimball, Deborah McCombs, Dr. Darwin Bell, Dr. Tino Unlap**

**Will Sea Stars Tolerate the Rising Levels of Ocean Acidification Predicted in the Near Future?**

The effects of predicted Ocean Acidification levels, which are rising due to anthropogenic CO2 emissions, were studied in sea stars (Luidia clathrata) in the phylum Echinodermata. These effects were tested by weighing the sea stars, measuring the length and radius of the arms, measuring righting times, and analyzing biochemical composition of the body wall and pyloric caeca of the sea stars. This study indicates that the pH levels predicted in the near-future have no significant impact on the functions of Luidia clathrata, but further studies may be warranted to determine the effects on other marine organisms.

**Payton Lambertsen, Abbi Long, and Tabitha Wallace**
The SRF-Independent/SAP-Dependent Genes Represent a Poor Prognosis for Breast Cancer Patients

In previous studies, the gene Tenascin-C was found to promote breast cancer metastasis to the lung, which is significant because the main cause of death in breast cancer patients is usually metastasis rather than the tumor itself. This project endeavored to identify genes that were co-regulated with Tenascin-C by the Mkl1 transcription factor, attempting to determine other genes that promote breast cancer metastasis. Using HC11 mammary epithelial cells overexpressing different Mkl1 constructs, a subtractive transcript profiling screen was devised to identify the mechanism by which Mkl1 induces a gene set co-regulated with Tenascin-C. Computational analysis of the Mkl1 target genes and cell biological experiments were performed to confirm the effect of these gene products on cell behavior. To analyze whether this gene set is prognostic of accelerated cancer progression in human patients, the bioinformatics tool GOBO was used, which allowed the researchers to investigate a large breast tumor dataset linked to patient data. They discovered a breast cancer-specific set of genes including Tenascin-C-- which is regulated in a SAP domain-dependent, serum response factor-independent manner-- is strongly implicated in cell proliferation, cell motility and cancer. Expression of this gene set is associated with high-proliferative poor-outcome classes in human breast cancer and a strongly reduced survival rate for patients independent of tumor grade. This study highlights a crucial role for the transcriptional regulator Mkl1 and its SAP domain during breast cancer progression. The identified novel gene set that correlates with a bad prognosis may assist in deciding the rigor of therapy.

Lindsey Ferraro, Aubrey Shaw, Leila Yang

Gene x Drug x Media Variations in S. cerevisiae, Analyzed Through Experimental Methodology, to Develop Translational Models

The phenomics research focuses on analyzing yeast strain fitness to understand human gene interaction networks and develop translational models. Yeast models were utilized due to their conservation of fundamental human cell functions and the relative ease of performing genome-wide phenotypic analyses on these models. Media (6 types), gene (8 types), and drug (2 types, 12 concentrations each) were independently varied to determine their combined effects. A human-like media was created by introducing changes to the yeast media; different genes were altered to enhance drug efflux and/or permeability for testing drug concentration gradients of hygromycin and bortezomib. A new cell-array imaging methodology, Quantitative High Throughput Cell-Array Phenotyping (Q-HTCP), and normalization using logistic growth curves produced Cell Proliferation Parameters (CPPs) and gene interaction values (fitness). Differences in gene interaction values among the varying strains and their environments were found. Finding the optimal gene x drug x media combination, based off of gene interaction values and enhanced sensitivity, can reduce the drug cost for a genomic screen. Yeast models that most effectively mimic human genetics can be used to better understand human diseases and genetic expression.

Karen Wang, Amy Jasani, Byron Cot

Is PGC-1α knockout a model for Huntington's Disease?

There is increasing evidence that the transcriptional coactivator PGC-1α plays a role in the pathophysiology of Huntington’s Disease (HD), an autosomal dominant disorder that results in deterioration of motor function and psychological capabilities. Mice with reductions in PGC-1α in the striatum and muscle tissue exhibit certain characteristics of HD as early as the initial postnatal period.
This experiment sought to determine if the loss of PGC-1α in animal models led to the transcriptional changes, reduced cellular viability, and phenotypical behavior observed in animal models of HD. One litter of mice underwent a double knockout to eliminate the PGC-1α coding gene and was compared to mice who expressed the gene through a series of performance tests at 4 and 12 weeks. Additional tests such as gene expression analysis, histology comparison, and HPLC were performed after 12 weeks. It was determined that while PGC-1α-/- mice display certain HD pathology, they do not exhibit the Medium Spiny Neuron loss that is a defining feature of HD. Furthermore, while PGC-1α-/- mice do display neurodegeneration, the damage is observed in the initial postnatal period. It can be concluded that while PGC-1α is responsible for the proper development and protection of neuron cell populations, it cannot be a model for HD.

Alice Kim, Nicholas Southern, Mychi Tran

Identification of the Anterior Right Ventricular Insertion as the site of Ventricular Fibrillation

Ventricular fibrillation (VF) is defined as the quivering of uncoordinated muscle fibers located in the lower two chambers of the heart. It involves the accumulation of many wavebreak events, which indicate the rhythmic abnormalities within the electrical activity of the heart. This phenomenon makes it difficult for the heart to properly pump blood, causing irregular heartbeat (arrhythmia) and cardiac arrest. In worst cases, it may even lead to death, making it the most serious cardiac rhythm disturbance. In order to prevent the advancement of VF, the identification of a consistent anatomical site where the first wavebreak event was studied. Ten pig heart samples were collected and analyzed via panoramic optical mapping. Defibrillated with padded electrodes, the hearts were stimulated with VF and were examined for wavebreak sites through fluorescence imaging. The results showed that the initial VF wavebreak events occur within the anterior right ventricular insertion (ARVI) region, which is the point of intersection between the left and right ventricles. The next step in the research would be to understand why the ARVI is the common anatomical site when VF occurs. Using this information, treatments can potentially be developed to lessen the likelihood of VF, and hopefully, to eliminate it.

Eunice Lim, Sean Martin, Reagan Merritt

CD38 Deficiency Inhibits the Calcium Mobilization Pathway during Cellular Immune Response

The transmembrane glycoprotein, CD38, expressed in pancreatic and lung cancer cells, plays an essential role in cellular immune response, motivating Dr. Partida-Sanchez’s laboratory to investigate the effects of inhibiting CD38 to lead to biological cell death of the cancer. The laboratory developed CD38 deficient mice and used flow cytometry to measure the extent to which calcium mobilization, an essential event during cellular immune response and chemotaxis, is suppressed. The study demonstrated that the migration of neutrophils is dependent on the influx of calcium ions, regulated by cADPR. With this study, researchers hoped to disrupt the cancer cell’s ability to grow, using the inhibition of CD38 to eventually cease the formation of cancer.

Jenna Alkhatib, Jessica Graham, Kristine Farag

PIP2 Degradation Inhibits the NBCe1-B and -C Variants Expressed in Xenopus Oocytes

NBCe1-B/C is a Na+/bicarbonate cotransporter that plays a big role in regulating intra- and extracellular solute balance and pH. PIP2 (phospholipid phosphatidylinositol 4,5-biphosphate) is a signaling molecule and cell membrane component. VSP is a voltage-sensitive phosphatase that can regulate the amount of PIP2 in a cell. In this experiment, wild-type- and mutated-VSP oocytes were used to measure NBCe1-C
current through two-voltage clamp technique in combination with pH measurement and fluorescent imaging. They decreased PIP2 by manipulating VSP (keeping it clamped at a certain voltage, then forcing it to depolarize, thus no longer depleting PIP2), and this inhibited NBCe1 activity. The results suggest that PIP2 could be a powerful regulator of NBCe1 activity and thus also a powerful regulator of solute balance and pH. One of the bigger pictures of this and past studies like it has been how this can relate to autosomal recessive polycystic kidney disease (ARPKD). ARPKD is a genetic disease that involves mutation of the the PKHD1 gene, and severely reduces life expectancy through the effects of underdeveloped lungs, high blood pressure, and loss of kidney function. Na+ channels in the cellular membrane, such as NBCe1-C, contribute to Na+ hyperabsorption to regulate pH and acid base transport in the tissues such as the brain, heart, and kidneys. The next step would be to evaluate what activates VSP in order to indirectly maintain pH regulations and acid-base transport in kidneys in general and in ARPKD.

Ian M. Thornell and Mark O. Bevensee

Where Are We Now with Birmingham’s Plan to Prevent and End Chronic Homelessness?

Homelessness has been a critical issue throughout the entire U.S, especially in Birmingham, AL. Within the Birmingham and Jefferson county area, homelessness grew 145% from 1987 to 2005. In order to lower the rate of chronic homeless, the city of Birmingham proposed a 10 year plan that carries out a range of prevention and service-delivery strategies that have been deemed as effective and cost-saving. The 10 year plan focuses on expanding local resources and improving their ways to better serve the homeless population by fund raising efforts and proactively addressing issues that are cofactors in homelessness to the community. 5 goals have been established within the 10 year plan to reduce the amount of homeless. The present aim of this project is to analyze the 10 year plan goals to see what has exactly been accomplished and what has yet to be accomplished in order to develop potential strategies to accomplish these goals. Anne Regalâ€™s Tedx video and 10 year plan was used to assist in understanding the gravity of Birmingham’s homeless problem. Each member of the team assessed each goal within the 10 year plan and was then collected by the project manager to incorporate in the poster. In the end of the semester, we plan to assess what has been accomplished in the goals as well as what has not been accomplished. We will then work on developing ways to help solve what has not been accomplished in order to improve the homelessness in the Birmingham community.

Stephanie Diei, Courtney Carraway, Alex Patel, Gyusik Park, and Mark Jeon

GSK3 Inhibition Decreases Synaptic Plasticity in Nocturnal Mice During Night Hours

The objective of the lab is to define the role of temporal regulation of GSK3 activation in hippocampal function. The method to obtain the data involved placing the mice in a 12 hour light :: 12 hour dark cycle. Further testing included hippocampal slice preparation and electrophysiological recordings. Long-Term Potentiation was induced in GSK3 inhibited hippocampal slices and GSK3 active hippocampal slices. Day and night time LTP levels and differences were measured. This study discovered that GSK3 is rhythmically inactivated in the hippocampus in both a light/dark cycle and in constant darkness. Inhibiting GSK3 disrupted day-night differences in Long-Term Potentiation suggesting GSK3 modulates hippocampal function over a 24 hour cycle. LTP was decreased at night (when nocturnal mice are active, and GSK3 phosphorylation and inhibition is lowest). There was no effect on LTP during the day. Several neurological and neuropsychiatric diseases could benefit from this study as GSK3 signaling has been implicated in depression, bipolar disorder, and Alzheimer’s disease (Li and Jope, 2010; Machado-
Vieira et al., 2010). Those with these disorders typically suffer circadian disruption (Foster and Wulff, 2005; Hope, Keene, Gedling, Fairburn, and Jacoby, 1998; Wulff, Gatti, Wettstein, and Foster, 2010). By understanding the connection between the hippocampus, GSK3, and the circadian rhythm, further studies may be conducted and new information discovered that could potentially result in treatment for those with neurological diseases.

Shahaan Farrukh, Sky Morris, Alyssa Klop

Low levels of Ldb1, Isl1, or SSBP3 lead to beta cell dysfunction
Diabetes Mellitus is a chronic disease caused by a dysfunction in insulin-producing beta cells of the pancreas, affecting 371 million people worldwide. The Hunter lab sought to identify whether a lack of the proteins Ldb1, Isl1, or SSBP3 affected the function and development of beta cells by performing co-immunoprecipitations and si-RNA transfections. The research methods were conducted on both mouse and human cells to ensure the validity of data for future human applications. The experiment determined that Ldb1, Isl1, and SSBP3 were found together in beta cells and that the lack of any one of these proteins resulted in a decrease in beta cell function. Presumably in the future, monitoring the levels of these proteins in the beta cells would allow an earlier diagnosis of diabetes, and would result in a novel treatment to inject Isl1, Ldb1, and SSBP3 into the body to reverse the course of diabetes.

John Kim, Simon Peeples, Katy Snoddy

Metabolic Heating Affects Sex Ratios of Turtles
The sex of a sea turtle is reliant upon temperature dependent sex determination (TSD), which means the sex ratio of the population is dependent upon the temperature of the egg during embryonic growth. Metabolic heating could potentially affect the sex of the population. It is important to understand the impacts of metabolic heating on the sex ratio of the population because it does affect the health of the population. In the study, metabolic heating and ambient beach temperature were measured for 18 hawksbill sea turtle clutches. One data logger was placed in the center of a clutch to measure metabolic heating and another was placed one meter away at a similar depth to measure ambient beach temperature. The data from the temperature loggers were then used with the Embryogrowth R package (a statistical analysis test) to estimate the sex ratio of a clutch. The study found that metabolic heating produced higher temperatures and thus a lower percentage of males near the center of the clutch, while ambient beach temperatures were cooler and would produce a higher percentage of males.

Katie Dietz, Nia Peterson, and Sophie Wasilevich

The Dimerization of Membrane Trafficking Enzyme GBF1 is not Required to Maintain Golgi Homeostasis
Many human diseases, such as Osteogenesis Imperfecta, are caused by the failed delivery of a specific protein to its appropriate site. GBF1 is an enzyme that initiates retrograde membrane trafficking, the cellular cargo pathway from the cis-Golgi to the ER. A better understanding of this type of enzyme would initiate new procedures to counter diseases. GBF1 is known to exist as a dimer in nature (wt). This laboratory tested the significance of GBF1’s dimerization by introducing mutations at the 91st and 130th amino acids which prevented GBF1 from dimerizing. Three experimental groups were prepared: non-transfected, wildtype, and mutant GBF1-91/130. An inhibitor, Brefeldin-A, was used to inhibit GBF1’s enzymatic function which ultimately led to Golgi degradation. The lab used
immunofluorescence to measure the percent of transfected versus non-transfected cells with degraded Golgis. Monomerized GBF1-91/130 showed little distinction from its dimerized counterpart. The data they collected suggested that GBF1-91/130 could target the Golgi and maintain homeostasis similarly to normal GBF1.

Jason Zhang, Annabel King, Dhruv Singh

The deletion of CDNOS1 influences fluid-electrolyte balance and mean arterial pressure
Hypertension increases risk for heart disease and stroke and is regulated by sodium-sensitive blood pressure. The Hyndman lab aimed to determine the specific function of the NOS1 gene in relation to sodium excretion and the regulation of blood pressure. Mice without the collecting duct specific NOS1 gene (CDNOS1KO mice) were produced by breeding AQP2-CRE mice with NOS1 floxed mice. When challenged with high dietary sodium, CDNOS1KO mice showed significantly reduced urine output, sodium and chloride excretion, and increased mean arterial pressure relative to flox control mice. This showed that the NOS1-derived nitric oxide in the collecting duct regulated the fluid-electrolyte balance and blood pressure. The research showed the importance of the CD NOS1 pathway and the necessity to translate these findings to humans.

Madelyn Hoffmann, Lan Wang, Alan Jeskey

Understanding Level 1 Fieldwork Rotations Within Occupational Therapy Education
Occupational therapists (OTs) work with people across a wide range of ages to accomplish their daily activities so that they can lead independent and productive lives. OTs achieve this by engaging people in activities to improve a person’s well-being. OTs are currently in high demand, meaning that sites for clinical rotations, an integral part of clinical education, are being burdened with a large influx of students. In addition, the Accreditation Council for Occupational Therapy Education (ACOTE) is putting forward new standards that redefine the delivery of Level I fieldwork rotations. To better position the UAB Department of Occupational Therapy, the program is undertaking a study to understand current models used by OT programs for Level I fieldwork rotations. This information will guide curriculum development and position the department to meet the requirements of the new standards. The department proposes to develop and distribute a survey, using Survey Monkey, to all OT and occupational therapy assistants (OTA) schools, accredited by ACOTE to gain insight into alternative fieldwork experiences. The questions will capture data related to the type and number of experiences, when these experiences occur, number of hours, and other variables to be identified from the literature. The expected results of this study should offer insight into the various models used for Level I fieldwork experience nationwide, which, should aid in constructing a model to best fit UAB’s curriculum. From the feedback on the survey, UAB’s program will adjust the curriculum for its Level I fieldwork rotations to become more efficient.

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

UAB Solution Studiosâ"¢: Facilitating Clinical Innovation through Interprofessional Collaboration
Clinicians at UAB Hospital have incredible insight into clinical problems, but they often lack the time and resources to develop innovative solutions. UAB Solution Studiosâ"¢ is an initiative created to address this issue by pairing clinicians with UAB undergraduate students who have the time, relevant education, and eagerness to gain hands-on experience in the clinic. UAB Solution Studiosâ"¢ trains students to utilize clinician insight through a design thinking curriculum. This enables students to conceptualize
innovative solutions to clinical challenges at the bedside. Not only does this interdisciplinary, patient-centered innovation have the power to bring life-changing solutions to healthcare, it also provides immeasurable practical experience for the next generation of clinical and engineering professionals. Through extensive immersion with UAB Solution Studios™ clinical partners and direct interactions with patients, students receive rapid design feedback, advancing the innovation process. In its inaugural year, students participating in this process produced two projects (provisional patents pending) that seek to solve real clinical problems involving two issues: 1) standardization of stoma surgery for ostomy patients and 2) reduction of medical adhesive related skin injuries without compromising device securement. These projects, their funding, and the overwhelming support from UAB clinicians and administrators attest to the potential impact of UAB Solution Studios™ on health care and patient-centered innovations both at UAB Hospital and abroad.

Brody DeSilva, Allaire Doussan, Ali El-Husari, Hira Munir, Paige Severino

Got Micronutrients?: Improving Inadequate Micronutrient Intake in 2-5 year olds in Early Childhood Education Centers Through Individualized Interventions

Micronutrient deficiencies are present in about half of children ages 6 months to 5 years worldwide making them more prone to developing long-term negative health impacts, like iron deficiency anemia and obesity. Currently, children ages 2-5 in Early Childhood Education (ECE) centers do not meet the requirements for the recommended micronutrient intake for several micronutrients including iron, calcium, and vitamin D. Further, current literature fails to address needs for individualized interventions for ECEs, which is necessary due to the vast differences among centers that impact the ability of an ECE to implement an intervention to resolve these low intakes of micronutrients in ECEs. The purpose of this project is to explore different interventions in terms of long-term change, to understand if dietary quality can be improved, with focus on increasing micronutrient intake. In the ECEs, we will work with the cook to develop the menu, the teachers to develop micronutrient-related lesson plans, and the children to observe their acceptance of food changes. We will compare the recommended levels of selected under-consumed nutrients, such as iron, calcium, and vitamin D, to the average intake of micronutrients in children ages 2-5 year olds in ECEs before and after the interventions to determine effectiveness of intervention. By creating an individualized plan for a center, focusing on improving access to varying cooking strategies and nutrition education, the individualized interventions done in the ECE centers could then be modified for a larger-scale application.

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

Virtual rubber arm illusion as exposure therapy for blood donation phobia

The annual US blood supply is provided by non-remunerated donors and has decreased from 5.4% to 3.6% of the population. Phobic responses to blood and needles are central barriers to blood donation and blood draws in healthcare settings. In-vivo exposure to feared stimuli (e.g., blood and needles) represents an effective intervention to address these concerns. The current program of research aims to develop an effective and flexible exposure paradigm by using virtual reality technology and body illusion methods to provide a simulated blood donation experience. Three studies are described. The first study examined feasibility of a virtual blood draw which paired footage of a human arm undergoing a blood draw with tactile stimuli delivered to the participant’s own arm, thus generating a sense of virtual arm ownership (i.e., rubber arm illusion). Results indicated that the illusion was
successfully induced. Further, the simulation elicited significant changes in physiological and presyncopal responses consistent with exposure to feared blood/needle stimuli. Finally, measures of fear related to blood and needles showed strong associations with presyncopal symptoms following illusion administration. As part of further validation, the second (ongoing) study compares psychological and physiological responses to the above paradigm against responses to control and sham conditions which do not induce the arm illusion. The third (ongoing) project will utilize virtual reality and motion-tracking technology to generate the blood donation simulation within a fully immersive virtual space. To date, results suggest that virtual exposure may be an effective paradigm across a variety of intervention contexts.

Stephen Spivey, Sarah Atkinson, Danielle Hill, Allison Cvengros, Ala'a Abu-Spetani, Corey Shum, Zane Ballard, Deanna Rumble, Allison Jones, Stephen Christopher France, Zina Trost

Introduction of a phospho-block mutation to evaluate the significance of phosphorylation in HP1a

The Heterochromatin Protein 1 (HP1) family is a highly conserved protein family central to the maintenance and formation of heterochromatin. Members of the HP1 protein family are characterized by three domains: the chromodomain, chromoshadow domain, and hinge domain. The chromodomain binds H3K9 methylation, while the chromoshadow domain interacts with other HP1 family members. The hinge domain connects the two domains. In this project, we are creating a phospho-block mutation in the hinge domain of the HP1a protein, a specific paralog of the HP1 family present in Drosophila melanogaster. To achieve this goal, a donor plasmid carrying the mutation is constructed following to be used for CRISPR/Cas9 genome editing. After successful construction, we will inject this donor plasmid and an appropriate guide RNA into Drosophila embryos. By creating the phospho-block mutation, we hope to reveal more about the function of the hinge domain, as well as the function of the HP1 family in general. We predict this mutation will interfere with the heterochromatin function of HP1a. The mutation generated in this study will be part of a series of post-translational modification mutants which also includes a phospho-mimic (imitates phosphorylation) mutation of HP1a and both phospho-block and phospho-mimic mutations of a predicted phosphorylation site in HP1B, a second HP1 family member in Drosophila.

R. Campbell Mackenzie, J. M. Schoelz, Nicole C. Riddle

Effects of Î±-synuclein conformations on phenotypes of Parkinson's Disease in mice

Parkinson’s Disease (PD) is a neurodegenerative disease that is pathologically characterized by dopamine neuron death in the substantia nigra pars compacta and by Lewy bodies and Lewy neurites that are composed of Î±-synuclein. It is unknown which conformation of Î±-synuclein causes neuron toxicity or inclusion formation. In this study, five Î±-synuclein conformations—monomeric Î±-synuclein, long unsonicated fibrils, pure oligomers, pure short fibrils, and the heterogenous mix of monomers, oligomers, and short fibrils—were unilaterally injected in the striatum of five groups of mice. To investigate motor function, the pole test and cylinder test were performed; in the cylinder test, left hindlimb steps were examined to study potential deficits in the limb contralateral to the injection site. Videos are currently being analyzed and will be presented at the time of presentation. After behavioral analyses, mice were perfused at three and six months post-injection for immunohistochemistry using antibodies to tyrosine hydroxylase to label dopamine neurons and phosphorylated Î±-synuclein to label Lewy body and Lewy neurite-like inclusions. We will then be able to determine dopamine neuron death and the presence of inclusions with an unbiased stereological approach. However, we are currently
blinded to experimental conditions and cannot yet make final conclusions. In progress results comparing quantifications of differences between the groups will be presented at the time of presentation. Future plans for this work in progress include completing the project to ultimately determine each Î±-synuclein conformation’s effect on the phenotypes of PD.

Nadia Anabtawi

Relating Physiological Response to Driving Conditions
Motor vehicle collisions are one of the leading causes of death across the lifespan, and driving may also impact physiological functions and subsequently long-term health complications. It is important to learn how certain driving environments and situations may directly impact physiological functions. Innovative technology such as BIOPAC can be used to measure physiological response while driving and has shown strong agreement between physiological responses measured in both real-world and simulated driving. BIOPAC has previously been used to measure emotional arousal through skin conductance response and stress via heart rate and heart rate variability. Research has shown how increased physiological stress through time pressures has increased driver speed. Evoked through electrical shocks throughout a 6-hour drive, stress fatigue and physiological arousal have been shown to impact driving through increasing driver error and decreasing reaction time Although research has examined how autonomic functioning may predict driving performance, it is unknown how autonomic functioning is impacted by specific driving environments and hazards. BIOPAC is a well validated device that measures multiple physiological functions. This work in progress is unique in that it will be using a fully immersive driving simulator equipped with BIOPAC technology to evaluate the physiological output in varying road conditions and hazards. The use of a simulator allows high experimental control of environments and hazards and will enable researchers to study how weather, daylight, road conditions, and unexpected events can affect the stress levels of the body while behind the wheel.

Jacqueline Heidi Mikell, Ben McManus, MA, Despina Stavrinos, PhD

LRRK2 Pharmacological Inhibition Mitigates Neurodegeneration in an Alpha Synuclein Induced Model of Parkinson’s Disease
Parkinson’s disease (PD) is the most common neurodegenerative movement disorder. The most common cause of genetically linked PD is the G2019S mutation in the LRRK2 gene which leads to the overactivity of the leucine rich repeat kinase 2 (LRRK2) enzyme, causing dopaminergic neurodegeneration. Mutations in the protein alpha synuclein are also associated with Parkinson’s Disease. Dr. West’s lab hypothesized that neurodegeneration associated with PD can be reduced through the use of a LRRK2 enzyme inhibitor (PF-475). Transgenic rats with a G2019S mutation and wild type rats were injected with rAAV-alpha synuclein to induce dopamine neuron loss. They were then treated with a LRRK2 inhibitor, to test its ability to reduce dopaminergic neurodegeneration. Stereology was used to collect dopaminergic neuron counts that would show the LRRK2 inhibitor drug’s performance in reducing dopaminergic neuron loss. The results from this study indicated that there was significantly less neurodegeneration in rats that were treated with PF-475 than the mice that were not. No signs of toxicity were linked with the use of this inhibitor in the brain, lungs, liver, and kidneys that is commonly associated with other LRRK2 inhibitors.

This not only shows that PF-475 is tolerated well in rats, but the results also indicate that inhibiting LRRK2 kinase activity significantly increases neuroprotection from alpha synuclein overexpression. The conclusion of the study elucidates the need for further testing to test the potential of LRRK2 inhibitors in other PD models.
Isha Chaudhary, Mindy Foster, and Dahlia Cantor

**Tomasyn-2 Binding Protein Negatively Affects Insulin Secretion**

Type II diabetes is primarily caused by a combination of both genetic and environmental factors which leads to insulin resistance. The focus of this research pertained to the binding protein tomosyn-2 which not only lead to insulin resistance, but also the lacking secretion of the insulin itself. In order to test the relative insulin secretion in comparison to the normal, \( \beta \)-cells were extracted from mice and transfected with GFP (control), an indicator, or tomosyn-2 with GFP (independent variable). The study concluded that tomosyn-2 indeed produced less insulin by comparing fractional insulin secretion of both normal and transfected \( \beta \)-cells with a significant p-value of \( p \leq 0.05 \). Thus, the implications of this study are that silencing genes for tomosyn-2 production could decrease the risk of type-II diabetes for humans.

Sai Sriraman, Julia Homola, Paras Ahuja

**Transcranial Direct Current Stimulation Reduces Food Cravings in Individuals with Binge Eating Disorder**

The purpose of this research is to test the effect of transcranial direct current stimulation (tDCS) on individuals with binge-eating disorder (BED) and subthreshold binge-eating disorder (subBED). Dr. Boggiano’s research team is testing the viability of tDCS as a treatment for BED and subBED on the grounds of reducing food cravings. Electrodes are placed bilaterally on an individual’s temple regions in order to stimulate the dorsolateral prefrontal cortex (DLPFC) which governs impulse control and inhibition. In the proposed full treatment, the right DLPFC is targeted and stimulated with a weak current continuously over a 20-minute period. In the sham (placebo) treatment, the right DLPFC is targeted and stimulated in the first two minutes and last one minute of the 20-minute period. Participants of both the full and sham treatments take the same survey before and after the treatment to record their craving scores for four food categories: desserts, non-sweet carbohydrates, savory proteins, and a combined category called all foods. This treatment demonstrated more significant decreases in food craving scores for males than females, particularly in the categories of desserts and proteins.

Danica de Jesus, Morgan Kurowsky, Lauren Moradi
Virtual Presentations
Business, Financial, and International Studies

The Clinton Foundation Strategic Analysis
The Clinton Foundation, started when President Clinton left office in 2001, is focused on improving the lives of peoples around the world. Starting with supporting an HIV/AIDS pandemic the foundation grew to support other areas of health care and continued along that path into a mission to defeat childhood obesity. With the idea to work themselves out of a job by eradicating disease and health crisis they are fighting the foundation has grown into the organization that it is today including Bill, Hillary and now Chelsea Clinton.

Ashley Brown, Brittany Thompson, Heather Hepburn, Sancho Redus, Matt Tortorice

Innovative Consultants Strategic Assessment of Innovate Birmingham
Tasked with the strategic assessment of Innovate Birmingham, we set out to answer 3 main questions. Where is Innovate Birmingham now? Where is Innovate Birmingham going? How are they going to get there? Innovate Birmingham is a company that is a driver of technological economic development. They assist startup companies in Birmingham through the Innovation Depot and pair them with VC investors who are wanting to make an economic impact in Birmingham’s ever developing environment. Innovate Birmingham also holds sessions in a classroom like setting that help qualified young adults learn necessary tech skills to start careers in these companies that are needing technologically skilled employees. The main goal of Innovate Birmingham is to bring more tech based jobs to the city. In our project we will be presenting different models and data on how we best think they can do that. Innovate Birmingham, though young, is on the way to making positive impact on the city as a whole.

Michael Frost, Tammie Barnes, Jeremy Locklear, Joel McGukin

Innovate Birmingham
This semester, our class was tasked with analyzing the competitive strategies and business models of various Alabama companies, with the goal of applying the knowledge gained in various undergraduate classes to offer strategic recommendations. Our team chose to research Innovate Birmingham, a company focused on fostering the entrepreneurship, creativity, and determination of local innovators and leaders, and pairing those innovators with job seekers within the Birmingham community. Our expo submission will highlight Innovate Birmingham’s vision, mission, and core values. We will perform a SWOT analysis on Innovate Birmingham, focusing on how they build their strategy to align with their values to help build their strengths, outweighs their weaknesses, and analyzes their opportunities and threats. Lastly, we will provide recommendations to the leaders of Innovate Birmingham, based on our interpretation of their current position and our understanding of this semester’s teaching modules.

Jamie Davis, Jakori Eaton-Dowell, Isack Mayala, Danielle N. Spruiell, Jordan Stone

Tesla Inc. Strategic Analysis
In an increasingly environmentally conscious world, new companies are emerging as leaders in renewable energy technologies. In 2003 Tesla Inc. set out to change the world by making environmentally sustainable transportation widely available. Today this mission has expanded to include the harnessing of solar energy and storage of this energy in large batteries in pursuit of a totally sustainable world. Tesla has established itself as an industry leader in sustainable energy generation,
energy storage, and an incredibly competitive automobile market. This has been made possible through strategic investments like the purchase of SolarCity. Constant innovation is also being driven by CEO and board member Elon Musk which is critical in the success of any company. In 2016 Tesla Inc. opened the GigaFactory. When the factory reaches full capacity in 2018 it will produce approximately as much battery power as the rest of the world combined. This increase in production capability combined with the release of the long-awaited Model 3, which retails for only $35,000, is making Tesla’s dream of a sustainable world a reality. Tesla has been successful in their pursuits to this point and is placing itself in a spot to maintain their competitive advantage and leading the industry for years to come.

Carter Tanner, Christopher Smith, Jonathan Knudsen, Justin Young

IBERIABANK Corporation Strategic Analysis

IBERIABANK Corporation started operations in 1887. Since 1887, IBERIABANK has evolved into a very successful financial institution. Analyzing a company can help consumers and business-people understand what state the company is in and what strategies it is looking to achieve in the short-run and the long-run. This analysis examines every aspect of IBERIABANK and its strategic stance in the financial industry. By looking at IBERIABANK’s values, culture, financial and strategic objectives, key success factors, internal and external environments, and determining the organization’s competitive strategy, there is an overall understanding of what steps IBERIABANK strives to complete throughout its daily operations. This was completed by receiving detailed information from IBERIABANK’s financial reports and IBERIABANK employees themselves. After this research, it was determined that IBERIABANK focuses on their employees to provide amazing customer service to its clients. It gives back to its communities by outreach. IBERIABANK has a Focused Differentiation strategy that is strives to achieve. IBERIABANK is growing in locations and in assets. Compared to its direct rivals, IBERIA has a relatively good competitive advantage. By having this knowledge of IBERIA’s competitive advantage compared to its rivals, understanding its strategic and financial objectives, and knowing where to improve, IBERIABANK can determine if its short-term and long-term goals are aligned with the company’s overall mission and vision or if that mission and vision would need to be restructured for the year.

Raven Crumbley, Kenneth Farrar, Lindey Lawrence, Mark McCannon, Mary Thursby

UAB Herbert Institute for Innovation & Entrepreneurship

It can be very difficult to create and maintain a successful organization without having a strategic plan. Strategic planning helps maintain a business by keeping them on track to achieve goals. There are five important managerial stages that organizations need to follow in order to continue to strive to meet goals. These steps are Develop a Strategic Vision, Setting Objectives, Crafting a Strategy, Executing the Chosen Strategy, Monitoring Developments, Evaluating Performance, and Initiating Corrective Adjustments. These steps are the guiding stones to help organizations reach long-term goals. Bill L. Harbert Institute for Innovation and Entrepreneurship (Harbert Institute) strives to provide a strong innovative & entrepreneurial ecosystem through education and experiential learning. Our goal is to study how effective their methodology is in meeting their strategic objectives and recommend areas of opportunity for the group to increase efficiency.

Hiten Patel, Kelly Lowder, Terrika Johnson, David Dejeune, Stanley Birl
The Birmingham Education Foundation
The Birmingham Education Foundation (Ed) is a nonprofit organization with a mission to ensure all Birmingham City students grades K-12 are given every opportunity to excel in life after high school. They believe there is no excuse for a student to not receive an ample amount of education and skills to be successful in whatever path they choose to take; college, military, work force, etc. Ed has embedded their program with the right people and resources to motivate, inspire, and positively influence these students. According to Ed’s website, they have reached nearly 6,000 students from grades K-12 in the last four years. However, Ed will not be satisfied until they reach every student in the Birmingham City area. In hopes to reach this goal, they have developed two objectives to focus on for the next ten months. One objective is to understand the needs and desires of the local community and constituencies. The other objective is to survey existing educational programs across the country to gain knowledge on how to keep progressing their program. Ed earns revenue through contributions and government support. In 2016, their total revenue equaled $1,038,755. Contributions have been increasing annually so it can be expected that they will continue to rise over the coming years. J.W. Carpenter, Ed’s founder, believes that if they teach the students how to network and build relationships with others that will be the key to how the students will succeed.

Rachel Dunsford, Chandler Pinegar, Zach Sims, John Baker, Jennifer Nall

Southern Company - Leading the Future of Energy
Southern Company is a leading energy provider in America with assets spanning from coast to coast. The competitive landscape is ever evolving and changing with many factors that raise questions on the future of energy in America. How will Southern Company meet increasing demands of electricity consumption while maintaining their stronghold as a leading provider of clean, safe, reliable, and affordable electricity? The answer is diversification. Natural gas, wind, and solar are all clean ways to meet the demands above. Some methods are more cost effective than others. Right now, natural gas is relatively cheap and continues to be the primary method to produce ample amounts of electricity and meet consumer demands. To meet the changes in the future of energy, without knowing exactly what those changes are, Southern Company has come up with a three-part strategy. The first part of this strategy focuses on how Southern Company’s retail electric subsidiaries serve customers. They have developed an “all of the above” resource planning strategy to meet customers’ traditional needs for clean, safe, reliable and affordable energy. The second part is to engage in more components of the value chain that ultimately results in the ability to offer a wide range of energy products and services to customers, with the goal of becoming their preferred energy provider. And the third part of the strategy is to take an “options” approach to technology and business models, whereby they can maintain a fluid strategy that is adaptable to changes in the market.


Woodlawn Foundation Strategic Analysis
This project analyzes the organizational strategy of Woodlawn Foundation and examines the current state of competition among non-profits in the Birmingham, Alabama area. The performance of the organization is measured by how they are able to offer differentiated services in three specific areas: housing, education, and community wellness. Services are offered through a holistic approach through integration of programs within city schools, revitalization of existing buildings and homes, and utilizing retail developments for economic stimulation. We used information available through annual reports,
press releases, local news, and interviews with the staff of the non-profit organization to create a macro-environment analysis. It is concluded that Woodlawn Foundation offers a focused differentiation strategy to offer services that improve the overall state of the community of Woodlawn.

Lucas Armbrester, Jake Easter, Brewer Hicklen, James Naile, Tanner Vines

BBA and the Future of Birmingham

Birmingham is growing steadily every year, and its economic standpoint is getting stronger daily. Birmingham though is in a position now more than ever to benefit from the Birmingham Business Alliance or BBA for short. BBA is the leading economic developer for the Greater Birmingham area, but it still is not being utilized to its fullest. BBA could be a greater help to Birmingham if it changes in 2 ways: 1. It must condense itself and not focus on such broad markets and 2. It needs to market itself better. BBA is Birmingham’s best bet at utilizing a non-profit to promote economic growth. BBA needs to redefine its market area vs approaching all markets. It does not have the resources to be helpful everywhere and must utilize the resources it does have to focus on one area. This is the first thing Birmingham and the BBA need to focus on. Second, BBA does not have much marketing and remains under the radar. It is hard to promote economic growth when no one knows who you are. BBA should begin a marketing campaign to bring in more companies in which they could utilize to further the growth of Birmingham. Birmingham is in a great position to become a light upon a hill for the southeast, but they are going to need BBA’s help.

Amanda Dunn, Saikou Diallo, Seth Grice, Chase Moorehouse, Krupa Patel

Works in Progress

BUS450-QL Capstone Project- American Red Cross

When disaster strikes, the world often calls on the American Red Cross to mobilize and help those impacted by disasters of all kinds. Through a strong network of volunteers in local chapters all around the world, the American Red Cross focuses on preventing and alleviating human suffering in the face of emergencies by mobilizing the power of volunteers and the generosity of donors. The American Red Cross consists of a nationwide network of over 650 chapters, 36 blood blood services regions, well over 500,000 volunteers, and around 30,000 paid staff members. By analyzing the competitive strategy of the American Red Cross it will allow others to offer strategic recommendations for improvement to the organization. The analysis includes the current situation of the company, which refers to their mission statement, vision, and opportunities the company has; as well as where the company is headed, their weaknesses, opportunities and threats the company faces in order to fulfill their stated mission and vision. Also included in the analysis is a strategic analysis performed using several of these analysis tools: Five Forces Analysis, Competitive Strength Assessment, Strategic Group Mapping, and Macro Environmental Analysis. All of the information reported will yield results about how the organization is performing, and where it is headed in the future. Through the analysis, we will be able to make recommendations to the leaders of the company in order to ensure continued progress and a strategic competitive advantage over their rivals.

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