10TH UAB EXPO 2017
AN EXPOSITION OF UNDERGRADUATE RESEARCH

SCHEDULE OF EVENTS

ORAL PRESENTATIONS
APRIL 13TH, 2017 / 1PM-5 PM

POSTER PRESENTATIONS
APRIL 14TH, 2017 / 7AM-12:30PM
10th Annual UAB EXPO
An Exposition of Undergraduate Scholarship

Welcome

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

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

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

Best Regards

Gareth Jones
Program Administrator for Service Learning and Undergraduate Research

Richard Nguyen & Charlotte Boles
UAB EXPO 2017 Directors
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Gareth Jones
Program Administrator for Service Learning and Undergraduate Research

Amy Badham
Director of Service Learning and Undergraduate Research

EXPO COUNCIL
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EXPO Coordinator

Director - Charlotte Boles
EXPO Co-Coordinator

Advertising Chair - Kayla Hazelwood

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Emily Milligan
Susmita Murthy
Aashka Patel
Joshua Purvis
Amy Stewart
Marina Triplett
Neha Udayakumar
Courtney Walker
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Michele Forman is a documentary filmmaker and Director of Media Studies at the University of Alabama at Birmingham, an interdisciplinary minor she co-founded in 2003. The aim of the program is to educate college students in media production practice and film history, as well as connect them with crucial community issues in the Greater Birmingham area through documentary filmmaking, digital storytelling, and multimedia-based research.

Forman gained her experience as an executive in feature films. As Director of Development at Spike Lee’s 40 Acres and a Mule Filmworks, she was responsible for the acquisition and development of new projects, including New Jersey Drive, Girl 6, Sula, The Jackie Robinson Story, and Summer of Sam. In addition, Forman served as associate producer on Mr. Lee’s Academy Award-nominated film 4 Little Girls, a feature-length documentary for HBO about the bombing of the Sixteenth Baptist Church in Birmingham, Alabama, in 1963.

Her work with the UAB Media Studies Program has created a student-produced archive of over 400 community-based social justice short films. The films are available free of charge online, streaming from both the UAB Mervyn H. Sterne Digital Collection and the UAB Media Studies Vimeo Channel. Program partnerships include Birmingham Civil Rights Institute, McWane Science Center, UAB School of Public Health, Sidewalk Film Festival, Vulcan Park and Museum, Red Mountain Park, WBHM, and the national oral history project, StoryCorps. Media Studies has been supported in part by the Ford Foundation Difficult Dialogues Initiative.

Since 1997, Forman has been directing and producing documentary projects for film and television, earning an Emmy nomination in 2001 for Coat of Many Colors. Her feature-length documentary Climb for the Cause: A Breast Cancer Story (2007) documents five women who became activists for women’s health after surviving breast cancer. The film sent Forman up Mt. Kilimanjaro, one of the world’s tallest peaks, following the women as they raised money and awareness about what women can accomplish after cancer. Climb for the Cause was optioned for fictional adaptation by Caribou Entertainment.

Her current film Alabama Bound tells the story of same-sex families fighting for custody of their children, a crucial issue not resolved by the groundbreaking U.S. Supreme Court decision legalizing same-sex marriage. Alabama Bound is slated for premiere in California in June 2017.

Forman began her film work at Harvard University, where she double-majored in English and filmmaking.
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<tr>
<td>*Undergraduate Neuroscience Program, U. of Alabama at</td>
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<td>Birmingham, Birmingham, AL, USA. +Dept. of Neurobiology, U.</td>
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<td>of Alabama at Birmingham, Birmingham, AL, USA. 1720 2nd</td>
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From the Twelfth Century to the Twentieth: King Arthurs Transformative Journey to the American Cinema

Alice Grissom
This presentation examines how the MGM film Knights of the Round Table (1953) reinterprets Arthurian myth in a context that propagates and supports American values, primarily the cultural conservatism and anti-Communism of 1950's America. By deviating from Sir Thomas Malory's Le Morte d'Arthur, the source material for the film, specifically in the characters of Lancelot and Mordred, MGM produced an agenda-driven film that aligned with the company's HUAC-influenced conservative views. HUAC (the House Un-American Activities Committee) held the power of the blacklist over the heads of executives and actors alike. In the film, an Americanized Camelot serves as a platform for the McCarthyistic theme of personal sacrifice for the sake of one's country that fueled anti-communist suspicion of an enemy within during the Cold War. I define how the tales of the knights of the Round Table were heavily censored and Christianized and explore possible causes for these inaccuracies, ranging from individual motives of the cast and crew to the control of the Catholic League of Decency, a restrictive organization that governed the morality of film in the mid-1900's. Susan Aronstein's Hollywood Knights: Arthurian Cinema and the Politics of Nostalgia and Jonathan Stubbs' "Hollywood's Middle Ages: The Development of Knights of the Round Table and Ivanhoe, 1935-53" provided foundational research for the topic, as well as the comprehensive website www.arthurianlegend.com.

The Crux of Cultural Crossroads: Analysis of Hindu and Jain Elements in Mahabat Maqbara

Sarah Faulkner
"The Indian state of Gujarat exhibits a breadth of cross-cultural influences due to its location near commerce centers both along the coast and the Silk Road, the variety of religions that flourish in the region, and the recurrent exchange of power over the province between different empires. Foreign empires that ruled India brought in aesthetics not indigenous to the country, which manifested in the structures built in India after each empire's rise to power. Despite Gujarati architecture eventually coming to emulate the vogue stylistic preferences of these outside influences, the design and construction of these structures were undertaken by members of the local Indian artisan guilds, who had been trained to design and build Hindu and Jain architecture. This would have been the case with Mahabat Maqbara (1878-1892 CE), a mausoleum in Junagadh that was completed during the British Raj for the interment of a Muslim leader. The tomb, though outwardly Gothic and Muslim, arguably incorporates a design program that reveals the continuation of the influence of Hinduism and Jainism on architecture as the result of the usage of local craftsmen. Due to this, Mahabat Maqbara offers an interesting case study for the analysis of the perseverance of the influence of Hinduism and Jainism on architecture after years of non-Hindu and non-Jain influence, though this influence is concealed by a foreign veneer. This project seeks to identify which elements at Mahabat Maqbara are executed in a manner informed by Hinduism and Jainism."

"
Forty Years of First Ladies
_Carlotta Boles_
Many high ranking female professionals have experienced gendered backlash after introducing new policy programs, such as First Lady Michelle Obama’s Let’s Move program facing public resistance that often centered on her gender and perceived lack of experience. Such baseless criticisms often affect the impact a policy program can have, and I will discuss the relationships between gender, celebrity, and program success.

Art, Expression and the Community in Healing
_Kane Agan_
Individually, the fields of medicine, public health, and the fine arts have made huge contributions to the healing process, methods of expression and the concept of identity. However, a rare discussion is the intersection of these disciplines and how they contribute to one another. At one of these intersections lies a question: How might communities facing stigma and oppression use art to catalyze healing and conquer barriers to expression?
Exploring this question, students used service learning to immerse themselves in various communities, and developed 10-minute intervention plays to be used as an expressive tool in healing. Augusto Boal first defined this methodology in his Theatre of the Oppressed, where he engaged the community by creating a forum for members to creatively expressed their solutions to societal problems. The Medea Project uses similar methods of expressive theatre for women diagnosed with HIV/AIDS to combat the stigma around the disease. The students plays allowed them to express their findings and anecdotal data in unique and compelling ways, exposing the community to issues often unconsidered. These methods may be used by communities undergoing cultural oppression or discrimination as a medium of expression in the form of nonviolent protest. It may help in the representation of historical inequalities shared by oppressed groups, and give a broader set of tools to articulate their modern effects. These interdisciplinary methods, when properly and inclusively applied, have substantive potential to advance the professional practices of healing to address unique issues in oppressed communities the person as a whole."

1-f
_Ramiro Bautista_
"FLL 333 -Foreign Language Internship/SL, Department of Foreign Languages, College of Arts and Sciences, University of Alabama at Birmingham, Professor Sanchez
Alexander Bautista
Educational Landscape: Education as a profession

The purpose of my research during my service-learning at the Altamont School was to investigate certain educational aspects in the Spanish teaching field. My investigation will determine the global role of teachers in areas such classroom management, student motivation, teacher motivation, and successful foreign language teaching techniques. In addition, I wanted to compare my service learning experience in a private school with my own educational experience in a public high school in Alabama. The results of my qualitative investigation are based on four months of observation to different languages teachers; interviews with every member of the faculty in the Foreign Language department, that includes: Spanish, French, Latin, and Mandarin. Finally, from my own experience acquired by teaching during this past semester.
This service-learning gave me the opportunity to explore the professional field, and to acquire teaching experience. It also gave me the chance to share my Mexican cultural background and heritage and to encourage others to learn a second language. With this in mind, I believe that a second language now days is very important. Therefore, Education as a career in foreign languages is crucial because we have the future of the new generations in our hands."
2-Knowledge Jam: Moving Platforms to Grow Engagement
Casey Marley; Bailey Barrow
"Last summer, the Digital Media Staff expressed interest in refreshing the content and image of its blogging platform, Knowledge Jam. Media Fellow, Casey Marley was charged with overseeing the rebrand of the publication and serving as the lead editor. After researching unique and effective content marketing strategies and the growth of the online writing platform, Medium, the team decided that the best plan to maximize Knowledge Jam's growth and reach and to teach web writing was to move Knowledge Jam from the Content Management System (CMS) Squarespace to the more social environment of Medium. With this move came entirely new branding and the creation of an affiliate podcast named "The Toast."

The entire process of rebranding occurred from Summer 2016 to Fall 2016, with public implementation occurring in January 2017. In that time, Marley worked with Media Fellow Bailey Barrow to create a more playful brand, and Marley designated Digital Media's Writing Team as the hub for Knowledge Jam's content creation. While the Digital Media team is still working to build Knowledge Jam's new audience, the rebranding process proved invaluable to gaining creative and strategic content experience and allowed UAB Digital Media to engage a broader community by housing the blog on a writing social platform rather than a static website."

3-Stand As One Alabama
Kenzie Greer
This video was created for an event called "Stand as One: Empowering Marginalized Voices In Birmingham." UAB students were asked to write brief essays about the experience of identity and marginalization. They respond with their personal experiences, a sense of history, and an awareness of political division. As a result, they were asked to read their responses on camera to share their stories with the community. They represent examples of marginalized voices on our campus and our community.

Methods: Mature female domestic pigs received injections of fluorescent dextran tracers into the primary motor cortex and the red nucleus using StealthStation® image guided navigation. 5-6 weeks post injections, the pigs were euthanized and their brain tissue and spinal cord were collected. The tissue was serially sectioned and examined using confocal microscopy to observe to location of the CST and RST.

Results: The results demonstrated that the CST in pigs is laterally located in the white matter, very similar to that of humans. However, the CST does not appear to descend past the cervical regions. The exact location of the RST cannot be determined at this time, but preliminary results also point to a lateral location within the white matter throughout the entire length of the neural axis.

Discussion: The location of the CST and RST in the porcine model are anatomically similar to humans. Further work needs to be done to pinpoint the exact location of the RST, however, these results point to the porcine model as a valuable pre-clinical tool to improve translation of promising SCI treatments.
4- Welcome to UAB Video
"Producer- Casey Marley
Director of Photography- Kenzie Greer
Editor - Tyra Robinson, Casey Marley
Music - Zach Walker, David Smith, Jacob Richardson"
"The University of Alabama at Birmingham transcends the traditional college experience. While many colleges are self-contained in their own bubble of college life, UAB shares a mutual relationship with the city of Birmingham; both give each other life. UAB provides opportunity and economy while Birmingham contributes to culture, stability, and people. This relationship is a bit difficult to communicate to prospective undergraduate students during orientation. And while a tour of UAB's campus allows us to show off our world class facilities first hand, we wanted to share the beauty of Birmingham as well.

This video was produced by students and was created to get potential students excited for a non-traditional college experience in a city with infinite possibilities."

5- Takeover Tuesdays: A Snapchat Experience
Millena Oliveira and Madison March
"The Takeover Tuesday Snapchat initiative was launched in February in an attempt to give students a voice through an official UAB social media platform. Every Tuesday, with some exceptions, a single student would be selected to use the uab.snapdragon account. This would allow current, former, and prospective students to get a ""day in the life"" perspective on UAB. The host of each Takeover showcases special events, activities, or even just what they do on a normal day.

Currently, hosts are picked through an application process that allows the UAB Digital Media team to choose students that will uphold University standards and be able to post engaging content. Even with this selection process, it can be difficult to predict which potential host will produce the content we hope to see. Through a couple of guidelines, the Takeovers strike a balance between using the official voice of University Relations and the unique voice of each student.

Overall, Takeovers have increased engagement on the uab.snapdragon account. The goal for this project is to connect the student voice to the University brand on social media. With the ever growing presence of social media as a business platform, Takeover Tuesday is expected to enhance the current student experience and attract prospective students to enr"
6-The Archaeology of Trade and Exchange in Viking Age England
Nicholas J Maloof
In this paper, I review the available archaeological evidence to understand the extent the Vikings influenced trade and exchange between the late-eighth to the mid-late tenth century in England, in addition to the available contemporary literary evidence as well as comparative archaeological evidence from the Middle and Late Anglo-Saxon time periods. Most early medieval and medieval literary sources focus exclusively on the raiding activities of the Vikings. The discussion of archaeological evidence can serve as a complementary tool, filling in some of the gaps found in the historical evidence. Analysis of foreign goods imported into England does suggest that the role of the Vikings as traders, at least initially, may have been exaggerated. While there is a variety of exotic goods, which does suggest a wide range of long-distance contacts, the proportion of international finds in ninth- and tenth-century England is small. This is in contrast to the sixth to ninth centuries in England, which boasts a large number of imports. During the Viking Age, local and regional trade, as is attested by archaeological finds in Yorkshire, Lincolnshire, and East Anglia, became far more important than long-distance trade.

7-Women's Reproductive Rights
Megan Julian
Through our poster, Sydnee Gowens, Riley Olague, and myself will provide a comprehensive plan to expand upon women’s reproductive rights and to create a generation of women who no longer have to fight to be in control of their own bodies. Our poster will also explore the injustices surrounding women's reproductive rights on the local, state, federal, and international level.
Subcellular studies of the Frataxin G130V protein in FRDA
Yu-Yun Chen, Jill Butler, Marek Napierala
Friedreich's ataxia (FRDA) is an autosomal recessive neurodegenerative disease most often caused by large homozygous expansions of GAA repeat sequences in intron 1 of the Frataxin (FXN) gene. In some cases, FRDA patients harbor a point mutation in the coding sequence of one FXN allele and a GAA expansion in the other. The most prevalent Frataxin point mutation changes a glycine to a valine at amino acid position 130 (G130V). Frataxin is a mitochondrial protein necessary for iron-sulfur cluster synthesis, and deficiencies in frataxin can slow or limit many aspects of cell metabolism, resulting in FRDA phenotypes. FRDA patients with homozygous GAA expansions exhibit lower levels of Frataxin mRNA and protein expression compared to heterozygous carriers and healthy controls. Interestingly, FRDA G130V patients exhibit milder FRDA phenotypes than patients with homozygous repeat expansions. In addition, FRDA G130V patients exhibit levels of FXN mRNA equivalent to carriers but have lower levels of frataxin protein, suggesting a disconnect between Frataxin G130V gene transcription and translation. Currently, there is no cure for FRDA, hence a better understanding of the molecular function of frataxin and its role in FRDA is necessary for potential therapeutic treatments for the disease. The subcellular localization and maturation of the Frataxin G130V protein was examined in this study. The levels of FXN G130V transcripts were analyzed by real-time PCR, and mRNA transport was assessed in various subcellular compartments. Frataxin G130V protein levels and localization were also measured by transient expression of GFP-Frataxin fusion proteins and by western blot.
The Role of Phosphorylcholine Receptors in House Dust Mite Allergy and Asthma

Isabell Moon

60% of asthma patients have sensitivity to common house dust mite (HDM), which is present in virtually all indoor spaces. The epitope phosphorylcholine (PC) is present on HDM and other allergens, including Aspergillus mold species and Streptococcus pneumoniae, a common childhood pathogen, recognized by alveolar macrophages, which are involved in the pathogenesis of allergies and asthma. CD36 and PAFR are two known PC receptors of alveolar macrophages. This study looks at the role that these two receptors play in the phagocytosis of HDM by alveolar macrophages, which begins the immune response. Alveolar macrophages were taken from CD36 knockout, PAFR knockout, heterozygous CD36/PAFR, or CD36/PAFR double knockout mice using bronchoalveolar lavage (BAL) and isolated using a modified culture protocol. This culture protocol was developed specifically for alveolar macrophages in this study. Macrophages were then incubated with alveolar macrophage-specific antibodies (CD11c and SiglecF) and fluorescently-tagged HDM, then analyzed using flow cytometry. Macrophages that were deficient in either CD36 or PAFR exhibited significantly reduced HDM phagocytosis, with further reduced phagocytosis for CD36/PAFR double knockout macrophages. CD36 and PAFR are significantly involved in the phagocytosis of HDM by alveolar macrophages. Blocking the interaction between CD36 or PAFR with PC, using false receptors or competitively binding the receptors, can significantly reduce asthma and allergy pathogenesis.

Music and Anhedonia in Major Depressive Disorder

Aaron Cheng

Ever wonder why music can put you in a positive mood or make one feel more motivated? Its long-time, developed associations with our reward system in mammalian brains seems to affect the same regions disrupted by major depressive disorder. This thesis discusses how anhedonia, one of the symptoms of MDD, can be treated or alleviated using music.
IPX-750 and IPX-760 Attenuate Alpha Synuclein Aggregation in A Model of Parkinson Disease

Zainab G. Suleiman, Tawnya Yates, and Rachel B. Butler

Alpha-synuclein (Î±-synuclein) is a small protein that is expressed in neurons in substantia nigra. Its function in the healthy brain is currently unknown, but has been found to be the major constituent of Lewy bodies, protein aggregations that are a hallmark of Parkinson's disease. The effect of IPX-750 or IPX-760, two glycoconjugates of dopamine, on Î±-synuclein aggregation was tested in a cell base assay. Tet-off cell line consisting of neurons co-expressing Î±-synuclein proteins conjugated to the amino terminal (Î±-synuclein-nGL) or the carboxyl region of the Gaussia luciferase protein (Î±-synuclein-cGL). Aggregation of two Î±-synuclein proteins brings the two regions of Gaussia luciferase together which results in increased fluorescence that is captured by a microplate reader. The effect of each drug on Î±-synuclein aggregation was tested by growing cells for 24hrs in the absence of tetracycline to allow the expression of Î±-synuclein-nGL and Î±-synuclein-cGL. Cells were treated with IPX-750 or IPX-760 at 0.1, 0.05, and 0.1µM followed by fluorescence assay at 24hrs. The effect of each treatment was compared between treated and non-treated samples and expressed as % aggregation reduction. Our results showed that IPX-750 reduced Î±-synuclein aggregation by 5, 15 and 16%, respectively, while IPX-760 reduced Î±-synuclein aggregation by 18, 17, and 18%, respectively. These results demonstrate that IPX-750 and 760 are potential candidates for Parkinson disease treatment.

8-Mitochondrial Alterations of Parvalbumin Positive Deep Cerebellar Nuclei and Purkinje Cell Terminals in PVCre: ERRg FL/ FL mice

Cody Savage, Allison Dahlberg, Ellen Apple, Laura McMeekin, Rosalinda Roberts, and Rita Cowell

"Dysfunction of metabolic activity within various neuronal cell types has been implicated in many neurodegenerative diseases. Neurons of high metabolic activity such as parvalbumin positive(PV+) deep cerebellar nuclei and purkinje cells are particularly vulnerable in these diseases. The deep cerebellar nuclei and purkinje cells function in the coordination of complex movement. Dysfunction of these neurons plays a role in the pathology of neurodegenerative diseases that exhibit motor deficits. This metabolic dysfunction is thought to be caused in part due to downregulation of certain gene programs within these neuronal cell types."

The transcriptional factor estrogen-related receptor gamma (ERRγ) has been shown to be a regulator of metabolic genes. However, its role in deep cerebellar nuclei and purkinje cells has not been investigated. Our lab has demonstrated that mice lacking ERRγ in PV+ populations exhibit motor deficits. We hypothesize that metabolic disruption caused by reduced number and/or function of mitochondria may be the cause of this observed motor deficit. In order to test this hypothesis we will use electron microscopy to measure differences in mitochondrial number and size between PVCre:ERRγ+/+ and PVCre:ERRγ FL/FL mice. My project is to identify number and size of mitochondria in PV+ deep cerebellar nuclei and of the inhibitory synapses onto deep cerebellar nuclei neurons from PV+ Purkinje cells using electron microscopy. The ultimate goal of this investigation is to determine if upregulating ERRγ in these neuronal populations may alleviate some of the motor deficits observed in neurodegenerative diseases by giving these neuronal populations the high metabolic capacity they require."
9-Glucose-mediated changes to the redox state of cardiomyocytes
Lamario Williams, Manoja K Brahma, Qian Li, Gloria Benavides, Trent Tipple, Victor Darley-Usmar, Adam Wende
Cardiomyocyte metabolism is an important process to understand because of the heart’s high energy demand. In the case of diabetic heart failure patients, there is a known discrepancy in substrate utilization. Fatty acid oxidation is increased while glucose oxidation is decreased, perhaps being shunted into non-oxidative pathways like the hexosamine biosynthesis pathway which leads to GlcNAc modifications on cellular proteins. In this study we focus on the GlcNAc modification to UQCRFS1, the iron-sulfur heme in complex III of the electron transport chain. We use a cardiomyocyte specific and inducible mouse model for the over expression of the glucose transporter GLUT4 alongside an STZ induced diabetic experimental group. We use electron paramagnetic resonance to detect reactive oxygen species (ROS) levels and the redox state of the iron-sulfur heme. An in vitro model has been developed utilizing AC16 cardiomyocytes and Thiamet G for a phenotype of increased GlcNAc and DON for a phenotype of decreased GlcNAc. This study utilizes the Seahorse Assay for determining mitochondrial energetics and complex activity in vitro. Complex activity appears to decrease while the reserve capacity also decreases with increased GlcNAc. Metabolomics and western blot data shows differential flux in glutathione, NADH, NADPH, taurine, HNE, MnSOD, and PRDX3. This suggests that our mouse model is undergoing complex redox change and that glucose is contributing to those changes through GlcNAc modification. The redox changes do appear to be putting more stress on the cell, contributing to diabetic cardiomyopathy disease progression.

10-Glucose Regulation of Pyruvate Carboxylase in Cardiac Tissue of Streptozotocin (STZ)-induced Diabetic and Glucose Transporter 4 (GLUT4) Transgenic Mice
Brenna Nye
In diabetes, 65% of patients will die from a cardiovascular related disorder. In healthy individuals the heart utilizes fatty acids, but in diseased cardiac muscle the heart switches to glucose, except in diabetes which continues to use fatty acids. Based on early work it was proposed that restoring cardiac glucose utilization could rescue the heart. However, increasing expression of glucose transporter (GLUT4) led to a marked decrease in metabolic function. To determine the mechanism of glucose toxicity we examined cardiac-specific gene regulation. One of the altered genes identified is pyruvate carboxylase, Pcx, whose protein, PCX, is heavily involved in cellular metabolic pathways. In this study we will examine how glucose regulates Pcx expression in the cardiac tissue of a GLUT4/STZ mice model and human cardiac tissue.
11- Discovering the Sea
Forrest Collins
“The goal of the research performed is to record the history of the Lepidocheyles kempii, the Kemps Ridley sea turtle, to identify potential causes that have lead up to the dramatic decrease of this species' population.
The largest group nesting, called an arribada, recorded for the Kemps Ridley was back in 1947. A man named Andres Herrera, a native to Rancho Nuevo, Mexico, filmed this arribada and since then, scientists have analyzed his film to estimate the carrying capacity of the species. With the help from Doctor Thane Wibbles, historical data has been collected from those people who were present during the 1947 arribada, and those who were important in the first efforts to conserve the species. This historical data is then recorded, organized, and translated into English to better understand the species before they were labeled endangered.”

12- Heme Scavenging Prevents Br2 Inhalation Injury-Induced Peribronchial Fibrosis
Henry Paiste, Israr Ahmad, Nilam Vetal, Adam Lam, Matthew Carlisle, Saurabh Aggarwal, and Sadis Matalon
Bromine (Br2) gas exposure from environmental or occupational accidents cause acute lung injury (ALI) and death from respiratory failure. Survivors often develop airway fibrosis, a debilitating consequence of ALI. We previously demonstrated that the inhalation of Br2 induced ALI in C57BL/6 mice caused heme-dependent oxidative injury. However the long-term lung phenotypic changes and mechanisms involved are still elusive. Therefore, we hypothesized that the heme induced ER stress would underlie the development of airway fibrosis in mice exposed to Br2.
13- Making Decisions Without a Complex Brain: Dietary Protein Targeting in the Sea Urchin Lytechinus variegatus

Ben McCafferty, Marlee Hayes, Yuan Yuan, Stephen Watts
"Variegated sea urchins, L. variegatus, are opportunistic omnivores feeding on a variety of plants and animals. Like many other animals, sea urchins show preference on protein source intake over other macronutrients. We hypothesize that the variegated sea urchin has a mechanism by which they target specific quantities and qualities of protein sources. L. variegatus displayed differing levels of feed intake for each of the 11 protein sources offered, indicating that the urchins are not consuming indiscriminately. However, higher protein content did not dictate higher food intake. A trend in higher protein intake was correlated with higher essential and branched amino acid content. Thus, it appears L. variegatus is able to discriminate among protein sources at an amino acid level. This decision-making[] would allow the urchin to consume a quantity of food based upon the amino acid content. These urchins, without a complex brain, are able to make choices regarding food consumption based on signaling attributes of the protein chemistry. The ability to select for quality proteins in this primitive deuterostome may offer a glimpse into the early evolution of dietary preferences in other animals including humans. Furthermore, the concept of not all proteins being created equal is of particular interest for its applications in aquaculture feed development."

14- Defining cell-autonomous and non-cell autonomous consequences of Mecp2 deletion using MeCP2-GFP reporter mice

Hailey X. Egido-Betancourt, Wei Li, Lucas Pozzo-Miller
Rett syndrome (RTT) is a developmental disorder caused by mutations in methyl-CpG binding protein 2 (MECP2), located in the X chromosome. RTT affects 1 in 10,000 live female births, which develop neurological and cognitive deficits, including seizures and autistic behaviors. Due to random X-chromosome inactivation (XCI), the brain of RTT individuals is a mosaic of cells that express the MeCP2 protein and mutant cells that do not express MeCP2. In this study, we used transgenic mice that express the fusion protein MeCP2-GFP (green fluorescence protein) to map the distribution of non-mutant (GFP positive) and mutant cells (GFP negative) in the mosaic brain of female mice. Mice were fixed by transcardiac perfusion of 4% paraformaldehyde, and their brains were dissected and sectioned for immunohistochemistry using anti-MeCP2 and anti-NeuN antibodies, followed by confocal microscopy and quantitative image analyses. Preliminary results revealed a homogenous distribution of GFP positive and GFP negative cells in female wildtype (WT) mice, suggesting non-clonal XCI; we will further characterize this distribution in female Mecp2 heterozygous mice. In addition, the morphology of Mecp2 mutant and non-mutant neurons will be characterized by injection of a fluorescent marker into GFP positive and GFP negative cells in slices of the hippocampus. These studies will define cell autonomous and non-cell autonomous consequences of Mecp2 deletion on neuronal morphology in the mosaic brain of female Mecp2 heterozygous mice, providing useful outcome measures for preclinical studies of novel therapies in mouse models of RTT.
15- Putative Gene Function Determination in Corynebacterium Phage Darwin Using In Silico Bioinformatics Tools


Bacteriophages, viruses that infect bacteria, are the most abundant entities on earth. For the past 5 years, the UAB Phage Genomics research team has worked to significantly increase the number of full-genome sequences publicly available for phages infecting hosts of the phylum Actinobacteria. We recently isolated and sequenced 12 novel Corynebacterium phages and completed manual annotation of each sequence. Close examination of the gene calls revealed a number of novel putative genes with low level sequence identity to genes in GenBank. Thus, a putative function could not be determined. In this study, we used a suite of bioinformatics tools (Phamerator, HHpred, ITASSER) to further study putative gene products with no identifiable gene function via BLAST. We will report on the number of functions tentatively assigned to putative gene calls using this new suite of tools and the feasibility of using these tools to extend assignment of putative functions for phage gene products in the future.

16- Genomic Analysis of Novel Phages Infecting the Bacterial Host Species, Corynebacterium


Bacteriophages are viruses that infect bacteria and are one of the most abundant entities on Earth. It is believed there are 1031 phages worldwide, yet fewer than 2,000 full-genome phage sequences are currently recorded in GenBank. Only 2 full-genome sequences for phages infecting the bacteria host, Corynebacterium, are presently recorded. We recently isolated and characterized novel phages infecting the host, Corynebacterium vitaeruminis (C. vitaeruminis) CAG1. Phage DNA was submitted for full-genome sequencing, and a suite of modern bioinformatics tools were used to analyze genomic features of this new set of phages. Specifically, auto-annotation programs (GeneMark, Glimmer, GeneMark.hmm) were used for initial analysis of phage genomes and auto-annotated gene calls were manually checked. Anomalies in gene calls detected by manual annotation were modified using a suite of supporting data (ribosome binding site strength, length of open reading frame (ORF), coding potential, gene spacing). Here we report descriptive genomic data (number of nucleotides, start codon preference, guanine-cytosine percent [GC%] content, gene count) for each virus as well as comparative genomics for this collection. This data will allow for greater understanding of the similarities and differences among phages infecting bacteria hosts of the phylum, Actinobacteria.
17- Isolation and Characterization of Phage Infecting the Bacteria Host, Corynebacterium
Nellie Baghaei, Nikki Mallepalli, Cameron McPhail, Ashlynn Murrell
Bacteriophages are viruses that infect bacteria and represent a new realm for discovering novel genes and proteins. To date, over 1500 phage full-genome sequences have been entered into GenBank, yet only 2 Corynebacterium phage sequences exist in the database. In fall 2016, we isolated and characterized 12 new bacteriophages infecting the bacteria host, Corynebacterium, from sewage samples. Influent samples were obtained from a Jefferson County, AL sewage treatment plant, filtered through a 0.2μM filter, and enriched for bacteriophage infecting Corynebacterium vitaeruminis CAG1. To isolate a clonal population of phage, 3-4 serial phage titer assays were completed. After three rounds of isolation, a high titer stock of virus was obtained and used for DNA isolation. Restriction endonuclease digestion assays and electron microscopy were used to characterize each virus prior to sequencing. Together, this collection of viruses represents the largest assembled collection of phage infecting the host Corynebacterium."

18- Astrocytic expression of the RNA Regulator HuR accentuates Spinal Cord Injury in the Acute Phase
Thaddeus Kwan, Candace L. Floyd, Jason Patel, Amanda Mohaimany-Aponte, Peter H. King
"We recently showed that the RNA regulator, HuR, is translocated to the cytoplasm in astrocytes in the acute phase of spinal cord injury, consistent with its activation. HuR positively modulates expression of many pro-inflammatory factors, including IL-1Î±, TNF-Î±, and MMP-12, which are present at high levels in the early phase of spinal cord injury (SCI) and exacerbate tissue damage. We further showed that knockdown of HuR in astrocytes blunts expression of these factors in an in vitro stretch injury model of CNS trauma. In this report, we further investigate the impact of HuR in early SCI using a mouse model in which human HuR is transgenically expressed in astrocytes. At 24 h following a mid-thoracic contusion injury, transgenic HuR translocated to the cytoplasm of astrocytes, similar to endogenous HuR, and consistent with activation. Compared to littermate controls, the transgenic mice showed a global increase in astrocyte activation at the level of injury and a concomitant increase in vascular permeability. There was a significant decrease in neuronal survival at this time interval, but no differences in white matter sparing. Long term behavioral assessments showed no difference in motor recovery. In summary, transgenic expression of HuR in astrocytes accentuated neuronal injury and other secondary features of SCI including increased vascular permeability and astrocyte activation. These findings underscore HuR as a potential therapeutic target in early SCI."
19- Deficits in Learning and Exploration in First Episode Schizophrenia Patients

Raktima Datta

We investigated the differences in Go learning and No-Go learning and exploration versus exploitation in first episode schizophrenia patients (FEP) compared to healthy controls (HC). This research is important because while it has been established that patients with schizophrenia have deficits in reward pathways when compared to healthy controls, there is significantly less literature on the differences between patients first diagnosed and not yet on medication and chronic patients diagnosed and on medication for years. To further the knowledge on this, we used the Time Conflict Task to analyze the deficits in learning and exploration between healthy controls and first episode patients with schizophrenia. We found that FEP had deficits in Go learning and intact No-Go learning. Moreover, both HC and FEP showed less uncertainty-driven exploration, but HC more so than FEP. We concluded that FEP demonstrate similar Go and No-Go learning trends as chronic patients. However, because HC appeared to show less uncertainty-driven exploration than FEP, more studies need to be done to analyze this finding to see if it was a fluke or something substantial considering chronic patients are typically more risk averse than HC.

20- Amygdala specific microRNA network dysregulation in stress induced rat model of depression

M. Dunbar, B. Roy, Y. Dwivedi

Major Depressive Disorder (MDD) is the leading cause of disability worldwide according to the World Health Organization. Many patients do not respond to current treatments. This may be due to a lack of knowledge about the underlying molecular mechanisms of depression. MicroRNAs (miRNAs) present a novel mechanism of gene regulation that has been shown to be affected in both animal models of depression and patient samples. The regulation of these miRNAs could potentially play a role in conferring susceptibility or resistance to depression. One brain area that has been largely unexamined for miRNA dysregulation in depression is the amygdala. The current study is focused to uncover the potential role of miRNA network dysregulation in the amygdala using rat learned helplessness model of depression. Through next generation sequencing (NGS) we have found that a network of miRNAs show differential expression across resistant and susceptible groups, including miR-107-3p, miR-211-5p, miR-325-5p, miR-194-3p, miR-380-3p, miR-216a-3p, let-7a-2-3p, and let-7c-5p. These miRNA have mRNA targets that are involved in Wnt signaling pathway. Wnt signaling pathway is important in cell fate determination, cell polarity, neural patterning, and most importantly synaptic plasticity. Quantitative PCR analysis of these targets has shown significant differences between the NLH (resistant) and control groups as well as the LH (susceptible) and control groups. Also, Wnt 3 and Wnt 3a have shown significance between the NLH and LH groups. Altogether, our study suggests that miRNA network dysregulation may play an important role in depression resistance or susceptibility mediated through disrupted Wnt signaling pathway.
21- New Insights in Corynebacterium Phage Infection

The SEA-PHAGES (Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science) program is a two-semester, discovery-based undergraduate research course that engages students in the discovery of novel bacteriophages. Throughout the fall semester, students isolate novel phage from the environment. In the spring, viral genomes are sequenced and analyzed using modern bioinformatics tools. We recently identified 12 novel Corynebacterium phages and completed basic characterization of these viruses in addition to full-genome sequencing. To further extend our analysis of this new set of viruses, we designed additional characterization experiments to explore host range, viral dependency on calcium for infection, and protein composition of phage particles. Taken together, this new set of data will provide greater insight into requirements for phage infection of the host Corynebacterium.

22- The Effects of Dopamine and Tyrosine Supplementation on Drosophila melanogaster Lifespan across Multiple Genotypes

C. Aaron Smith, Jessica M. Hoffman
Aging is a complex process that arises from the interaction of many different environmental and genetic factors. To study aging, researchers analyze different biological levels within an organism, including individual genes, the entire genome, the proteins these genes code, known as the proteome, and the products these proteins make, metabolites, the sum of which make the metabolome. Previous research has shown individual metabolites change with age, and some are believed to show links to aging and longevity. However, not much is known about the effects of manipulations of individual metabolites on the aging phenotype. Here, we investigated the effects of dopamine and tyrosine supplementation on fly longevity. We mixed dopamine and tyrosine separately into standard Drosophila media. We then distributed male and female flies of four different genotypes into three groups: those that received food with tyrosine, those that received dopamine, and a control group that did not receive either. We found significant variation in the longevity changes of the different genotypes, as well as sex differences in longevity. Our results also suggest dopamine has a negative effect on lifespan while tyrosine’s effect on longevity varies across different genotypes. Future studies will test the effect tyrosine and dopamine supplementation on different measures of health in Drosophila.
23- Investigating the Role of Microphthalmia-Associated Transcription Factor (MITF) in Autophagy (CH 461 Final Project - NIH F31 Example Application)

Roshan Dorji

"This study aims to evaluate the role of microphthalmia-associated transcription factor (MITF) in autophagy, and further investigate the link between autophagy and melanogenesis. Understanding the regulators of autophagy remains a goal in understanding aging and cancer. While medicine has found ways to extend our lifespans, it has not yet provided a way to keep us young and in our prime. This study is important as it helps to shed light on how we might approach the problems of aging and cancer formation. Malfunctions in the formation and transport of autphagosomes 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. 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.

This study would utilize transmission electron microscopy (TEM) and immunohistochemistry to compare melanosome biogenesis and autophagosome formation in both mutant and wild type mice. Quantitative polymerase chain reaction (QPCR) would also be utilized to assess gene expression in both mutant and wild type mice."

24- Understanding the Role of STAT4 in the Regulation of Autoreactive CD4 T Cell Development and Survival

Tayleur White, B.S., Ian L. McWilliams, Ph.D., and Laurie Harrington, Ph.D.

Multiple Sclerosis (MS) is an inflammatory disease of the brain and spinal cord in which individuals exhibit symptoms such as vision loss, impaired coordination, and weakness in leg muscles. Demyelination of nerve axons in the central nervous system, during MS, results in conduction blockage or a slowing of conduction at the site of myelination. To identify the factors that mediate the cellular drivers of MS, we use an animal model of experimental autoimmune encephalomyelitis (EAE). It shares certain clinical and pathological features with the human disease and allows us to research molecular mechanisms of MS/EAE. The EAE model has demonstrated an important role for CD4 T cells, specifically Th17 cells, in disease induction. Th17 cells produce the pro-inflammatory cytokine IL-17A, and require TGFβ, IL-6, and IL-23 signaling for their development. Recent studies have indicated that a specific gene signature is associated with pathogenic Th17 cells that can cause EAE. Among this gene set is the transcription factor STAT4. Signal transducer and activation of transcription 4 (STAT 4) is an important signaling molecule that stimulates the cellular responses of IL-12, as well as other cytokines. We and others have demonstrated that STAT4 is necessary for EAE induction, even though IL-12 is not, presenting an interesting scientific paradigm. We hypothesize that STAT4 is essential for the development and survival of pathogenic Th17 cells. We observed that in the absence of STAT4, CD4 T cells express the Th17 master transcription factor RORγt and are capable of producing IL-17A, after in vitro Th17 differentiation. This suggests that Th17 development is intact. However, we found that STAT4-deficient Th17 cells were unable to induce EAE after adoptive transfer, and fewer of these cells were recovered from the CNS compared to the wild-type Th17 cells. To test if STAT4 is important for Th17 cell survival, the susceptibility of wild-type and STAT4-deficient CD4 T cells to activation induced cell death (AICD) was examined. Preliminary experiments show that Th17 cells are less susceptible to AICD than non-polarized activated CD4 T cells, and that the absence of STAT4 did not affect the CD4 T cell survival. Together, our data indicate that STAT4 regulates accumulation of autoreactive Th17 cells in the CNS during EAE but this is likely not due to differences in cell survival.
25- Clean Water
Lavanya Bharani, Aleena George, Cameron Harper
Accessibility to clean water is a prevalent issue facing billions around the world, including many in the United States. Having access to clean, drinkable water is a basic human right and is necessary to sustain life. Many related problems can be solved simply through education, in fact, the main problem is not a shortage of water, but rather the wasteful and unsustainable use of available water supplies. This project aims to educate the public about water conservation methods and water quality through concise research from various environmental, health, and human rights organizations. Although the water crisis is a nationwide issue, getting involved in Birmingham's community is the first step to combatting this dilemma. The utilization of the program WaterSense, which was designed by the EPA to educate citizens about the daily conservation of water, is one of the programs at the forefront of our involvement in transforming Birmingham. Efforts will be aimed at UAB and local public schools to bring guest lecturers and host community events to raise awareness and encourage involvement in sustainable water practices. This work hopes to inspire members of the community to educate themselves about conscious water use.

26- The New Gold Standard Assay for Testing a Potential IRES.
Whitney Narmore, Beth Walters, Sunnie R. Thompson
Internal Ribosomal Entry Sites (IRES's) are hairpin loop structures found in the 5' untranslated region (UTR) of mRNA. Since their discovery in 1988, it has been found that both cells undergoing stress and several viruses use them for non-canonical protein synthesis. Ribosomal protein 25 (eS25) has also been found to have a very important role in the facilitation of IRES-mediated translation. Currently, there is no standard way to determine the presence of an IRES, and this has lead to several conflicting claims over whether certain mRNA's contain an IRES. For this project, a knockdown of eS25 was used to test for IRES activity using a dicistronic reporter assay. The IRES activity in the eS25 knockdown cell line was compared to IRES activity in the presence of eS25. Previously verified IRESs were used as a control. The data collected confirmed that the knockdown of eS25 can be used as a gold standard assay to test any potential IRESs. We used the eS25 knockdown to test two controversial mRNA's, p27 and XIAP, for potential IRES activity. The aim of this project is to accelerate the pace of research by finally utilizing a foolproof method to test mRNAs for the presence of an IRES, which will aid in quickening research timelines and also give the scientific community a definitive assay to use when testing for an IRES.
27- Histone H3K27 Trimethylation Regulates Pten Gene Silencing and mTOR Signaling in the Hippocampus during Memory Reconsolidation

Gabriella A. Perez, Timothy J. Jarome, Katrina M. Hatch, Rebecca M. Hauser, Farah D. Lubin

Retrieval of a memory for a previously learned association increases protein synthesis in neurons within the hippocampus, a process referred to as reconsolidation. Enhancer of zeste homolog 2 (Ezh2) is a subunit of the polycomb repressive complex 2 that trimethylates histone H3 at Lys-27 (H3K27me3), which regulates transcriptional gene silencing. One of the known targets of Ezh2 is Pten, which plays a key role in the modulation of the mTOR signaling pathway, a critical regulator of protein synthesis. However, it is currently unknown whether or not H3K27me3 mediates repression of Pten to regulate mTOR signaling in the hippocampus during memory reconsolidation. Here, we used a hippocampus-dependent fear-motivated task where rats were trained to associate a novel context with a mild footshock. Twenty-four hours later, rats were returned to the training chamber to reactivate the memory and at one hour the CA1 region of the hippocampus was collected. We found that animals that were re-exposed to the context had an increase in Ezh2 and H3K27me3 levels that correlated with a decrease in Pten protein levels compared to non-reexposed controls. Chromatin immunoprecipitation analysis revealed that H3K27me3 was present within the Pten coding region, suggesting repression of Pten by H3K27me3 following retrieval. Further, small interfering RNA (siRNA)-mediated knockdown of Ezh2 in the CA1 region prevented retrieval-dependent increases in H3K27me3, decreases in Pten, and increases in mTOR activation. Collectively, these results indicate that H3K27me3-mediated repression of Pten controls mTOR activation during reconsolidation, which may have important clinical implications for the treatment of psychiatric disorders.

28- Characterization of the effects of the TrxR inhibitor AFN on Nrf2 and pro-inflammatory pathways in alveolar macrophages

Rachael Wood, Stephanie Wall, Qian Li, Rui Li, Katelyn Dunigan and Trent Tipple

Bronchopulmonary dysplasia (BPD), characterized by altered lung development in infants, is caused by exposure to high oxygen levels following premature birth. Work done previously in our lab has shown that the thioredoxin reductase (TrxR1) inhibitor auranofin (AFN) has a protective effect against injury caused by hyperoxic exposure of newborn mice. Recent investigation has shown that increased inflammation plays an important role in causing lung injury. Our work tested the hypothesis that AFN decreases pro-inflammatory pathway activation in alveolar macrophages. Murine alveolar macrophages (MH-S) were stimulated with the pro-inflammatory molecule, lipopolysaccharide (LPS), in the presence or absence of 0.5μM AFN for 2 hours and lysates were collected for analysis. Activation of the cytokine IL-1β by quantitative polymerase chain reaction (qPCR) was evaluated by enzyme-linked immunosorbent assay (ELISA). Inhibition of TrxR was confirmed by determining enzymatic activity. Expression of the antioxidant response element activator Nrf2 was measured. LPS treatment significantly enhanced IL-1β mRNA and protein levels. Co-treatment with AFN decreased IL-1β mRNA and protein expression in response to LPS stimulation. Further, AFN treatment inhibited TrxR activity completely after 1-hour treatment and enhanced Nrf2 expression. LPS did not stimulate more Nrf2 expression than control, but when treated with AFN, expression went up by nearly 80%. Macrophages significantly contribute to pro-inflammatory responses including IL-1β. Enhanced expression of the IL-1β has implicated as a contributing factor to BPD development. Collectively, our novel data suggest that AFN may also work by blunting pro-inflammatory responses in addition to its effect on decreasing the damaging effects of hyperoxia.
29- Wnt Inhibition in Combination with Dose Dense Taxol for the Treatment of Chemoresistant Ovarian Cancer


"Background: Ovarian cancer (OVCA) is the most lethal gynecologic malignancy. Many patients experience tumor relapse and become chemoresistant due to the presence of tumor-initiating cancer stem cells (CSCs). Current treatment for chemoresistant OVCA utilizes dose dense paclitaxel (DDPac) chemotherapy; however, none of the current standard treatments target chemoresistance in CSCs. Objective: We hypothesized that inhibiting the Wnt/β-catenin signaling pathway, an important pathway in CSCs, in combination with DDPac could successfully modulate the immune system and overcome paclitaxel resistance.

Methods: Ascites cells from 53 OVCA patients were treated with 1 microM of WNT974. Viability assays were conducted on OVCA cell lines that were treated for 7 days with cells receiving 0-50μM of WNT974 and 0-250nM of paclitaxel. RNA-seq and qPCR was also conducted. C57BL/6 were injected subcutaneously with 7 million ID8 murine OVCA cells. Treatment groups included: vehicle control, DDPac, WNT974, and DDPac + WNT974. Tumors were measured and mice were weighed twice per week.

Results: The combination of both agents significantly reduced proliferation of OVCA cells better than either agent alone both in vitro and in vivo. Our data potentially shows that patients with low immune response might respond to Wnt inhibiton and the combination treatment with DDPac could further improve outcomes."

30- micro-Optical Coherence Tomography application in uncovering novel methods to address Mucus Ciliary Clearance defects from smoke (toxins)

Krina Patel1 Lawrence W Rasmussen1 Li Ping Tang1 Steven M Rowe2 S Vamsee Raju1

Chronic Obstructive Pulmonary Disease (COPD) is the third leading cause of death in the United States of America, which includes hallmark symptoms such as chronic cough present in diagnosed chronic bronchitis patients. The cause of such symptoms results in an inability to remove excess mucus from the airways; a mechanism that is regulated by the liquid hydration component of airway epithelial cells known as cystic fibrosis transmembrane conductance receptor (CFTR). Defects in this protein's function leads to deterioration in airway liquid interface that promotes mucociliary clearance (MCC) and mucus ciliary transport (MCT). Currently, there are few reliable methods to monitor the function of MCC in in vitro and in vivo model systems. However, utilization of a novel micro-Optical Coherence Tomography (μOCT) allows for examination of MCC activity in a ferret lung model system, which aptly mimics chronic bronchitis conditions in humans. When airway epithelium is exposed to smoke particulate, such as nicotine that binds to nicotinic acetylcholine receptors (nAChRs), there is a shift in CFTR function resulting in decrease mucus transport activity. Utilization of μOCT allows for the identification and impact of this type of nicotine insult; as well as, the ability to observe methods to ameliorate MCC and MCT. Presented here is the ability to use μOCT to observe therapeutic techniques, including our lab's stimulation of α7-7 nAChR alone by a specific agonist, GTS21, before exposure to smoke from cigarettes and electronic cigarettes that results in a significant increase in MCT.
31- Test the Stress: Fat body Knockdown of Syndecan Increases Oxidative Stress Levels in Drosophila melanogaster

Karis Ederer and Maria De Luce
Increased oxidative stress in the adipose tissue of obese individuals is a risk factor for metabolic complications. Identifying the mechanisms responsible for the increased oxidative stress is, therefore, of paramount importance. Syndecans are heparan sulfate proteoglycans that can be found on the cell surface of most adherent cells. Previous studies performed in the De Luca lab showed that knocking down the expression of the Syndecan (Sdc) gene in the fat body (insect equivalent of mammalian adipose tissue) of the fruit fly D. melanogaster led to increased fat storage. Additionally, Sdc knockdown flies had higher levels of Eip71CD (belongs to the methionine sulfoxide reductase family) gene expression and increased c-Jun N-terminal kinase (JNK) signaling compared to controls. Based on these results, we hypothesized that reduction of Sdc levels in the fat body increases oxidative stress. To test our hypothesis, we crossed male transgenic flies carrying a fat body GAL4-driver to females with an Upstream Activation Sequence (UAS) enhancer element followed by inverted repeats (the responder) or without the responder. In the resulting progeny, binding of the GAL4 protein to the UAS generates an RNA interference (RNAi) hairpin that partially degrades the Sdc transcript in the fly fat body. To measure reactive oxygen species (ROS), we used a fluorometric assay kit (Sigma-Aldrich) following the manufacturer's protocol. Our preliminary data showed that the fat body specific Sdc knockdown flies had a 45% increase in ROS when compared to the controls (p=0.006). This finding suggests that Sdc might influence oxidative stress in fat tissues.

32- CRISPR/Cas based gene knock-down construct to establish strategies to evaluate the function of a cold shock gene in Escherichia coli

Maryem A Gendy1*, Kelsey C Jolley1*, Sarah M Ladhani1*, Brinda M Shah1*, Hyunmin Koo1, Anil Challa2, and Joseph A Hakim1
Foodborne microbial pathogens such as Escherichia coli and Salmonella enteritidis are the causative agents to gastrointestinal illnesses in humans, primarily through consumption of contaminated poultry products, fruits and vegetables. Although these products are stored under refrigerated conditions, disease incidences have been reported following consumption. Thus, the ability of these pathogens to survive cold temperatures is of concern. It has been reported that these pathogens can alter their physiology through expression of a cold shock protein, enabling them to survive in cold temperatures. The objective of this study was to determine the efficacy of the CRISPR/Cas genetics system targeting key segment(s) of the cspA gene in E. coli, thereby disrupting their cold adaptive phenotype. Our attempt in targeting the conserved RNA binding sites within the cspA using chimeric pcas9 plasmid with target-specific gRNA resulted in a lethal phenotype in E. coli. Thus the selection, construction and execution of multiple gRNA targets based upon the location of PAM motif sites along cspA is currently being attempted. We hope to identify gene sequences in which mutation(s) would allow for successful knock-down cold adaptive function without lethal phenotypes. Consequently, the functionality of the cspA can be evaluated in pathogenic E. coli, and later in S. enteritidis. The outcome of this study will help understand the permissible sequences within cspA and perhaps its regulator cspE where the CRISPR/Cas based gene knock-down construct(s) can be established to study the structure and function of this gene, thus allowing future strategies to be adopted to protect human health.
33- Effects of Ghrelin and Time Restricted Feeding on Circadian Clock Rhythmicity

Assata Pyatt, Jennifer Davis, Parker Hoda, Mugdha Mokashi, Sam Mabry, Siva Tekumalla Martin E. Young, David B. Allison, Karen L. Gamble

Prior studies suggest that caloric restriction or ghrelin receptor activation lead to increased lifespan through altered metabolism. Peripheral metabolic tissues are entrained to 24-h feeding/fasting cycles, each other, and the light-dark cycle by the suprachiasmatic nucleus (SCN) in the hypothalamus. Ghrelin, the hunger hormone, is a rhythmically expressed metabolite. It remains unknown if the timing of ghrelin receptor activation and food availability are necessary for the effects that ghrelin as on age. Therefore, we hypothesized that time-of-day food availability and ghrelin receptor activation differentially entrains circadian clocks in a tissue-specific manner. We placed Period 2 luciferase (Per2::LUC) mice on a chronic (8-week) and acute (9-day) study, divided the mice into day-fed and night-fed groups, and gave them a 1.66% ghrelin agonist (LY444711 [LY]) or a 45-mg sucrose pellet. Half of the mice received LY at the beginning of the light-cycle and the other at the start of the dark-cycle. The 8-week study showed that food availability during the light-cycle decreases weight gain but, LY administration at the dark-cycle rescues it. Light-cycle feeding lead to a large circadian phase shift in the liver, adipose, and hippocampus but, not the in the SCN or skeletal muscle. The 9-day study showed acute mistimed feeding and LY is sufficient to lead to tissue specific circadian shifts. We therefore suggest that the timing of food intake, and ghrelin receptor activation, impacts the circadian timing of metabolically active tissues. Further studies will investigate whether ghrelin receptor activation impacts lifespan through synchronization of the circadian clock.

34- Mucokinetic Potential of Î±-7 Nicotinic Acetylcholine Receptor Agonists in COPD

Krina Patel1 Lawrence W Rasmussen1 Li Ping Tang1 Steven M Rowe1 S Vamsee Raju1

COPD is the third leading cause of death in the United States. COPD patients exhibit symptoms of irreversible airway resistance, chronic inflammation and persistent cough, especially those with chronic bronchitis phenotype. The key pathogenic mechanism underlying chronic bronchitis is mucus over production and the inability of the airways to remove excess mucus. Studies from our lab indicate that loss of cystic fibrosis transmembrane conductance receptor (CFTR) (the causative gene in cystic fibrosis) ion transport results in diminished airway surface hydration that is needed for optimum mucus ciliary transport (MCT) in smokers and COPD patients. Here, we used micro-Optical Coherence Tomography (Î¼OCT), a novel imaging method capable of revealing parallel information regarding airway surface liquid (ASL) depth, ciliary beat frequency and MCT to determine the potential of Î±-7 nACHR agonist GTS-21 to address pathologic mucus accumulation. Our data suggest that GTS-21 can activate CFTR function in ferret airways exposed to cigarette smoke or nicotine and markedly restores ASL depth and MCT. These data establish that Î±-7 nACHR may be a suitable pharmacologic target in COPD and support further testing of GTS-21 in animal models and patients.
35- Single Cell Protein May Substitute for Fish Meal in Animal Diets
Michael E. Heisler, Jeff Barry, Yuan Yuan, Ayah Alkhatib, Adele Fowler, Mickie Powell, and Stephen A. Watts
The animal feed industry has placed a demand on fishmeal, a crucial ingredient due to its exceptional essential amino acid content. The rising cost and limited availability of fishmeal encourages the use of alternative protein sources. Large-scale production of single cell protein sources (bacteria or fungi) might be a suitable protein replacement. In this study, fish protein hydrolysate (FPH) was replaced by one of two proprietary sources of single cell protein (SCP-1 and SCP-2) in the diet of juvenile zebrafish (Danio rerio). These diets were fed for 6 weeks, and weight gain was compared. Experimental and control (fish meal) diets were fed at two rations: a full ration or a half ration (dietary restricted). Fish were weighed bi-weekly to evaluate weight gain and calculate feed rations. Each treatment had six replicate tanks (n=14 fish per tank). At the end of the six-week feeding period, the two non-dietary restricted SCP treatments had an 8-10% lower mean weight compared to the FPH control treatment. However, when the rations were restricted, the two SCP treatments showed a 20-23% lower mean weight compared to the FPH control. These data suggests that SCP sources have the potential to replace or reduce the inclusion of fish protein hydrolysate in aquafeed. Moreover, the efficiency of SCP sources could be improved by altering protein expression through genetic modification. Since SCP can be produced using waste or low value carbon products, we suggest SCP could be a valuable feed ingredient for animal feeds in the future.

36- Using CRISPR to Induce Mutations Preventing Dimerization of the Chromo Shadow Domain in Drosophila HP1 Proteins
R Colton Ritchie, Rachael Mackenzie
The Heterochromatin Protein 1 (HP1) family is a family of highly conserved proteins found in many eukaryotic species, including humans and Drosophila melanogaster. HP1 proteins bind chromatin, and some of these proteins are involved heterochromatin formation. In Drosophila, there are three somatic HP1 homologs: HP1a, HP1B, and HP1C. Each serve related, though not identical, functions in the maintenance of chromatin structure. A complete lack of HP1a and HP1C is lethal; a lack of HP1B is not lethal but leads to a decrease in activity and an increase in lipid storage. The HP1 proteins have a conserved structure: the chromodomain, which binds to methylated sites on histones; the hinge domain; and the chromo shadow domain, which dimerizes two HP1 molecules and is believed to facilitate condensation of chromatin. It is unclear if dimerization is required for all HP1 functions. Mutations to prevent dimerization will be induced in all somatic Drosophila HP1 proteins to elucidate the importance of dimerization. These mutations will be induced with the CRISPR/Cas9 system which uses the Cas9 protein and a guide RNA (gRNA) to make cuts in the genome. Cuts are repaired with a plasmid containing the desired mutation, causing the organism to produce the modified protein. The gRNA and donor plasmids have been prepared and verified by genetic sequencing and are now being injected into Drosophila embryos. Lifespan, behavior, and body composition will be studied and compared to wild-type and flies without HP1 expression. Changes will reveal if dimerization is essential for complete HP1 function.
37- Evaluating the Effects of Salinity and Gender on Growth of Diamondback Terrapin Hatchlings (Malaclemys terrapin pileata)

Dilani Patel
The Mississippi diamondback terrapin (Malaclemys terrapin pileata) is a threatened keystone species facing population declines due to overhunting, habitat loss, and pollution, resulting in the Diamondback Terrapin Restoration Project at UAB. Diamondback terrapins are able to live, thrive, and maintain osmoregulation in brackish waters through a variety of physiological and behavioral methods. Salinity has been shown to a factor of various physiological aspects such as growth in diamondback terrapins, indicating the involvement of phenotypic plasticity. Adult diamondback terrapins show sexual dimorphism, where females typically are bigger in size while males have longer tails. However, gender can only be determined by incubation temperature for hatchlings. In order to determine the influence of salinity in addition to gender on the growth rates of hatchling diamondback terrapins, 17 male (26°C) and 22 female (31°C) hatchlings from six different clutches were placed in freshwater (0 ppt) or brackish water (10 ppt) and were measured weekly for seven different growth measures (carapace length, carapace width, height, plastron length, tip of plastron to vent, vent to tip of tail, and weight) over the course of 20 weeks. Growth rates are predicted to be better for hatchlings that are female and/or were placed the brackish water. This study is limited by the small sizes for the gender and salinity groups. However, this research could potentially indicate presence of sexual dimorphism in early stages of life, provides more helpful academia for other restoration programs for terrapins and turtles, and provide more academia regarding phenotypic plasticity in turtles.

38- Understanding the mechanism of Parvalbumin induction in neurons

Kaval Patel
In Parkinson's Disease (PD), cell death and mitochondrial dysfunction is observed in multiple neuronal populations. Parvalbumin (PV) positive interneurons have been studied in the context of PD because PV immunoreactivity in substantia nigra pars reticula is reduced in patients with PD and animal models of PD showed PV-positive neuron loss from the globus pallidus (GP). PV is also a target of metabolic and mitochondrial transcription factors such as peroxisome proliferator-activated receptor gamma coactivator 1-alpha (PGC-1α) and estrogen related receptor gamma (ERRγ). PV is hypothesized to be in a topically associated domain of PGC-1α regulated genes. Therefore, understanding the mechanism of PV expression can provide insights to PV interneuron vulnerability in PD. In this experiment, we aimed to better understand the mechanism of PV induction by using CRISPR/dCas9 mediated activation and inhibition of PV transcription in a human neuroblastoma cell line. Using a CRISPR/dCas9-VP64 construct targeted to regions in intron 1, we were able to induce PV expression in the cell line. This information can be used to overexpress PV in mouse models of PD and gives further insights into PGC-1α mediated transcription.
39- Approaches Used to Find a Novel Gene Relating to the Aging Process: Bioinformatics and Lab Techniques

Christian Douglas Parker, Dr. Melissa Harris

It is appreciated that somatic stem cells play a role in aging phenotypes. One common phenotype related to aging is hair graying, caused by the loss of melanocyte stem cells (McSCs) in the hair. McSC loss throughout the aging process is characterized by premature stem cell differentiation. We are interested in identifying novel genes that contribute to this process. Previously it was reported that McSC differentiation is influenced by genetic background. Specifically, the DBA1/J inbred strain can reduce McSC differentiation in an acute model of hair graying, while C57BL/6J has shown an elevated level of McSC differentiation in reference to DBA1/J. The gene responsible for this reduction of McSC differentiation was mapped to chromosome 13 using genetic linkage analysis. By using bioinformatic approaches, we aimed to identify possible candidate genes on chromosome 13 by assessing the known genomic variant sequence data to compare the differences between C57BL/6J and DBA/1J “specifically those variants that landed within the coding regions of a gene. By filtering and comparing the variants to other inbred strains of the similar hair graying phenotypes, the number of genetic variants on chromosome 13 was reduced from 294,351 total variants between DBA/1J and C57BL/6J to one INDEL and nine SNP variants. Then, the top candidate gene chosen for differential expression between C57BL/6J and DBA/1J McSCs were tested using qPCR for changes in mRNA expression or IHC for changes in protein expression. In the future, the participation of these candidate genes in hair-graying will be tested using gene knockout methods.

40- Identification and Characterization of PTBP1 Inhibitors for GBM Therapy

Elizabeth Caver, B.S., Reginald Brown, B.S., Rajani Rajbhandari, B.S., Susan E. Nozell, Ph.D., Markus Bredel M.D., Ph.D.

Glioblastoma (GBM) is the most lethal cancer in the CNS; patients rarely survive beyond 18 months post-diagnosis. GBM is diffusively infiltrative, aggressive, and challenging to treat. Our research will identify small-molecule inhibitors of Polypyrimidine Tract Binding Protein (PTBP1), which is overexpressed and problematic in GBM. PTBP1 mediates alternative splicing of Annexin 7 (ANXA7), a tumor suppressor. High levels of PTBP1 ensure ANXA7 isoform 2 (I2) is expressed in GBM. ANXA7 I2 allows epithelial growth factor receptor (EGFR) signaling; this is correlated with poor patient prognosis. PTBP1 inhibition elevates ANXA7 isoform 1 (I1) levels; this inhibits EGFR signaling and decreases GBM tumorigenicity. We hypothesize compounds inhibiting PTBP1 will restore ANXA7 I1 levels, inhibit EGFR signaling and reduce GBM tumorigenicity. To identify candidates that inhibit PTBP1, we will use a Cell Based High Throughput Assay (CBHTA) to screen a library of 2 million compounds. Candidates will be tested in established glioma cells and patient derived xenografts (PDGxs). We will measure PTBP1, ANXA7 I1, and ANXA7 I2 levels and/or inhibition using Immunoblots(IB) and qRT-PCR. EGFR signaling will be assessed using IBs and ELISAs. We will quantify changes in cell proliferation by measuring ATP metabolism, cell growth, and cell cycle progression. We have confirmed amiloride, a diuretic, inhibits PTBP1 and promotes cell death within 24 hours. These events coincide with reduced levels of EGFR and re-expression of ANXA7 I1. Unfortunately, amiloride is unsuitable for use in the treatment of patients with GBM. However, these results do provide proof of principle data that our CBHTA is competent to identify PTBP1 inhibitors that reduce EGFR signaling and inhibit GBM cell growth for the treatment of patients.
41- Teneurin C-Terminal Associated Peptide as a Positive Modulator of Aerobic Respiration, Potential Aging Effects

L. Amber Requena

Aging is a phenomenon common to all living organisms and can be seen as the metabolism declines over the lifetime of the organism. It is believed to be linked to the mitochondria. As the mitochondria produces Adenosine Triphosphate (ATP), free radicals are made. These are highly toxic to the cell and can result in mutations to the mtDNA and RNA, both of which are imperative for optimal performance. Over time these mutations accumulate, leading to an amplified decrease in the amount of ATP produced by the mitochondria. Apoptosis is regulated by the mitochondria, and possibly a result of the decrease in ATP. This process is believed to be one of the causes of sarcopenia, an age-related loss in the number of myocytes and the strength of muscles. At this time there is no understanding of any process by which to eliminate the free radicals. We suggest a counter to this utilizing Teneurin C-Terminal Associated Peptide (TCAP) as a positive modulator of mitochondrial metabolism, resulting in a greater amount of energy production. Danio rerio, the zebrafish, was used because of its muscle growth pattern that closely resembles that of higher vertebrate models such as the rodent. Through this study we show that TCAP created an increase in metabolism which was measured by Resazurin Metabolic Assay. This is crucial data necessary to establish the zebrafish as a valid model for TCAP and its subsequent effects on senescence. Future studies will look at conservation of myocytes and mitochondria through the lifetime.

42- The Role of the Ubiquitin Proteasome Pathway in the Regulation of Memory

Samantha R. Golf, Jada H. Vaden, Julie A. Wilson, Scott M. Wilson

Effective proteome maintenance is essential to eukaryotic function and survival. The Ubiquitin Proteasome Pathway plays an integral role in the selective clearance of short-lived and damaged proteins. For proteins to be degraded by the UPP, they are modified by the attachment of ubiquitin. This post-translational modification marks the protein for degradation by the proteasome. Controlling the ubiquitination of proteins is a key step in their selective turnover. The cellular processes controlling ubiquitin levels are currently unclear. This is of particular importance as many neurological disorders are associated with changes in ubiquitin expression. The present study aimed to elucidate the effects of ubiquitin on learning and memory by investigating the molecular, synaptic, and behavioral consequences of ubiquitin overexpression in the hippocampus. For this study, we utilized mice that overexpressed ubiquitin 1.5-fold and 3-fold within the CA1 region. Examination of the behavioral effects of ubiquitin overexpression revealed a dose-dependent decrease in contextual and cued freezing behavior compared to controls. Electrophysiological analysis of hippocampal synaptic function identified a dose-dependent decrease in field excitatory postsynaptic potentials and reduced long-term potentiation for ubiquitin overexpressing mice. These changes correlated with significant differences in the protein levels of the glutamate receptors GRIA1-4 without changing their transcript levels. These results suggest that controlling ubiquitin levels could function as a new mechanism for the regulation of AMPA receptor expression, synaptic function, and behavior. Further investigations into the fundamental mechanisms controlling the UPP will provide an opportunity to uncover disease processes and aid in the development of novel treatment methods.
43- Role of Hatha Yoga Therapy as an Effective Treatment Option for Chronic Migraine

Varshini Venkatesan
Migraine headache is a chronic pain condition that is characterized by unilateral, throbbing head pain, which is moderate to severe in intensity and is often aggravated by physical activity. Even as the second most common disorder in the United States, the cause of chronic migraine has been debated for decades, with no definite cure. However, there are several treatment options to alleviate the impact of chronic migraine and they range from acute and prophylactic medications to non-pharmacological strategies. Among these non-pharmacological options, yoga therapy, specifically Hatha Yoga, has been proven to be effective in treating chronic migraine, especially in managing it long-term. This study aims to explore the reasons behind the effectiveness of Hatha Yoga as a treatment option for chronic migraine, by not only examining its pathophysiology in terms of central sensitization and peripheral sensitization, but also comparing its pathophysiology to that of prophylactic medications.

44- Analyzing activity and efficiencies of CRISPR-Cas9 sgRNA designs in the ndr2 gene of zebrafish

Jordan B. McGill, Ivy Bookout, Lauren Brashear, Mia Rodgers
"CRISPR-Cas9 can be an incredibly useful tool in determining functions of genes and in genetic engineering, and understanding the factors that determine an active design can improve genetic research methods and further the utilities of CRISPR. We used current systems for CRISPR design such as Benchling’s on-target scores (Doench, Fusi, et al., 2016) and off-target scores (Hsu et al., 2013) and the well characterized nodal-related 2 gene (ndr2) in zebrafish, expressing the cyclopia phenotype when mutated, as controls so that comparisons and conclusions could be formulated from the CRISPR designs of our fellow classmates.

Eighteen CRISPRs were designed for the ndr2 gene on all three exons in the gene with various efficiency scores ranging from the lowest to highest with the idea being we could compare our results with the quantitative scores and either validate or disprove them. Each design was synthesized and injected into zebrafish embryos using a common procedure. We compiled our results and compared CRISPR designs that were both active and non-active based on the heteromobility duplex assay (HMA) and/or in vitro assay (IVA) with their predicted scores."
45- An In Vitro Analysis Method to Validate In Vivo Activity of CRISPR-Cas9 in Zebrafish

David Gahan, John Gotham, Ashish Kaushik, and Victoria Miller
Targeted gene manipulation has become a reality with the emergence of engineered nucleases. The CRISPR-Cas9 system, an adaptive immune system in Bacteria and Archaea, is the latest tool for manipulating specific gene sequences to create mutations. It creates a double stranded break in the target genomic sequence, then the cell repairs the cut by either non-homologous end joining (NHEJ) or homology directed repair (HDR). NHEJ often results in insertion or deletion (indel) at the target site, creating a mutation. Our goal was to identify effective CRISPR/sgRNA that can target specific sites in the zebrafish (Danio rerio) nodal-related 2 (nrd2) gene to create double strand breaks. We designed, synthesized, quantified, and tested 20 CRISPR/sgRNAs for quality and injected them and Cas9 protein into zebrafish embryos. We tested if the CRISPR-Cas9 system was working properly to verify that the lack of an indel was due to the cell precisely repairing the genetic sequence or the CRISPR-Cas9 system failing. While injection of sgRNAs resulted in clear phenotypes (cyclopia) for some, others did not. To determine if there was nuclease activity, we performed an in vitro test with PCR-amplified target region. Our results show most sgRNAs with nuclease activity in vitro, but no activity in vivo. We also observed cases where the sgRNAs did not show in vitro activity but resulted in phenotypes in the embryo. Overall, we demonstrate the value and limitations of an in vitro assay as a quality control step for sgRNA nuclease activity before being used in vivo.

46- Effects of Estrogen Replacement Therapies on Diurnal Expression of Neurocognitive and Circadian Proteins in the Prefrontal Cortex and Hippocampus in Ovariectomized Female Rats

Marisol Gomez, Emily Goulet, Nateka Jackson, Lori McMahon
Hormone replacement therapies are used widely to alleviate menopausal symptoms such as hot flashes and sleep disturbances. Estrogen may help prevent cognitive losses during the menopausal transition and has been shown to alter the circadian system of rats. Here our goal was to investigate the effect of 17β-estradiol and Premarin (conjugated equine estrogens) on protein expression in the hippocampus (HPC) and prefrontal cortex (PFC) using a surgically menopausal rat model. Female Sprague-Dawley rats were ovariectomized and 2 weeks later were administered (s.c.) 2 injections of either sesame oil (vehicle), 17β-estradiol (10 µg/250g) or Premarin (10 µg/L) on two consecutive days. Tissues were collected at Zeitgeber time (ZT) 6 and 18 (ZT 0 = lights on and ZT 12 = lights off), and p-mTOR and total mTOR was assessed using Western blot. Results showed significant diurnal differences in the HPC, with an increase at ZT 18 in the p-mTOR/total mTOR ratio and the mTOR/β-actin ratio in comparison to ZT 6, while no effect of hormone treatment was observed. In the PFC there was a significant decrease in the ZT 18 p-mTOR/mTOR ratio compared to ZT 6 levels, no significant change was observed for mTOR/β-actin ratio and no effect of hormone treatment was observed. These findings show that estrogens differentially affect the expression of p-mTOR and mTOR in the HPC and PFC in a time-of-day dependent manner.
47- Using the CRISPR-Cas9 system to test the phenotypic mutation spectrum of the ndr2 gene during embryonic development of zebrafish

Reagan Andersen, James Davis, Austin Walker, Cerissa Nowell, Sarah R. Glover, Sami D. Foster, Ashley N. Turner, M.S., and Anil K. Challa, Ph.D.

"CRISPR-Cas9 is a system that is being employed to efficiently knockout and modify genes. We are interested in understanding the spectrum of mutations that occur in an embryo injected with a CRISPR/sgRNA-Cas9 ribonuclease protein (RNP) complex. We focused on the ndr2 gene in zebrafish because of an easily scorable visual phenotype when the gene is mutated. Loss of ndr2 gene function causes fusion of the eyes in the developing zebrafish embryo, which is a physiological disorder known as cyclopia[7] (Rebagliati et al., 1998).

From our analysis, we found four specific sites where a deletion in the gene would result in cyclopia: two on Exon 1, one on Exon 2, and one on Exon 3. We cloned PCR products from individual embryos exhibiting mutant phenotypes, and obtained sequence information of the mutations through the Sanger method. We present our methods, results and discuss the spectrum of mutations which were observed in the mutant embryos.

References:
Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC21439/

48- Effect of CRISPR-Cas9 Activity on Protein Structure and Function

Zac Moseley, Baraa Hijaz, Yazen Shihab, Riddhi Patel, Sarah R. Glover, Sami D. Foster, Ashley N. Turner, M.S., and Anil K. Challa, Ph.D.

The ability to generate genetic mutations in a targeted way has become very efficient with the advent of gene editing technologies, especially the CRISPR-Cas9 system. Using the CRISPR-Cas9 system, we focused on creating mutations in the nodal-related 2 gene (ndr2) in zebrafish embryos. The nodal proteins responsible for mesendoderm induction, nervous system patterning, and determination of the dorsal to the ventral axis in vertebrate embryos fall under the transforming growth factor beta (TGFβ) family. We designed multiple guides targeting distinct regions of the gene with 3 coding exons. We identified mutations that lead to highly penetrant phenotypes with some CRISPR guides, but not others. One of the guides that caused a strong phenotype targeted the end of exon 3. This observation motivated our study to map the mutations causing cyclopia in the developing embryos on to the ndr2 protein and analyze the structural basis for the mutant phenotypes. We used multiple sequence alignments and protein domain analyses with orthologous genes, and genes in the transforming growth factor (TGF) family to analyze the mutations we generated.
49- Effects of L-Kynurenine on regulatory B cell differentiation: Implications for advances in immune manipulation.

John G. Strenkowski, Kenneth P. Hough, Joshua D. Jackson, Sultan Tausif, Yong Wang, and Jessy S. Deshane

"Regulatory B lymphocytes (Bregs) have been shown to exert potent immunosuppressive effects primarily by interleukin-10 cytokine production. Additionally, the immunologically relevant tryptophan metabolite L-Kynurenine (L-Kyn) is implicated in promoting an immunosuppressive phenotype by ligation to the Aryl hydrocarbon receptor (AhR), a B cell differentiation regulator, suggesting a possible link between the two.

Recent literature confirms our observation that an increased L-Kyn:tryptophan ratio (a measure of tryptophan depletion and L-Kyn accumulation) observed in lung cancer microenvironments is positively associated with tumor immune evasion. In this study, we seek to elucidate a link between L-Kyn accumulation and Breg differentiation at the transcriptomic level as a possible means by which L-Kyn induces an immunosuppressive phenotype.

mRNA was isolated from B cells of WT mice and treated with L-Kyn, lipopolysaccharide (LPS), and additional mitogenic and immunosuppressive factors. Gene expression assays were performed using quantitative PCR on a number of developmental, metabolic, and immunosuppressive genes with an established role in B cell differentiation.

We found that the expression of AhR is differentially modulated by L-Kyn and LPS. Genes associated with lymphocyte metabolism and B cell function also exhibited differential changes according to their intervention.

These preliminary results are a key stepping stone to understanding how Bregs are activated and what epigenetic or transcriptomic signatures can be reliably connected to Breg activation. Unearthing the association between L-Kyn accumulation and immunosuppressive phenotypes in B cells holds promising implications for tumor microenvironment immunotherapy as we seek to better understand the development and roles of these potent immune regulators."

50- The effects of lithium on Drosophila melanogaster longevity are genotype dependent

"Jeremy B Chu Jessica M. Hoffman"

Small doses of the metal lithium are commonly prescribed for treatment of bipolar disorder and suicide risk in humans. In addition, dietary lithium supplementation has health and longevity benefits in the fruit fly. However, previous research has been conducted on single a Drosophila genotype, and the effects of lithium across multiple genetic backgrounds have yet to be determined. Twelve Drosophila genotypes of both sexes were raised with Lithium Chloride (LiCl) in their food, and their longevity was measured against a Sodium Chloride (NaCl) control. This experiment is currently in progress, and our preliminary results suggest lithium has variable effects on Drosophila lifespan. At the conclusion of this experiment, we expect to find that the lithium will have a positive effect on longevity in most genetic backgrounds. This prediction is promising as it would suggest the effects of lithium on longevity are reproduced in multiple genetic backgrounds. Future studies are needed to determine if lithium supplementation improves lifespan in species other than Drosophila.
51- The presence of insulin markers in old vs. young tree shrew retinas

Surabhi Rao
The Successful Start-Up Company and The Venture Capitalist Investment

Linaa Rohman

Does Venture Capital Investments injections into a university start-up company incubator contribute to its success? This paper aims to find out if a start-up company is positively affected by venture capital investment. Start-up companies that do not have venture capital investment will be used for comparative utility. Venture capital injections and its correlation to start-up company success will be tested through the means of survey data. I will answer the question: Does Venture Capital Investments injections into a university start-up company incubator contribute to its success? Investments from venture capitalists will include both human and financial contributions. The population of my sample selection is local start-up companies in Birmingham. More specifically university incubators programs and their respective start-up companies. The purpose of this paper is to understand if the success of a start-up company is because of the investment of the venture capital.

52- Dependence on Imports for Basic Food and the Rise of Industrial Agriculture in Belize

Suzanna Swanson

While the idea that large-scale agriculture contributes to the dependence of non-core nations is deeply rooted in the foundations of Dependency Theory, the direct correlation between this agricultural expansion and dependence on foreign countries for food has largely not been explored. This study examines what causes a country to become dependent on imports for their basic food needs, and looks at the specific case study of Belize. The demand for imported staple foods, such as maize, has become inelastic over the last 30 years causing Belize to become dependent on foreign supply for this food. Because sugar is the largest crop in Belize, this study uses data pertaining to this crop's land use when examining the impacts of industrial agriculture. To come to a conclusion, this study examines a time period before and after the rise of industrial sugar production in Belize, and considers both the effect of population change and the expansion of industrial agriculture as potential causes of the country's dependence on imports. After comparing data from these different sectors, this paper suggests that Belize's dependence on foreign imports for these foods has become inelastic due to the rise of industrial sugar production.
53- Competitive Aggression in Leadership: What is the Impact on Students' Emotional and Mental Health?
Kristal S. Mayfield

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

54- Win Maximization and Its Effects on the Financial Statements of European Football Organisations
Cory Roden

The goal of this presentation is to determine if it is financially feasible for European soccer as an industry to operate under the win maximization economic model that most of the top teams and leagues have adopted since the turn of the century. Since the goal of all businesses (as well as most American sports teams) is focused on a profit maximization financial strategy, the fact that European teams are more concerned with spending as much money as necessary to guarantee team success raises concerns about the financial sustainability of the industry as a whole, and calls into question the integrity of every public financial statement issued by seemingly profitable organizations. The methods used to identify and solve this problem included gathering and analyzing data from the Deloitte Annual Review of Football Finance from 2016, as well as analyzing individual team financial statements.

55- Can One Sales Course Increase Emotional Intelligence and why is This Important?
Kaci Chesser

Emotional intelligence (EI) has been linked with desirable business outcomes such as enhanced selling skills, leadership abilities, and overall business effectiveness. Hence, it is important research identifies those factors capable of enhancing EI. The current study addresses this issue by examining the link between participation in a professional sales course and students' EI scores. Specifically, twenty-nine undergraduate students were surveyed prior to and upon completion of the professional sales course. Although study results revealed no significant difference in students' pre- and post-EI scores, there was a sizeable difference in marketing and non-marketing students' pre- and post-scores. This finding appears to show that sales course teaching pedagogy can have a more powerful effect on non-marketing majors.
56- "Word-of-Mouth Marketing in an Increasingly Digital Age"

Vishal Patel

“As the business environment face increasing globalization, marketers and marketing departments of small businesses face a unique opportunity to boost publicity and attract more customers. Survey research gathered from 96 individuals (representing a realistic portrayal of the U.S. population with consideration given to parameters such as age, sex, income, etc.) gives us insight on consumer preferences, behaviors, and tendencies. It also develops applicable knowledge that businesses can implement immediately.

The survey research rendered several important points for the business-to-consumer relationship. Consumers were asked to quantify the value on a scale for WOM, digital media (& eWOM), and print marketing and gave them average values of 7.05, 6.64, and 5.37, respectively. The majority of consumers engage in WOM and trust recommendations from family, friends, and colleagues. Newspaper and mail-based ads, magazines, and television commercials are becoming progressively obsolete ways of marketing to the younger population (18-25 & 26-34), and consumers of all age groups (18-25, 26-34, 35-44, 45-54, & 55+) conduct their own online research and engage in eWOM. WOM/eWOM holds significantly more value when consumers are considering non-recurring, or otherwise expensive products or services. Consumers engage in WOM and eWOM and trust it more so than traditional marketing efforts.”

57- UAB Student's General Financial Knowledge

Hiren Nitin Patel

The purpose of this research paper is written to understand and gauge the financial knowledge students of the University of Alabama at Birmingham attain. The need for financial knowledge has become increasingly important after the 2008 “2009 financial crisis of subprime mortgages. The capacity to have a sound foundation on this important life skill brings the concern of how prepared students are once they leave the institution. Respected universities across the United States have program's in place helping their students enhance their knowledge in this field. This research has attempted to address if students of UAB need structures in place that will engage and develop financial literacy and knowledge. The study was done through a survey that touched two hundred respondents from all schools and departments at the university. A financial literacy quiz was also distributed within the survey testing the capabilities of all students across the campus. The data offers evidence to what factors could potentially cause the lack of financial knowledge. It is also in hopes this study provides light on students at UAB's ability to understand financial information and concepts.
58- Student Athletes and Transformational Leadership

Rebecca Chandler

Leadership is a field that still has an expansive area to explore. Transformational leadership and athletics have been studied regarding the realm of performance; however, looking at how athletes’ leadership traits and skills are harbored and grown through the context of athletics has not been clear-cut. Hypothesizing that college student athletes, because of their environments growing up in athletics, should have developed more transformational leadership skills as well as in team task proficiency. In order to test this hypothesis the sample group was surveyed and took Dussalt's (2013) 21-item Self-Report Scale, to gather a sample for both regular students as well as student athletes. To gauge both individual task proficiency, as well as team task proficiency the survey conducted will be adapting six items from Griffins (2007) performance analysis. The sample group is 79 responses including 33 student athletes and 46 students taking this survey comprised of the Dussalt's (2013) and Griffins (2007) items. The results yielded that there in fact was a significant difference between athletes in transformational leadership versus students. Interestingly the linear regression model also showed that only individual performance is related to transformational and transactional leadership. These findings help show that athletics and transformational leadership development are related.

59- Band Directors: How Leadership Style Affects Student Motivation

Rachel Stafford

"At any level of education, band directors are the primary figurehead of their school's music department. They are appraised just as academic teachers are and by the same standards. However, band directors are enlisted to oversee and conduct many different ensembles of students and are tasked with finding a way to motivate each of them. Motivating students in a music environment can be very different than in a typical academic environment, and band directors must adjust accordingly.

Naturally, students react differently to various leadership styles. Due to diverse personality types and levels of motivation, no singular leadership style can motivate every student. By analyzing the results of a survey of college band students from various backgrounds and with various levels of motivation, patterns can be seen in terms of what students believe affects their motivation.

All students that participated in the survey noted that they believe band directors can have a direct effect, either positively or negatively, on a student's motivation, meaning that they fully expect their director's actions to affect their ensemble. Each student surveyed presented their own opinions regarding which director actions cause those effects. Overall, students viewed positive dispositions, acknowledgment of hard work, and valuing student opinion as traits that would affect their motivation in a positive manner. Conclusively, students' motivation appears to be positively impacted by characteristics of democratic or participative leadership styles and negatively affected by authoritarian styles."
60- Success and Retention of Accounting Majors Correlated With Time Gap Between Introductory and Intermediate Accounting

Samuel Sullivan, IV
This study investigates whether the length of the time between introductory and intermediate accounting (i.e., time gap) affects performance in the accounting major. Using student data from a four-year AACSB accredited institution, for the period 1980 to 2012, we find that time gap is positively associated with intermediate accounting attempts and negatively associated with the likelihood of graduating in accounting. The time gap between these two classes can be easily reduced by eliminating unnecessary prerequisites. For example, at most universities introductory managerial (not financial) accounting is a prerequisite for intermediate accounting even though this course is unrelated to intermediate accounting. Our findings suggest that accounting programs can increase retention by making minor curriculum changes.

61- College Students and Music Pirating and Purchasing

Jesse Shoop
This is a poster presentation highlighting the major components of my research project for my BUS 496: Honors Program Independent Study. My research topic is college students and music purchasing and pirating; a study on why college students purchase music rather than pirate music. The outline for my research project is 1.) Music sales have slowed because of pirating 2.) College students are significantly responsible for music pirating 3.) What do college students say is the primary reason they buy music 4.) How can the music industry apply this/these reasons to improving music sales among college students? My hypothesis is that the primary reason that college students purchase music is because of their desire to support the artist. For my research I reviewed over 15 scholarly articles relating to my topic and used my findings as the foundation for my research. I distributed an online survey among the UAB college students and received over 100 submissions. My results showed that the primary reason students purchase music (rather than pirate) is primarily because it is easily accessible, with their desire to support the artists being the second greatest motivator. My poster will display my hypothesis, highlight the major points of my 20-page literature review, summarize my research methods, and display my research results. My poster will have a conclusion and a summary of how my research can benefit the music industry by informing music sellers what motivates college students to purchase music.
62- Analyses of Public Opinion on the Outputs vs. Outcomes of the Affordable Care Act

Jessica Fowler

The Affordable Care Act (ACA) has been an important topic of conversation in recent years, especially with a new political administration under President Donald Trump. This study sought to examine the outputs versus the outcomes of the ACA, as well as to determine how United States citizens were affected by its enactment. This study also assessed citizens' opinions on whether it accomplished its goals and whether it should be repealed and replaced. By conducting a survey of 96 people, it was determined that 35.4% of people do not understand the ACA, 60.3% feel it did not accomplish its goals, and 54.2% feel it should be repealed and replaced. Additionally, 7.3% of those surveyed feel they do not know enough about the ACA to have an opinion on repealing and replacing and 9.4% feel the ACA should be modified or improved to remedy its flaws. Furthermore, the data shows that 81.25% of Republicans surveyed feel the ACA should be repealed and replaced, whereas 80% of Democrats surveyed feel the ACA should not be repealed and replaced, indicating a possible effect of political affiliation on opinion regarding the ACA. The results indicate that the country is divided almost perfectly in half in terms of opinions of the ACA.

63- A Necessary Evil? Could Payday Loans Provide an Alternative to the Otherwise Forgotten Citizen

Dove L Medlock

The industry of payday lending has produced a hard-line being drawn between those that believe vehemently that the business is harmful to the general community, while others disagree. With this being a multi-billion-dollar enterprise, the public deserves a more definite 'and not a strictly emotional' answer. Many of the popular figures tossed around, such as 390%+ interest rates, are disingenuously stated. Utilizing both quarterly and annual measures tracked by the New York Fed such as total debt balance, percent of mortgages over ninety days delinquent, as well as figures obtained from the FTC regarding complaints connected to bill collectors and lenders to gauge overall consumer economic welfare in a multifaceted way. These metrics were used to quantitatively compare two states of very similar population size - Florida, which does not restrict payday lending, to New York which does not allow the practice at all. The research concluded with a mixed bag of results; there are benefits that suggest payday lending is beneficial, and some that suggest the opposite. The results suggest action needed like what is trying to be figured out regarding The Affordable Care Act: it is not beneficial overall in its current state, it would not be beneficial to get rid of, and figuring out exactly how and what parts to fix is an incredibly complex issue.
64- Do business leaders receive more attention on software bug forums?
Claire Hughes
While the popularity of online forums is increasingly the norm for society, the social constraints of why they are successful are not well understood. Businesses foster and operate social communities where users can ask and answer questions. These communities can be leveraged by the company hosts when they engage with the community following the social constraints paired to that community. Recent research suggests end users are a viable source of innovation, because end users possess unique skills or abilities for detecting ideas or innovations that may be cemonths or years[1] in advance of general market trends or consumer demand. Different from traditional innovation processes, online communities allow end users to contribute their knowledge regardless of geographic location and organizational affiliation. ETSY is an online community that offers a platform for sellers to sell their craft-related items. Through my research, I looked at types of leaders that could possibly influence the company to make changes through its online support platform, potentially driving new organizational innovations. To do so, I studied a day’s worth of data posted on their public software bug forum which entailed a total of 46 threads with 286 responses made by 108 unique users and 6 ETSY administrators. I looked to see if community leaders, sales leaders, subject matter leaders, and charismatic leaders received more attention than users who did not lead in a category. The results demonstrated that ETSY is influenced by community leaders and subject matter leaders, but not necessarily sales leaders and charismatic leaders.

65- Failing Schools and Financial Education
Amaan Chandiwala
"Failing Schools and Financial Education
Amaan Chandiwala
University of Alabama at Birmingham
Abstract
The complex financial world we live in today requires one to become financially literate at younger ages. Today's youth are introduced to financial concepts earlier than before. Schools should be facilitating financial education on practices such as: personal finance basics, saving, investing, and borrowing. Unfortunately, schools are failing behind in giving students an adequate financial knowledge base. Failing schools hardly ever turn around. This is a disservice to the students that attend failing schools. Interestingly, students from failing middle schools did not score any worse on preliminary financial literacy testing than students from non-failing schools. In fact, the two groups scored nearly identical. However, after club intervention from the Regions Institute for Financial Education, in which financial education clubs were established at the schools, post-test scores were significantly different between the two groups. Students at non-failing schools outperformed their counterparts by approximately 15% on the post-test. These results demonstrate that there is no difference in student financial literacy before intervention. On the other hand, attendees of non-failing schools are able to learn and apply financial knowledge; whereas, attendees of failing schools have difficulty improving their financial literacy."
66- Survey Says!: The Effect of Class Size on Teacher Effectiveness Ratings

*Edie Godwin*

In this paper we seek to answer the question of how does collegiate class size affect perceived teacher efficacy using a least squares model. We use 303 classes worth of student end-of-the-year survey data where the average score for each class was calculated from the Likert scored raw data, which ranged from 0 to 7 where 7 was agree or positive association. We find that, in a simple model, class size has a significant, negative impact on ratings of teacher effectiveness. The effect actually increases in magnitude when the model is made more complex by controlling for other variables. This is valuable information for those seeking to improve teaching practices, classroom management, of even employee training techniques.

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67- Social Media's Impact on Firm Financial Value

*Ryan Creel*

"Social media has become a primary channel by which firms market through, so this research seeks to study if a firm's social media usage contributes to the underlying financial value of a firm. In researching this topic, there is not a large body of academic work on the subject, especially outside of marketing literature, likely given social media's relative newness and what may be perceived as a passing fad. My research seeks to fill this gap by analyzing this area that has been neglected, even given social media's rapidly growing influence in the world with approximately 1 in 3 humans on the Earth having accessed social media through 2016. Given social media influence, my hypothesis is that a firm's social media usage is considered by the market and does add value for the firm.

By utilizing an industry created index, I collected and rank-ordered 60 companies across the airline and retail industries by how well these companies utilize social media overall. I then collected the stock return data for these 60 companies before and after the release of the social media index. Then I utilized statistical analysis to see if how well these firms utilize social media was a statistically significant predictor in the firm's stock returns. My hypothesis was proven incorrect, and market participants do not seem to value a firm's effective social media usage. These findings provide interesting implications for market participants and firm managers when considering a firm's social media use."
68- Assessing the Control Environment at Wells Fargo

Matthew R Ashburn
This study assesses the characteristics of Wells Fargo's control environment that led to employees creating a substantial number of unauthorized accounts during the period 2011 – 2016. The research observations are structured using Committee of Sponsoring Organizations' (COSO) five factors of the control environment. The subsequent investigations by the Los Angeles city attorney’s office, the Office of the Comptroller of the Currency, and the Consumer Financial Protection Bureau; congressional hearings; and other sources of information reveal that a culture cultivated over several years prompted and encouraged the creation of approximately two million potentially unauthorized savings accounts and half a million credit card accounts. Within the control environment, deficiencies were identified in the categories of integrity and ethical values, effective management in several areas, commitment to individuals with aligned objectives, and accountability. Whether the failures were attributable to the board of directors and/or audit committee was difficult to determine due to the lack of information in that area. The major failures in the control environment that enabled the fraud were the lack of integrity and ethical values, management effectiveness, and accountability. The findings of this research show that the failure of an organization to establish an effective control environment creates a high risk of unethical behavior in the organization.

69- Urban Pollution and Industrial Racism

Autumn Massey
In diabetes, 65% of patients will die from a cardiovascular related disorder. In healthy individuals the heart utilizes fatty acids, but in diseased cardiac muscle the heart switches to glucose, except in diabetes which continues to use fatty acids. Based on early work it was proposed that restoring cardiac glucose utilization could rescue the heart. However, increasing expression of glucose transporter (GLUT4) led to a marked decrease in metabolic function. To determine the mechanism of glucose toxicity we examined cardiac-specific gene regulation. One of the altered genes identified is pyruvate carboxylase, Pcx, whose protein, PCX, is heavily involved in cellular metabolic pathways. In this study we will examine how glucose regulates Pcx expression in the cardiac tissue of a GLUT4/STZ mice model and human cardiac tissue.
70- Creating the Next Generation of Leaders
Meredith Powers
Teaching ethics within the college curriculum has been heavily debated amongst researchers, professors, and The Association to Advance Collegiate Schools of Business (AACSB). Some believe that ethics courses have no value in a student's decisions throughout his or her college and future career because morals and values have already been influenced by family, religion, and prior experience. Others argue that educating students on ethical behavior, various frameworks, and theories will help student's make more ethically and morally-sound decisions throughout his or her life. The University of Alabama at Birmingham's Collat School of Business does not offer its students an ethics course needed for graduation. Other schools such as the College of Arts and Sciences The following study was conducted to if a student's major influences the ethical level of his or her decision-making. Business majors and non-business majors were surveyed on Maccoby's head and heart traits as well as answering hypothetical questions to measure how ethical his or her decisions would be. We find that non-business majors rated more head and heart traits as very important compared to business majors and that there were no significant differences between the two groups in regards to the hypothetical questions answered. Our findings suggest that amongst business and non-business majors there is a strong ideal and understanding of ethical behavior and that one's major doesn't necessarily influence a student's level of ethical behavior.

71- The Effects of Employment on Academic Achievement
Kelley Foster
"Students in the United States have had an increasing participation rate in the labor force for several decades now. The percentage of students who work while attending college has risen to almost eighty percent in 2003-2004. This is often attributed to the rising cost of living, tuition, and the changing dynamic of a typical student's life outside of school. The effect of this changing environment is important to understand because it has the potential to change the way students perform in the classroom and could ultimately impact his or her future.

This paper examines specifically the effect working has on a student's academic achievement. Academic achievement is measured by cumulative grade point average. Data was collected through a survey from students across the nation. Among some of the data collected was grade point averages, hours worked per week, and hours spent studying per week. Each participant remained anonymous to help insure the accuracy of the self-reports grade point averages and other variables.

After analyzing the data collected, there was no correlation found between grade point average and the number of hours a student worked during a typical week. Despite this, majority of the students who are employed believed that working affected their ability to study. This leads to the conclusion that a determinant other than the amount of time a student spends studying better estimates change in academic achievement. This variable could be a student's intellectual ability which is hard to measure and analyze."

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72- "How to Increase response for IDEA surveys"
Andres Caceres
This study is about how to increase response rates for IDEA course evaluation surveys. IDEA course evaluation surveys are important in order for schools to get better and improve for the future of education. I am examining response rates by looking into the IDEA Response rate data that I have obtained from the Collat School of business. The data states: the different types of classes as well as the teachers who taught the courses and the number of student registered for the class, along with the number of student who have completed the survey. These IDEA surveys are administered toward the end of the semester. Typically, they open three weeks before the class is over and they close right before the final exam. IDEA survey reminders are typically sent our two times a week during the time frame. I have conducted my own survey about possible reasoning's why students do not complete IDEA surveys. In my study, I have 302 students who have completed my survey, with 119 (39.40%) male students and 183 (60.60%) female students. It is interesting to state that 80 students (26.49%) have stated to completing IDEA survey øAll the time (100%)[]. However, 221 students (73.18%) have stated that if teachers were able to offer some type on incentive for completing IDEA surveys, they would complete the surveys øAll the time (100%)[].

73- Is Alabama diverse and inclusive? A study of Alabama public and private colleges concerning LGBTQ students
Wesley Garner
"Is Alabama diverse and inclusive? Diversity and inclusivity in Alabama have rarely been analyzed concerning our colleges and universities. LGBTQ individuals have gained ground through laws and courts in recent years. Whether Alabama colleges and universities are keeping pace has been uncertain. To determine the progress in our educational institutions, data was collected through online research, email questionnaires, and telephone contacts. A set of criteria similar to the Human Rights Campaign's Corporate Equality Index was used to formulate questions about anti-discrimination policies, housing policies, pro-LGBTQ organizations, and accommodations for LGBTQ students on campuses. Considering the religious base for most private colleges in Alabama, it was hypothesized that they would score less favorably than public colleges. Analysis of the data provided a clear overall picture of Alabama's public and private universities.
Although all Alabama colleges researched have an anti-discrimination policy, many do not include sexual orientation and gender identity in these policies. More frequently, transgender individuals are left out of the loop in both anti-discrimination and housing policies. Some schools have added these provisions and have created diversity programs to encourage inclusion, but this is severely lacking in Alabama's mostly religious private colleges. Some private colleges had anti-LGBTQ policies or had requested a religious waiver from the previous US administration's efforts to protect LGBTQ students. Prior research has shown that including safe spaces and LGBTQ inclusive policies help to prevent discrimination on campus which can make or break the college experience for an LGBTQ student."
74- The Effects of Social Responsibility on Financial Performance
Lee Proffitt
The purpose of this research is to analyze the effects of ethics or corporate social responsibility (CSR) on a company's financial performance over at least a 10-year period. The research focused on a set of monthly returns of two different mutual funds, and the overall stock market benchmark- The Standards and Poor's 500 (SP 500). The two mutual funds selected for the research were a socially responsible fund and a socially irresponsible fund. Whereas, a socially responsible fund focuses on companies that follow strict social, moral, and environmental codes. The socially irresponsible fund focuses on companies that produce revenues from activities that are deemed immoral, such as alcohol, gambling, and tobacco. The selected mutual funds were then compared against one another to determine which one performed better over the time horizon. The funds were also compared against our SP 500 market index to see if these concentrated funds outperformed the market. Lastly, regression analysis was conducted to determine whether correlations existed between fund performance and market performance. The results of our analysis is important in understanding the two main components of this research (1) do socially responsible or socially irresponsible funds perform better and (2) do either of these funds perform better than the overall market.

75- Risk and Debt Preferences Among Student Populations
Harry A Harnett V
"Previous research on student's interactions with debt outline the negative implications associated with borrowing. This study aimed to identify if students in campus honors' organizations debt & risk preferences are uniquely similar to those of Chief Executive Officers in corporations by differentiating honors students among the general student population. With the goal of honors organizations to develop future leaders within organizations, this research would like to find if honors students have similar risk and debt preferences to CEOs since corporate leadership represent a unique population of individuals within organizations who frequently utilize debt & assume financial risk in order to finance future projects; student interactions with debt instruments are limited to credit card usage & student loans.

Data was gathered from 103 students' (53 honors students & 50 general population students) via questionnaire, which gathered students' demographic information, loan/credit card usage, and behavioral preferences towards debt & risk. Findings and data from John Graham, Campbell Harvey, and Manju Puri's (2013) article "Managerial attitudes and corporate actions" was utilized to describe CEO and corporate leadership's debt and risk preferences.

The survey found that honors & general population students had approximately the same risk and debt preferences, utilization loan/credit, and future financial outlook. These findings suggest that current honors college students do not have uniquely similar debt/risk preferences from the general population."
76- Does Alabama Spend Enough Per Pupil?: An In-Depth Analysis of Per Pupil Revenues
Jordan A. Giddens
Alabama has consistently had one of the lowest per pupil expenditures for K-12 education, averaging close to $2,000 under the national average annually. The lack of funding is one of the driving forces in the poor academic performance on national testing and lowered federal funding for the state. This project uses data from the National Center for Education Statistics to evaluate the revenues and budgets of the three sources of funding for K-12 education in Alabama: federal, state, and local sources. The independent analysis of each source of funding helps determine and pinpoint the main drivers for per pupil funding disparities. The resulting analysis of the revenues from 1998 to 2013 showed that not only are there massive funding disparities between Alabama and the nation average, but there were also disparities in per pupil expenditures on a local district level. Many factors, such as test scores and local funding, of all 134 local school districts in Alabama were then analyzed to help determine the adequacy of the current level of funding for per pupil expenditures. The project shows that the overall lack of funding and the large disparities in funding for Alabama school districts on a per pupil level can have large implications on the performance of a state's education system.

77- Does a Traditional Degree Still Count for More?
Danny R Forrest
This research will try and explore whether hiring managers prefer a traditional college degree over an online degree. The research will ask questions that determine whether the hiring manager has any experience with online education and if that has any impact on their decisions. It will also measure if they believe the two degrees are equivalent based on accreditation, reputation, quality and experience. Interviews will be conducted to further understand how hiring managers view the two different degrees. The purpose of the research is to find a clearer and up-to-date understanding of online and traditional degrees and the so called, re-market value[2] of both in the job market. The research will also be aimed at finding the reason for a discrepancy in value, if one exists. Other questions and research that will be explored involve reimbursement for gaining additional knowledge through higher education. These questions involve how the decision is made and what factors are considered for reimbursement or other financial assistance. The results were heavily weighted towards traditional degrees; they were more valuable to employers and were believed to be more credible than degrees obtained online. This implies that students planning on attending higher education should look to try and go to a traditional college because it will yield better results when submitting resumes to employers.
208- The Successful Start-Up Company and The Venture Capitalist Investment
Linaa Rohman
Does Venture Capital Investments injections into a university start-up company incubator contribute to its success? This paper aims to find out if a start-up company is positively affected by venture capital investment. Start-up companies that do not have venture capital investment will be used for comparative utility. Venture capital injections and its correlation to start-up company success will be tested through the means of survey data. I will answer the question: Does Venture Capital Investments injections into a university start-up company incubator contribute to its success? Investments from venture capitalists will include both human and financial contributions. The population of my sample selection is local start-up companies in Birmingham. More specifically university incubators programs and their respective start-up companies. The purpose of this paper is to understand if the success of a start-up company is because of the investment of the venture capital.
78- Planning and Hosting UAB’s Middle School Math Tournament
Tina Tian, Joanna Schmidt, Joseph Lucker
"In order to bring the excitement of math tournaments to the college campus and to cultivate interest in math in middle school students in the Birmingham area, we hosted the first annual middle school math tournament in UAB’s Heritage Hall as our Science and Technology Honors Program STH 151 course. Participants challenged themselves with a written test and ciphering rounds, utilizing creative problem-solving skills to quickly and accurately solve problems. We provided the adults with breakfast, students with snacks, sold t-shirts, and also invited the Student Affiliates of the American Chemical Society to do a science demo show.

To ensure the success of the tournament, we made a mock budget to estimate the amount of money needed; contacted businesses to sponsor the event whether in monetary donations, food, or discounts; and paid attention to the details of the tournament from special volunteer t-shirts to providing entertainment during the breaks. To quantitatively measure the success of the math tournament, students, coaches, and parents filled out a survey regarding their experiences; and based on the results, the main areas for improvement are in the difficulty of the tests and the provided refreshments. Overall, the tournament was a great success, and with the quantity of leftover funds, the math tournament has potential to be a lasting trademark of UAB."

79- Circulating Cortisol is not Correlated with Adiposity in Older African American Women
B. Luke Harris, Eric P. Plaisance
Excess adiposity produces a pro-inflammatory condition which promotes secretion of cortisol by the hypothalamic-pituitary axis (HPA). The purpose of this investigation was to determine 1) if the relationship between cortisol and adiposity is similar between older obese postmenopausal African American (AA) and European American (EA) women and 2) if exercise training produces differential responses to cortisol between AA and EA women. A preliminary examination of data in AA and EA women (n = 6, age = ; weight = 92.9 ± 11.5) was performed after each individual performed 12 weeks of moderate-intensity exercise training (3 days/wk x 12 weeks). Baseline cortisol concentrations were lower in AA compared to EA women despite significantly higher body mass and android fat mass as determined by dual energy x-ray absorptiometry (DEXA). Android fat mass was positively correlated with cortisol concentrations in AA women (r = 0.99, p = 0.005) but was not correlated in EA women (r = -0.09, p = 0.94). Aerobic fitness was lower in AA women compared to EA women and was negatively correlated with circulating cortisol in the AA women only (r = -0.99, p = 0.027). Exercise training decreased cortisol concentrations in EA, but not AA women, despite the absence of reductions in total or android fat mass. These data suggest that health-related disparities and disparities in the response to exercise between AA and EA women may be related to differences in basal cortisol concentrations and the capacity of exercise to affect the HPA to decrease cortisol.
Does Classroom Environment Matter? Teacher Candidates' Research Results

S. Leffel, S. Vernon, T. Sims, T. Graham

"They study their own teaching in order to make it better and help improve the learning situation for children" (Castle, 2012). Creating a classroom environment where both the teacher and students are constructing knowledge is essential to success. Teacher research can be conducted in any classroom environment and within any content area as best practice in teaching. A cohort of four pre-service teachers researched individual questions during their final student internship. The teacher researchers asked questions to determine what affect if any their instructional practices would have on the learning in each classroom environment. Using regular curriculum, lessons, and ongoing assessments in general education classrooms, teacher candidates assessed students for three months using the instructional practices of number talks, journaling, and content area whole group instruction. The research results from the student teachers within their respective classrooms indicated that these instructional practices are advantageous for promoting a risk-free classroom-learning environment. In addition, each researcher built better rapport with students, learned to use results to direct instructional practice, and recognized the value in implementing ongoing research. As a result, the pre-service teachers each became a more reflective practitioner.

81- tia: A Tactile Independent Alarm Clock designed for the Deaf-Blind

Matthew Chan, David Chasteen-Boyd, Maggie Collier, Samuel Holder

An inexpensive alarm clock for the deaf-blind is being developed at the request of Mr. Michael Papp from the Alabama Department of Rehabilitation Services and the Helen Keller National Center and is intended to decrease the reliance of deaf-blind persons on caretakers. Based on price and quality gaps between existing solutions and the desired device, we developed a concept for a device to meet the need for an inexpensive method to provide a timekeeping and alarm device that can be set by a deaf-blind person without assistance from a caretaker, thereby increasing the deaf-blind person's independence. Our design for a tactile independent alarm clock, or tia, features an analog face interface to be read by tactile stimulation, an electrical interface that matches those found in standard bed vibrators already present in the homes of many of the deaf-blind community, and most importantly a reverse braille push button mechanism to set the original time as well as the alarm. The reverse braille input mechanism is novel in itself, due to its relatively minimalist direction which goes against modern designs which have become increasingly complex. In addition to its usage in our cost-effective alarm clock for the deaf blind, we believe the reverse braille input mechanism can be applied to a wide variety of independent niche uses in a deaf-blind individual's life, which would increase their independence drastically.

82- The FreeFlex: Developing a Better Continuous Passive Motion Device for Knee Rehabilitation

David Bentley, Ethan Downs, Zach Koenig, Zainab Suleiman

Continuous passive motion (CPM) devices are used as therapeutic adjuncts to more rigorous therapies for patients recovering from major knee joint procedures such as total knee replacement and ACL repair surgeries. As part of our senior design project in conjunction with Solution Studios, our team met with staff at Highlands Hospital to address their concerns with current CPM devices. Cheif among these complaints were that their current device was far too bulky and heavy, often requiring more than one nurse to transport and set up the device. To address these needs, we have designed the FreeFlex: a novel device that we have made more portable and efficient by excluding a base component. From brainstorming ideas and pitching designs, to actually building and testing our device, we have expereinced the entire design process to yield a better CPM device for our client.
83- Hearing Aid Battery Tester for the Visually and Hearing Impaired
Kylie Bushaw, Welles Richardson, Abdullah Tarawneh, Manik Thogaripally, Rick Watkins, Daniel Reeves
With the decreased self-sufficiency of people with multiple disabilities, many patients strive for solutions to common problems that would allow them to be independent. In the case of auditory impairments, many users use hearing aids that give them the independence and functionality of those without hearing problems. However, compounding this with an additional visual impairment decreases the patient’s ability to utilize the hearing aids. Our group proposes an idea to retain these patients’ independence by providing a solution that would allow them to test their hearing aid batteries without outside help. Currently, this niche of the market is not being addressed. Our device uses a microprocessor, a motor, a battery, a switch, and a 3D printed casing. It will be a handheld hearing aid battery tester that allows for tactile feedback to auditorily and visually impaired individuals. This device tests the charge of a hearing aid battery and produces a vibration if the battery is acceptable for use. There is a push button on the exterior of the device that is pushed by the user to activate the circuit which in turn activates the motor if there is enough charge. If there is not enough charge in the hearing aid battery, the device will not vibrate, thus indicating to the user that the hearing aid battery is dead.

84- A superior alternative to current pedicle screw systems for osteoporotic patients
Juan Antonio Castro, Eliana Henderson, Hiro Kamei, Priyanka Parajuli, Aaron Stuber
Spinal instruments are used by orthopedic and neurological surgeons to straighten and stabilize the spine and enable a successful bone fusion process. Bone fusion is the main treatment for osteoporotic and arthritic vertebral fractures, spinal trauma, spinal deformity, adjacent segment disease, and other associated conditions. Pedicle screws (PS), a category of spinal instrumentation, are metallic cylinders with a threaded outer surface and a top locking system, called tulip, which allows for the interlocking of rods or other instruments to each individual screw to provide a fixed anchor point. The screw is drilled into the vertebral pedicle, passing through cortical and cancellous bone, thus providing 3-dimensional fixation from the posterior and anterior processes. The proposed shelled design includes a metal core for enhanced mechanical properties and instrumentation attachment, and a polyetheretherketone (PEEK) polymer shell cushions the bone/screw interface, thus absorbing impact and increasing compliance. The metal core enhances the mechanical strength and allows for instrumentation attachment. The screw, consisting of a metal core, a tulip, and a tip, will be screwed into a pre-tapped hole. It is predicted that this design will decrease bone damage including fractures caused by the elevated high tensile strengths of current products, allow fixation, and improve bone growth during bone fusion. This invention will offer a tailored solution for osteoporotic patients by more precisely matching porous bone’s mechanical properties in physiological conditions including Young’s modulus, compression, and bending forces. It also aims to prevent follow-up surgeries and reduce surgical costs by decreasing instrumentation failure rates, like insertion site erosion.
85- Developing a novel low-cost sit-to-stand device for adults with cerebral palsy
Yu-Yun Chen, Diep Nguyen, Yawen Tang, John Wooley, Linh Phan
Currently, there is a need for a sit-to-stand lift that can accommodate a wide variety of limited lower-body mobility in addition to being accessible for in-home rehabilitative use. The market for sit-to-stand lifts is quite extensive and competitive, but most of the existing solutions that addresses limited lower-body mobility requires for the individual being lifted to have relatively extensive muscular and joint flexibility. In addition, the existing solutions are often bulky in size and non-portable, making them unsuitable for in-home care. As a result, the current market does not address the large gap that consists of adults with cerebral palsy, the elderly with variable osteoporotic conditions, post-stroke individuals, and individuals with obesity. The product proposed is home-friendly, cost effective, and easy to operate for the convenience of both the caretakers and the persons receiving care. The device is designed to raise an individual with limited mobility and lower-body flexibility from a sitting position to a standing position without the dependence on the individual's lower-body strength and flexibility. The device is modeled according to existing sit-to-stand lifts in the market and is manufactured with the main frame of a common engine hoist. The base and crane are both heavily modified to fit the needs of both size and weight capacities. The lift receives most of its power capacity from a hydraulic cylinder and is operated by manually pumping a lever. The device also features knee blocks and latches to accommodate a walker stably in addition to accommodating up to 500 pounds.

86- Controlled Biodegradable Metal Suture Anchor
Devin Bonner, Austin Baecher, Thomas Bailey
In the world of orthopedic surgery there is a demand for a device that adequately reattaches soft tissue to bone but it also degradable by the body. The purpose of this project is to create a suture anchor used in rotator cuff surgeries that has a controllable degradation rate. Current solutions fall short because they are either too strong and damage the surrounding tissue, or degradation is uncontrolled and the device is reabsorbed before healing can be completed. This leads to failure of the initial surgery and requires secondary procedures to reattach the soft tissue to the surface of the bone. By creating a device with a degradation that can be controlled, the healing process is ensured to be completed before any degradation occurs. This eliminates the need for subsequent surgeries and removes the problem of a foreign substance remaining in the body for years, even after all healing has been completed. Controlling the degradation of a magnesium based device will be achieved by using various methods to alter the surface of the device. Research has shown that there is a direct correlation between surface modification and the degradation of a biodegradable magnesium material. Surface treatment methods drastically reduce the degradation rate of the material and can create degradation that is both uniform and encompasses the healing time of rotator cuff procedures. Using surface modifications to control the degradation rate of the suture anchor will give the device a leg up on the competition.
87- Silver Antimicrobial Barrier
Jervaughn Hunter, Nikea McMullen, and Aqsa Nawaz
There are approximately 722,000 people who are readmitted to hospitals due to infections that they acquired within the hospital. It has recently been discovered that one of the main means of spreading infectious disease is via the stethoscope. Due to the lack of awareness of bacteria such as Clostridium difficile and Methicillin-resistant Staphylococcus aureus (MRSA), a preventative method is needed. To help alleviate some of the burdens associated with this issue, the Silver Anti-Microbial Barrier, also known as S.A.M Barrier, is being designed. The S.A.M Barrier is a one-day use antimicrobial and antifouling barrier that will prevent the transmission of infection-causing microbes between patients and doctors via stethoscopes. The base of the barrier is derived from polyisoprene, and will incorporate a Silverdur® 930 Antimicrobial coating applied to the surface. The chemical structure of the polyisoprene prevents the growth of microorganisms on the surface of the cover, while the silver nanoparticles kill bacteria. Silver kills the bacteria by damaging the cell membrane of the bacteria, which leads to denaturation of the proteins and DNA which cause cell death. S.A.M Barrier will be designed such that it will fit snugly on the diaphragm/or the bell of the stethoscope, and not move. Once applied, the cover will remain in place, where it will actively combat bacteria for a minimum of 24 hours. At the end of the day (or after 24 hours has passed), the cover is to be removed, and disposed of.

88- The Transfer Assistant Conveyor (TrAC)
James Ansell, Alexander Cruz Walma, David Lee, Hemali Patel, Catherine Porter
"The TrAC is a body transfer system used to horizontally move an immobilized body from one flat surface to another similarly-level surface in the perioperative setting, other healthcare environments such as nursing homes, and other settings in which a body must be laterally transferred. It uses a combination of two stacked roller layers, of which the top layer is covered by a conveyor belt, as well as a mechanically-driven gearbox and a ratchet system to accomplish the lateral transfer without any manual lifting of the body.

Two trained personnel are required to work the device. During the first phase of transfer, one person works a lever or other component to supply driving force, while the other person positions and pushes the TrAC from the end opposite the body. The upper and lower rollers rotate simultaneously"but in opposing directions"to burrow the device beneath the body. Once roughly half the body is on the device, the lower rollers are locked, stopping the device from moving. Then in the second phase of transfer, the driving component is worked, powering the upper rollers and translating the body along the conveyor belt until it is over the desired position of the second surface. Once the desired position is reached, the lower rollers are reengaged in the third phase, and the device is removed from beneath the body. The TrAC includes a reverse mechanism consisting of two reversible ratchets that work in tandem, allowing the bidirectional lateral transfer of a body between surfaces."
89- Autonomous Force Awakens Robot
"Alec Ferreiro
Cody Cose
Harris Azerf
Mustafa Muneer
Sean Bryson
Yarelis Williams"
The purpose of this project was to design and build an autonomous robot that would navigate and perform on a competition arena. The robot, nicknamed UABB-8, was built to compete within the IEEE SoutheastCon 2017 Hardware Competition. Using autonomous navigation, the robot would engage with four different stages which included the following: decoding a code by identifying five different types of components in an unknown arrangement, detecting an electromagnetic force and striking a vibration sensor, using the code from the previous stage to turn a quadrature encoder with a built-in RGB LED, and finally launching three darts into an open at the far end of the arena. All stages had to be completed in under four minutes and were scored. One scholastic semester was spent designing the robot and one semester was spent building. The resulting robot was able to complete all four stages and navigate throughout the arena within a certain tolerance. The robot placed first in preliminary competition among other UAB Electrical Engineering students. The robot placed fourth out of sixty teams at the SoutheastCon Competition.

90- Hardware Trojans in Autonomous Systems
Harris Azerf, Tracy Lin, Nagesh Gunti, Ranveer Kumar
Hardware Trojans are permanent hidden circuits or logic gates that are implemented into integrated circuits (ICs), the heart of all modern applications, which can affect functionality of a system, decrease reliability, or leak information. The purpose of this research is to understand the fundamentals of Hardware Trojans and how they can be implemented into circuits of an autonomous system. The process of implementation of Trojans is understood through the combination of digital logic and operations of an autonomous robot car and an artificial pancreas. In both systems, the digital gate level of the controller was looked at to implement the Trojans. In the digital level of the systems, additional gates were added to disrupt the process of the systems. The controller was programmed into a Field-Programmable Gate Array (FPGA) board which allowed the process to be shown through an output device. For the autonomous car, the basic functions such as the direction the car is moving were classified into bits, which are used to create a state diagram that defines the robot car’s previous, current, and next functions. In the other test base, the basic function of an artificial pancreas automates blood-sugar management by monitoring glucose levels and provides the right amount of insulin. Both systems were programmed onto a FPGA board and incorporated with and without Trojans to see the effects of the malicious hardware. The overall objective for this research is to learn effects of a hardware security threat to create a defense mechanism against these dangerous threats.
91- At home Poost-Stroke Rehab device

Tarek Midani, Karim Tarabehn

"Post stroke patients who experience partial paralysis in one half of their bodies find it difficult to relearn walking. The simplest of motions such as reach out, stepping up, or standing up become impossibly difficult for these individuals. Which is why it usually requires the aid of sophisticated robotic devices in rehab centers to train their muscles and their brains to do the same movements they were able to do before stroke. The second step to rehab is maintenance through continued treatment. After being discharged, those patients relapse into their previous symptoms. This causes all stroke patients to return periodically to rehab centers, making treatment inefficient and expensive. We aim to fix this problem by making an affordable at-home device.

The key concept behind our design is to provide a safe environment for users to perform 9 proven balance exercises without directly inhibiting or assisting their balance. We do this by allowing for hip rotation on all 3 planes of motion, and hip translation forward, backwards, upwards, and down with minimal resistance. The goal of our device is to safely catch the person after falling while providing optional vertical weight assistance at the hips without interfering with their balance forces.

Our device would allow users to safely push themselves using proven balance exercise treatments. This device shows it is economically feasible to access the hemiparetic market directly with an at home rehab device."

92- Using the Engineering Force: BHAMSolo Senior Design Project

Joshua Peeples, Blake Driggers, Michael Bedwell, Sikai Chen, Gilbert Contreras, and Ned Tracht

The UAB Electrical and Computer Engineering senior design project consisted of the construction and design a robot to compete in the Hardware competition for the Institute of Electronics and Electrical Engineers (IEEE) Southeast Conference 2017. The Star Wars themed competition involved four stages: stage 1 consisted of discovering five unknown components (wire, resistor, capacitor, inductor and diode) arranged in a certain order, stage 2 was a lightsaber duel, stage 3 was to bring down the shields by entering in the hidden code from stage 1, and stage 4 was launching torpedoes (nerf darts) through a target. In order to efficiently construct and design the robot, the various components of the project was divided up into 10 modules among the six team members. Our team was divided up into pairs where each person designed their own module and worked together on one module (one pair worked on two modules together). The Fall 2016 semester was the design of the robot and the Spring 2017 semester consisted of the implementation of the design. Our team, BHAMSolo, competed in the UAB competition and was the runner up with a score of 630 out of a possible 1000.
93- Improving Rotator Cuff Surgery Outcomes with a Biodegradable Barbed Magnesium Ribbon

Paul Stewart, Robert Rives, Michael Bui, and Peyton Guest

Our product is an absorbable, barbed, WE43 magnesium alloy ribbon suture for use in high-strength rotator cuff repairs. Like other barbed sutures, our suture will be simple to install and will have more even distribution of tensile forces than smooth sutures. Our product has two distinct advantages over existing solutions. First, other barbed sutures do not have enough strength for orthopedic repairs, so our product delivers the advantages of a barbed design to high-strength repairs. Second, our product is absorbable, which means it does not require a follow-up surgery to remove. Our device is composed of a degradable magnesium alloy ribbon with notched barbs that point towards the center of the suture. Once each side of the suture is threaded into tissue, the opposing barb orientations lock the suture in place, removing the need for delicate knotting maneuvers during surgery. The magnesium alloy will be treated with a procedure called micro arc oxidation, producing a thin ceramic coating which will slow the degradation of the suture, allowing it to maintain strength for long enough for tissues to heal. The suture will be coated in a PLLA polymer to aid in degradation resistance. The ends of the suture will be affixed to two stainless steel needles that allow it to be threaded through tissue.

94- Rogue7 - Electrical & Computer Engineering Senior Design Project

Braxton Baugh, Bill, Bosshell, Brandon Carter, J.T. Glasscock, Bo He, Tracy Lin, Peter Nichols

"The Institute of Electrical and Electronics Engineers (IEEE) hosts an annual conference, SoutheastCon, allowing students to participate in multiple competitions, one of which is focused on hardware and requires students to build an autonomous robot. This year, the goal of the robot in the Hardware Competition is to navigate an arena and complete four Star Wars themed stages in order to accumulate the most points in the least amount of time possible. As a senior design project, our team spent two semesters, one on design and the other on implementation, to create a robot to compete in the Electrical & Computer Engineering (ECE) department version of the competition, known as cRace Day, in order to qualify to represent the University of Alabama at Birmingham on March 31-April 2, 2017 at IEEE SoutheastCon.

The focus of our seven team members were divided based on individual interests and experience: chassis design and locomotion, power systems and wiring, navigation, and the four individual stages. Each team member wrote software for their respective area, while the Software Lead, Braxton Baugh, designed the software main loop, where he compiled the individual scripts. Our team designed a robot based on multiple constraints such as budget, size, and available materials. We kept costs low and customized our robot to our needs by making use of the 3D printers provided by the ECE department. This project allowed our team to apply concepts taught in class and learn about how to combine various engineering components for a high-performance robot."
95- A Robotics Competition In A Galaxy Far Far Away

Joseph Williams, Austin Criner, Jon-Michael Conrad, Adil Patel, Syed Imam, Adam Lindquist

In a galaxy far far away, long long ago, an intrepid group of Electrical Engineers embarked on a journey to save the galaxy. Saving the galaxy requires the team to construct a droid, named Mos-Fett, to perform a series of daunting tasks. Firstly, Mos-Fett must decode the secrets of the galaxy stored in a series of 5 pins. Secondly, a fearsome foe seeks to prevent our hero from completing his mission. This foe must be defeated in a lightsaber duel before continuing by detecting an electromagnetic field. Thirdly, using the secrets of the galaxy, a code must be input to a dial to lower the shields to enable the final task of the Mos-Fett's mission. The final task is to shoot three torpedoes through the now vulnerable opening. With the enemy neutralized and the galaxy saved, Mos-Fett has completed his mission and restored peace to the galaxy.
96- The International Symbol of Access: Is It an Effective Symbol for the New Generation?

MaKayla R. Smith, Jason E. Vice, Elizabeth Barstow, Archana Naik

"Background: The International Symbol of Access (ISA) has been used since the 1960s to signify an accessible area for those who are wheelchair bound. Its purpose has since evolved to represent both accessibility and restricted use for those with disabilities, which has made its usage confusing. While organizations are beginning to advocate for change, little consensus has been found on a replacement for the symbol. The current study examines the effectiveness of the ISA for individuals across the lifespan.

Method: A mixed-methods survey was disseminated to able-bodied and disabled individuals, groups, and organizations affiliated with inclusive fitness and accessibility. Quantitative data was analyzed for descriptive statistics, rank order of symbols and group comparisons of rankings. Qualitative data was analyzed using open coding for themes, to better understand opinions of the symbol.

Results: The sample consisted of 984 participants with an average age of 47 years. There was a slight negative correlation ($r^2$=-0.1117, p-value=0.0027) between age and the ranking of the ISA, with younger individuals reporting it as less effective. Qualitative themes support the findings, with individuals describing ambiguity when associating the ISA.

Conclusion: The findings suggest that the ISA has become less effective in conveying its original intent, due in part to its duality of usage and the mixed messages that are associated with its depiction. Trends among successive generations indicate that modification is needed to create a better depiction of accessibility for all."

97- Analysis of UAB Students for Comparison of Substance Use on GPA and Physical Activity

Mina Momeni, Aaron Smith, Hassan Sadruddin, Dr. Erika Austin

"Background
Students on college campuses are susceptible to risky behaviors, such as alcohol and drug use. Because of the high stress environment, students may turn to undesirable forms of stress relief. These, in turn, may become factors when evaluating levels of physical activity and Grade Point Average (GPA) for a student population. Therefore, we have analyzed substance use with a variety of factors in order to assess how to best combat this situation.

Methods
We distributed surveys to a random group of 220 UAB students. The surveys were administered on campus during a 2-week period in mid-February 2017. Each survey contained questions regarding physical activity, substance use, GPA, and many others. After the data was collected, it was entered and recoded using JMP. Contingency tables were created in order to examine the relationships between: various substances (alcohol, cigarettes, marijuana, and other drugs), gender, GPA, and levels of physical activity.

Results
A Chi-square test showed a significant result in our sample when comparing cigarette use and levels of moderate physical activity ($p = 0.0224$). The median minutes of moderate physical activity per week was 120 (IQR=60-210).

Conclusions
There is a significant relationship between smoking and levels of physical activity for UAB students. As smoking increased, levels of moderate physical activity decreased. This suggests that efforts that could be put towards reducing the amount that students smoke may increase the time spent performing physical activities, and thus improving overall health and well-being."
98- Flu Vaccinations in Long-Term Care Facilities: Does Ownership Matter?
Urvi Patel
Influenza is the eighth leading cause of morbidity and mortality in adults aged 65 years and older. Protection against influenza is readily available through the use of vaccines in long-term care facilities that house many of these older adults. Prior studies suggest that vaccinating employees who work in these facilities is just as important as vaccinating residents. Ownership status (for profit versus not for profit) may play an important role in ensuring the availability of these vaccines to residents and employees in long-term care facilities. We sought to explore the relationship between facility ownership and influenza vaccine practices using the 2010 National Survey of Residential Care Facilities questionnaire. This questionnaire surveyed about 2,300 private, nonprofit, and state facilities throughout the United States between March and November 2010. To analyze these data, we first compared characteristics of long term care facilities by ownership status, while also exploring influenza vaccine practices. We found statistically significant differences between for-profit and non-profit facilities for many influenza practices, including recommending vaccines, offering vaccines on site, offering vaccines for free or at a reduced cost, and providing staff incentives for vaccines. In logistic regression, we found higher odds of having a preparedness plan for influenza outbreaks in for-profit compared with non-profit facilities. We also found that smaller facilities of 4-10 beds were more likely to have an existing plan or plan in preparation for an influenza outbreak. This study highlights the important influence of long-term care facility ownership in protecting residents and staff against influenza outbreaks.

99- Status of Physical Activity among Students Attending a Medium-Sized University: The Use of Campus Recreational Facilities and Public Parks
Washington, LaTimberly; Ogbonna, Lisa; Robie, Jenna; Zecha, Emily; Garcia, Camila
"Background:
It is evident that several college students do not meet the recommended amount of physical activity, which includes more than 150 minutes of moderate physical activity per week. We initiated a study to analyze the relationship between the status of physical activity among college students, concurrent with another study focused on a community's access to a public park.

Methods:
We utilized quota sampling and obtained our data from 234 students at a medium-sized university in the Southeast. The 2-week study was conducted in February of 2017, with the use of voluntary paper surveys. Components of the study focused on community access to a public park, the BRFSS and the National College Health Survey were also included.

Results:
The sample that we obtained was intended to model the population of college students at the university. The median amount of minutes toward moderate physical activity was 120 (IQR=60-210). 34% of students reported not having visited the campus rec (range 0-30, mean 7.7). Juniors reported having the most visits per week, while freshmen reported the least. Men reported having more recreational visits than women (9.7 vs. 6.7, p&lt;0.01), and African Americans reported more visits than white students (9.7 vs. 7.9, p&lt;.03).

Conclusion:
Students at our institution do not meet the recommended guidelines for physical activity. Furthermore, our student population could benefit from more efforts towards increasing physical activity status."
100- Relatable Recipes

Hannah Friley, Tim Reese, Lindsay Stringer, John Mark Winslett

"Introduction: The Foundry, located in Bessemer, is an institution of recovery, re-entry, and rescue ministries. The outreach program provides community meals and distributes bags of produce. The disadvantaged community members have expressed a need for information on healthy cooking alternatives and food education.

Aim(s): Assist disadvantaged community members by improving knowledge of healthy meal choices.

Method(s): A survey was created inquiring about the produce frequently provided, what ingredients they already had, and if they had somewhere to cook. Upon receiving the surveys, a local chef prepared simple recipes with common foods reported. The objective is to assess, implement, and evaluate the ability to use the foods available to create family meals by April. The target population includes the disadvantaged community members who participate in the pantry services. Plans are to provide recipes based off the survey in order to provide healthy cooking alternatives and improve nutritional status. Recipe books will be placed in the produce bags to take home. After one week, there will be a second survey inquiring about the recipes provided.

Result(s): One week after recipe distribution, 16 evaluation surveys were passed out and resulted with the following: most popular recipe was chicken stock and 94% found the recipes helpful.

Conclusion(s): Recommendations included pictures of the final recipes for illiterate community members, different meat choices, and more spices. Challenges included running out of time and lack of accurate results due to the changing population each week. Overall, those who received the recipes and surveys found the project helpful."

101- Self-Reported Cognitive Changes between Caucasian and

"Susan Darby, BSN Student; Jacqueline B. Vo, BSN, RN; Silvia Gisiger-Camata, MPH, RN; Timiya S. Nolan, PhD, ANP-BC; Jennifer Bail, BSN, RN; Karen Meneses, PhD, RN, FAAN"

"Background: In Alabama, approximately 3,000 women are diagnosed with breast cancer each year. Among breast cancer survivors (BCS), nearly 75% during treatment and 35% after treatment experience cognitive changes. Previous data regarding cognitive function in BCS has been conducted with primarily urban Caucasians (CAU). Forty-eight of the 67 Alabama counties are rural. The purpose of this poster is to compare self-reported cognitive function among CAU and African American (AA) BCS in rural Alabama.

Methods: Think Well is a community-based program providing educational seminars on healthy living and cognitive function to BCS and co-survivors. After each seminar, participants were asked to complete a 25-item evaluation regarding the seminar quality and self-reported cognitive function in memory, ability to think, speed of problem solving, and ability to pay attention. Descriptive statistics were conducted with SPSS V23 to describe cognitive function among AA and CAU BCS.

Results: Of the 58 returned surveys, 69% (n=40) were CAU and 31% (n=18) were AA BCS from 10 rural Alabama counties. CAU and AA BCS reported moderate to extreme changes in: ability to think (76%; 50%); problem solving (78%; 50%); attention (68%; 56%); and memory (78%; 56%). CAU and AA BCS also reported moderate-extreme problems in memory (80%; 56%) and thinking (83%; 56%) attributed to their cancer treatment, respectively.

Conclusion: Overall, CAU BCS reported more cognitive changes post treatment than AA BCS. Future directions may include targeting larger sample of rural BCS and tailoring programs to rural Alabama."
102- Anti-Biofilm Properties of Flavonols
Alyssa Patel
Dental caries is a common health problem affecting more than 90% of the adults in the United States. Once the tooth is decayed, the only solution available is to drill out part of the decayed tooth and replace it with a restorative material such as composite resin or porcelain to prevent further decay. Tooth decay is caused by communities of different bacterial species in oral biofilms. Streptococcus mutans (S. mutans) is the main etiological agent causing the development of dental caries. With the help of glucosyltransferases (GTFs), S. mutans polymerize glucose into glucan which helps the bacteria adhere to the tooth surface, where lactic acid is produced causing the teeth to demineralize leading to the development of dental caries. Since glucans play a critical role in biofilm formation, inhibition of S. mutans GTF is a novel strategy to prevent glucan formation and thereby preventing the formation of biofilms and dental caries. Flavonols, found in natural plants, have been proved to fight against the bacteria found in the mouth. The goal of this project is to synthesize flavanol analogs and examine their ability to inhibit S. mutans' GTF and biofilm.

103- Factors Influencing Pressure Ulcer Prevention in a Surgical Intensive Care Unit
Dusty Bake, Samantha Perkins, Edward Youn, Rebecca (Suzie) Milner
"Background/Introduction
Hospital-acquired pressure ulcers (HAPU) are preventable incidents that cost nearly 11 billion U.S. dollars annually. Prevention bundles of care are sets of evidence-based practices to improve patient outcomes. The Veteran's Affairs (VA) Administration issued a new policy in 2016 requiring all newly admitted patients have a foam dressing (Mepilex) applied to vulnerable bony prominences (i.e., sacrum/heels) to reduce HAPUs; however, policy adherence has been inconsistent. Lack of time to gather supplies for Mepilex application has been cited by nursing staff as primary barrier. Purpose: Explore the effects of a prepackaged Mepilex supply kit (MSK) on Mepilex use in a high-risk setting.

Methods/Procedures
A repeated measures design was used to determine the effects of a MSK on Mepilex application adherence. MSK were created/placed in the intensive care nursing station at a southern VA facility. Staff education was provided via flyers and direct communication from unit leaders for one week. Post intervention data were collected at weeks three and four. A run chart was developed to examine changes over time.

Results/Conclusions
At two weeks of baseline data collection, 44% of patients had Mepilex applied to the sacrum and/or heels. After MSK were created/staff education completed, Mepilex application increased fourfold, from 25% to 100%. Run chart analysis showed a statistically significant downtrend immediately preceding the MSK intervention. Data points were insufficient in number to determine post-intervention sustained effectiveness.

Implications
Prevention bundles of care that reduce nurse time burden may be an effective strategy to reduce incidence of HAPU in acute care facilities."
104- Examining the Effect of Hospital Consolidation on Health Care Quality Outcomes
Claire Callaway
"The study explores the impact of hospital merger and acquisition on quality of care at the organizational and community levels. Using data from Becker's Hospital Review, the research identified a number of hospitals acquired by systems in 2009 and 2010 and created matched pairs with others using comparative variables including geographic region, size, admissions, and baseline quality.

Changes in quality of care variables taken from the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAPAS) survey collected from the baseline one year prior to acquisition and two years post-acquisition to analyze the correlation between merger and organization outcomes. Data from the Dartmouth Atlas Project were synthesized for the Hospital Service Areas of subject hospitals and compared to matched hospital HSAs in the same Hospital Referral Region to compared the effect of quality at the community level, using the same parameters of time.

The poster presentation summarizes the theoretical basis of the project, presents a visual representation of the key points of data, and presents the findings on the association of acquisition and merger on select indicators of quality of care at both population levels.

105- Perceptions of Verbal and Physical Abuse Experienced by Certified Nursing Assistants from Residents in Long Term Care Facilities
Cecily Buchanan, Melanie Edwards, Karissa Krause, Hannah McClellan, Vicki Winstead, and Rita Jablonski-Jaudon
"Background: Ninety-six percent of dementia patients will demonstrate aggressive behavior during care (Jackson, 2009), yet only 11.4% of Certified Nursing Assistants (CNAs) report exposure to physical and verbal violence (Astrom, 2004). McLaughey et al. found that CNAs with minimal training had an increased risk for injuries from residents with dementia who exhibited resistance to care.

Problem statement: There is little research on CNAs' perception of verbal and physical abuse from LTC residents and even less research regarding the training they receive for responding to the abuse. The purpose of this qualitative study was to explore how CNAs' perceived their experiences of verbal and physical abuse from LTC residents.

Methodology: Ten CNAs caring for nursing home residents in Alabama were recruited through snowball sampling and an advertisement in the UAB news reporter. Ninety-percent were female and 100% were African American. Recorded interviews were transcribed and then coded for themes.

Results: Major themes included acceptance of verbal and physical abuse as part of the job[]. While most CNAs reported racial slurs, their responses were internalized; they excused the behavior as part of the disease by minimizing the effects on them personally. They also expressed a lack of support from administration including lack of preparation. However, it was important to the CNAs to present themselves as compassionate and caring individuals towards their residents with dementia.

Implications (Conclusion): CNAs need extensive and ongoing training to understand the disease process of dementia, how it affects verbal and physical abuse, and how to respond."
106- Spreading Eagles' Wings: Blogging For A Purpose
Terronica Beckham, Kathryn Mills, Allison Wortel

"Introduction: Eagles' Wings, Inc. is an organization that promotes independence for adults with a range of mental and physical disabilities. Eagles' Wings is impacting clients, yet people in the area are unaware it exists. The blog highlights the clients, facility, and activities at Eagles' Wings to share through social media by informing the community about this organization.

Aim(s): The purpose of the Spreading Eagles' Wings blog is to inform the community about Eagles' Wings, Inc.
Method(s): The target population that will benefit is anyone involved with Eagles' Wings Inc., including clients, families, and donors. Our objectives are to increase awareness of Eagles' Wings, Inc. and funds related to heightened awareness. For implementation, we created the blog through Wordpress.com, wrote blog posts, and shared the blog through a contest on social media.
Result(s): This service project allowed us to implement the public health nursing assessment by recognizing and addressing needs of vulnerable populations. The blog features the individuals and staff, photos, gift shop items, and activity posts. As awareness increases, donations and visitors will increase. Class taught us about limited community resources for special needs population. Finding the necessary resources will allow Eagles' Wings to continue to serve these individuals.
Conclusion(s): The biggest challenge was time. The blog is a stepping stone creating a preview to the community of Eagles' Wings. Only being there to implement the blog may hinder how far this blog can take this community site. It is rewarding to know that we helped introduce Eagles' Wings to the community."

107- Assessing the Relationship between Quality and Financial Performance in U.S. Hospitals: A Systematic Review
Matthew Barnes

Hospital reimbursements are being tied to Quality Performance more every day. With this being the case some hospitals have been financially penalized due to their relative low quality scores. Despite strengthening bond between quality and financial performance, there seems to be lack of attention by researchers about this relationship. The aim of this study is to account for the relationship between financial performance and Quality in US Hospitals by conducting a systematic review of the literature. The search of three well-established databases including PubMed, ABI Inform, and Scopus generated 3,303 manuscripts. After excluding articles by a priori criteria (i.e, non-empirical, non-relevant), seventeen articles were abstracted. The results indicated that majority of these articles used some type of quality indicators that can be categorized under the outcome dimension of Donabedian's structure-process-outcome framework. Furthermore, as an independent variable quality was used 53% of the studies while financial occupied the remaining 47% of them. Overall, 88% of articles found a statistical significant and positive relationship between Quality and Financial performance. The remaining 12% of the articles found no significant association. This is the first systematic review that focuses on U.S hospitals while accounting for the relationship between Quality and Financial Performance. Restricting to the hospital setting allowed more in-depth analyses and led to the development of extensive managerial implications section. The finding of limited numbers of studies indicates that the research on the link between quality and financial performance is in its infancy at best. Therefore, there is a need for future studies.
108- Nutrition Disparities within Minority Populations in the U.S.
Rhett Pendley, Autumne Lee, Arianna Siler, Eric Rivera
A growing concern within minority populations within the United States is health and nutritional disparities. Dietary disparities are known as differences in dietary intake, dietary behaviors, and dietary patterns in different segments of the population that result in differences of nutritional quality. Nutrition affects the development and progression of chronic diseases within a community. A major contributor to the existing nutritional disparities within minority populations is socioeconomic status. Access to quality food is not as readily available in minority communities. Current studies provided a perspective about the importance of understanding nutrition and its effects on the general health of the body. This poster includes a statistical analysis that compares the nutritional status in low socioeconomic and minority groups to middle class Americans. Given the expansion of the minority populations, issues of nutritional disparities will become more prevalent if interventions are not successfully implemented.

Magdalene Blevins and Elizabeth Kroeger
Fifty-five percent of US preschoolers, aged 3-5 years, attend child daycare centers where they should receive at least half of their daily nutrient intake. Lunches served to children at childcare centers do not meet 1/3 of the Recommended Dietary Intakes for children ages 3-5 years old, indicating poor diet quality. The Child and Adult Care Food Program (CACFP) and licensure by the Department of Human Resources (DHR) are two common policies that have nutrition regulations; however, it is unclear whether these regulations influence diet quality. The purpose of this study was to assess diet quality between centers that participate in CACFP and/or licensure versus those that do not. Trained research assistants observed lunch at 34 childcare centers and recorded what was served and consumed for 3 randomly chosen children from each center. SAS (version 14.2) was used to run ANOVA, which compared nutrients served and consumed, while controlling for caloric intake. Lunches served by policy centers had more iron, calcium and fiber, but did not meet the Recommended Dietary Intake for these nutrients. Similar trends were found for food-consumed data; however, total fat exceeded the RDI for policy centers. Participating in CACFP/licensure was associated with better diet quality for some nutrients but was less than recommended. Future studies that identify foods commonly served and consumed by the children in the child daycare center environment would be useful to inform nutrition recommendations and direct policy changes.
110- Calorie Restriction-Mediated Negative Energy Balance may Abolish Browning of White Adipose Produced by Exercise

Emily E. Watkins, Eric P. Plaisance, Rachel A. Harley
Continuous moderate intensity aerobic exercise training (MIT) increases markers of thermogenesis in subcutaneous white adipose tissue (WAT) and attenuates weight gain on a high fat diet (HFD). The purpose of the current investigation was to determine if high-intensity interval training (HIIT) would increase markers of sympathetic activation in WAT and rescue calorie restriction (CR)-mediated reductions in resting energy expenditure (REE) to a greater extent than MIT. Markers of adipose thermogenesis (Ucp1, Prdm16, Dio2, Fgf21) were unchanged in subcutaneous inguinal or epididymal WAT with decreased Ucp1 expression in retroperitoneal WAT and brown adipose tissue. HIIT rescued CR-mediated reductions in lean body mass (LBM) and REE and both were associated with improvements in whole body glucose/insulin tolerance. These findings indicate that HIIT attenuates reductions in EE produced by CR through increases in the quality and/or quantity of skeletal muscle, but appears to abolish exercise-mediated increases in markers of WAT thermogenesis.

111- Social Determinants and Breast Cancer Screening in African American Women

Jasmine Duncan
Breast cancer is the second leading cause of cancer related deaths in women living in the United States. Although African American women are less likely than White women to be diagnosed with breast cancer, the mortality rate is higher for African American women. Few studies have explored the social characteristics surrounding the decision to get a mammogram, the primary method of diagnosing breast cancer. Using 2014 data from the Behavioral Risk Factor Surveillance System (BRFSS) survey, we wanted to determine which social characteristics were associated with screening. We first explored social characteristics in a sample of 256,342 women in the United States according to whether or not they had a mammogram. We then explored social characteristics of respondents by race. Finally, we used logistic regression to model social characteristics among women who have had a mammogram. The differences between women who had a mammogram compared with those who did not were statistically significant. We also found that there were significant differences by race. Finally, our regression model demonstrated that black women, women aged 65 and older, women with a high school education or less, and women with no children in the household were more likely to get a mammogram. This study found that these social determinants were statistically significant factors that effect mammography screening rates among Black women.
112- Perception of Physical Activity Among UAB Students

Chanel Lear, Jamia Haynes, Aidan Ryan, Rodrick Felder

Physical activity provides physical and mental health benefits. Despite that fact, the majority of college students do not meet the recommended physical activity guidelines. In this study, student’s perception of physical activity was collected. A self-administered paper survey was distributed and collected from 234 students at the University of Alabama at Birmingham during a 2-week period in mid-February 2017. Students were asked on a scale of strongly agree to strongly disagree whether physical activity is easy, enjoyable, and makes you more attractive. The results indicate that males find physical activity to be easier, while women disagree. In the same respect, 92.7% of males find physical activity to be easy compared to their female counterparts. Students under and over 21 years of age agreed that physical activity makes you more attractive. Overall, students have a positive perception of physical activity, which does not explain the lack of physical activity among college students, including UAB student population. The findings indicate alternative reasoning for students not meeting the recommended physical activity guidelines.
113- Investigating Carrier Dynamics in Vapor-Liquid-Solid Grown Silicon Nanowires Using Ultrafast Optical Microscopy

Aidan L O’Beirne; Michael R.C. Williams; Mel Hainey; Joan M. Redwing; Rohit R. Prasankumar

At the nanoscale, high surface to volume ratios and quantum confinement can result in novel electronic phenomena. This exotic electronic behavior can be exploited through the rational design of nanostructures, resulting in exciting new pieces of technology such as biosensing nanoribbon waveguides, microcavity lasers, and novel photovoltaic structures. To continue to develop nanotechnology, we must investigate the carrier dynamics in novel materials and nanostructures. We studied VLS grown silicon nanowires using ultrafast optical microscopy. The nanowires featured a combination of gold vs. aluminum catalysts; &lt;111&gt; vs. &lt;110&gt; growth plane; and passivated vs. non-passivated surfaces. We used ultrafast pulses of 400 nm light to photoexcite charge carriers and then monitored their recovery on a picosecond time scale with probe pulses of 800 nm light. We have measured enough NWs to develop a statistical correlation between carrier dynamics and NW growth features such as diameter, passivation, catalyst, and growth plane. Initial data analysis shows that passivated wires exhibit a longer time constant, and smaller diameters exhibit state filling as opposed to induced transparency.

114- Effect of Confinement on Nanosphere Assemblies for Lasing Applications

Clayton Allison and Kannatatseen Appavoo

Random lasing occurs when incident light scatters off of randomly assembled structures at the nanoscale. Random lasing in solution-processed nanomaterials has great potential for low-cost integrated photonics. Recently, it has been demonstrated that assemblies of zinc oxide nanospheres with subwavelength dimensions can display lasing action at ultralow fluence threshold, seeded by a random scattering process. Here we use three dimensional, full-field finite-difference time-domain electromagnetic simulations to understand how confining spatially these nanosphere assemblies can modify the resultant optical properties. Via use of multiple different structures of zinc oxide nanospheres, attempts to understand how structure affects the scattering off of these nanospheres at the nanoscale were conducted. Strategies to increase scattering while minimizing absorptive loss are discussed.
115- Finding applications of Morse Theory
Will Tidwell
Morse Theory is an important part of differential topology, and can be used in applications to engineering and computer science. Unfortunately, Morse Theory, it's applications, and usefulness are not widely known and easily accessible to individuals with an undergraduate understanding of calculus. I have reviewed known applications of Morse Theory in engineering and computer science, and provided a context for an individual with only an undergraduate understanding of calculus. This will make these applications of Morse Theory more accessible to individuals with an undergraduate understanding of calculus, and make an accessible list of applications to Morse Theory.

116- Burning Questions about Preservation: An Investigation of Cremated Bone Crystallinity in a Bronze Age Cemetery
Emily Quarato and Julia Giblin
Skeletal materials have been previously used to determine sex, age, and weight but more recently chemical composition and isotopic studies (Sr, C, N, O) have been conducted on remains in Hungary. Previously researchers thought that burned bones held no usable materials for data collection due to heat induced change in the bone structure that resulted from diagenesis and isotope fractionation. Recent work indicates that cremated bone may in fact retain in vivo chemical signatures due to changes in bone crystallinity during the calcination process. In previously conducted research, lower crystallinity indexes have been associated with fresh bone with increasing crystallinity trends after heating. Due to the observed higher crystallinity in bone nearing calcination, it is believed that they are more resistant to diagenesis than unburned bone. To analyze the believed changes in crystal structure of burnt bone Fourier Transform Infrared Spectroscopy (FTIR) has been utilized. Our study will be looking at the crystallinity of cremated bone from the Bakers 103 cemetery as a means of investigating preservation of in vivo isotopic values. We will investigate the degree of calcination via color on cranial and post cranial bones to see if there is any variability within the cemetery.
117- Testing the Properties of Chalcones: Antimicrobial, Anticorrosive, and Ability to Form Coordinate Complexes

Marrielle Santiago, Sarah Sisk, E.J. Aloria, Alex Ray, Om Patel,
"Chalcones are considered both an aromatic ketone and an enone. They have various applications including roles as antimicrobial, anticorrosive, antitumor, antimalarial, and anti-inflammatory agents. Additionally, their pharmacological properties suggest that they can be used to develop new drugs. Since chalcones can have a wide array of properties, we wanted to synthesize chalcones and test certain properties, specifically their antimicrobial and anticorrosive properties as well as their ability to form coordination complexes with certain transition metals. There is evidence that these organic compounds can form a coat on the surface of metals to create a barrier between the metal and the corrosive agent. This can decrease the metal’s corrosion rate, which is an important property in industrial settings. Furthermore, chalcones have also been shown to have an affinity to form coordination compounds. This is a topic of interest because it is found that in some bacteria species with metal ions have different enzymatic and physiological reactions which suggests that a chalcone’s ability to form coordination compounds can affect their pharmacological properties (i.e. being antibacterial, antioxidant, etc.) as well. In this study, we synthesized three chalcone derivatives and used IR and NMR to determine their structures. We then tested their antimicrobial and anticorrosive properties and their ability to form coordination compounds properties."

118- Erbium-doped Zinc Selenide Thin Films by Pulsed Laser Deposition for Middle-Infrared Laser Sources

Brian Chase Chandler
With the increasing number of applications for solid state mid-IR lasers in areas such as remote sensing, detection of chemical and biological components, DOD and military applications affordable production methods of mid-IR lasing capabilities are in high demand. Due to a wide middle-infrared (mid-IR) transparency range and low phonon cut-off frequency, II-VI wide-bandgap semiconductors are promising host materials for rare earth (RE)-doped mid-IR lasers. Many RE ions such as Er, Nd, Pr, and Ho have strong mid-IR transitions. When doped into II-VI crystals, these ions may allow mid-IR lasing under electrical excitation. In this work we explore the fabrication of Er-doped ZnSe thin films by pulsed laser deposition for photoluminescence (PL), electroluminescence and stimulated emission studies. A KrF excimer laser (2.0‘4.0 J/cm2) is used to ablate a pressed, sintered target produced by mixing powders of ZnSe and Er precursor compounds at various concentrations.. Targets are ablated at pressures below 1i, ‘10-6 Torr with substrate temperature kept at 450°C. Deposited thin films are produced on (100) GaAs wafers and film thicknesses from 500 nm to 3.5 μm are obtained as determined by deposition rate calibrations and scanning electron microscopy. Films are analyzed by X-ray diffraction and Raman spectroscopy to characterize the crystalline quality of the films. The optical absorption and emission characteristics of the films are used to verify the incorporation of Er ions into the II-VI host and evaluate the effect of film characteristics (crystallinity, grain size, and dopant concentration) in the potential of the thin films for stimulated emission.

Evan Garrison
II-VI semiconductors doped with transition metal ions are good candidates for mid-infrared laser materials. Among them, iron-doped zinc selenide (Fe:ZnSe) and zinc sulfide (Fe:ZnS) appear to be some of the most promising. However, their detailed properties are still not well understood. We have investigated the electronic and geometric structures around the Fe ion dopant in ZnSe and ZnS using density functional theory. The geometry around substitutional and interstitial dopants are fully optimized using a large supercell consisting of 217 atoms. First, we confirmed that Fe2+ with quintet spin (S=2) is the most stable state. The lattice distortion around the dopant is found to be very small. We identified two localized electronic orbits inside the band gap which are used in the laser application. For Fe:ZnSe and Fe:ZnS we found the excitation energy to be 0.329 eV, consistent with the experimental data. For Fe:ZnSe the upper state is very close to the conduction band, suggesting that the excited electron may go to the conduction band. For Fe:ZnS the upper state is substantially farther from the conduction band. Fe2+ as an interstitial with Zn2+ in the substitutional is found to be more stable than vice versa in both Fe:ZnSe and Fe:ZnS, indicating the slow diffusion is not caused by Fe requiring more energy to be knocked out of a substitutional position, and that there may be a preferred interstitial diffusion path.

120- Cellulose Enhanced Injectable Calcium Sulfate and Calcium Phosphate Composite Bone Graft

Carl Bartlett and Aaron Catledge, Ph.D.
Integration of multiple scientific disciplines is absolutely necessary to aid in medical advancement. Utilization of physics, engineering, and biology will develop a molecularly sound injectable bone graft with enhanced strength and no reduction in biocompatibility or osteoconductivity. Materials engineering has used a reduced volume of discontinuous fibers to develop Engineered Cementitious Composites (ECCs) that offers significant gains in strength and better ductility. Building off this premise by electrospinning high strength cellulose nanowiskers within discontinuous polymer fibers will significantly improve the strength of the traditional calcium sulfate and calcium phosphate bone grafts. The strength and fracture toughness will be measured for cellulose enhanced bone grafts compared with traditional calcium sulfate and calcium phosphate bone grafts. In addition cytotoxicity and osteoblastic differentiation will be performed for both cellulose enhanced grafts and traditional grafts to show osteoconductivity and biocompatibility.
209- Chemical Reactions and Measurements

"Tammie Joann Lee
Lee Walker and Santiago et. al"
"Organic Compounds to create a Bio Physic Effect
Inorganic compounds natural body chemical reactions for example; chlorine white solid liquid poured
for dissolve or chemical bacteria areas with oxidation, reduction, ionization, combustion,
polymerization, condensation and other chemicals that causes reaction(p.148).
Procedure of Measurements
Writing the Lab Notebook by Howard M. Kanare 2005"
121- Kids in Engineering Day: Operation C5

*Emma Latham*

Kids in Engineering Day (KIED) is an annual event hosted by the Society of Women Engineers (SWE) in collaboration with UABTeach. This past February, 95 4th-6th graders from all over the state of Alabama and beyond came to participate in Operation C5 “this year's theme of KIED. Throughout the day, students unlocked the 5C's of problem solving by completing design challenges and hands-on activities. The main goal of this program is to foster independent thinking and problem-solving skills through hands-on activities, but it is hard to demonstrate this main element with a conventional, flat poster. Instead, this transcendent poster will take you beyond the 2D surface and into a multi-dimensional realm of problem solving, tangible learning, and mystery to discover the 5 C's of problem solving.

122- Education That Will Blow You Away

*Kristine Clarke, Trent Davis, Ashley Strickland*

"Introduction: Urban Ministry's mission is to serve low-income persons in the Birmingham area with programs promoting self-sufficiency. The community lacks education on severe weather preparedness and necessary resources.

Aim(s): The goal is to educate and assist the members of the community on severe weather preparedness to better ensure their safety in the event of a severe weather outbreak.

Method(s): An educational session on tornado preparedness was held utilizing a meteorologist from ABC 33/40. The population targeted was primarily the low income elderly. The objectives for this event include to educate attendees on the importance of weather preparedness, to review the purpose of an emergency preparedness kit, and to list what items should be included in the kit. The group will present these items as examples of how to build a proper kit. This education session will help the community to become more aware of weather safety and use the knowledge and tools to keep themselves and their families safe. Five weather radios were secured from a local donor.

Result(s): A tornado preparedness survey was created and an educational pamphlet was distributed. Four weather radios and one emergency kit were given away. A knowledge assessment was conducted before and after the presentation. Improvements were noted in the areas of the participants' safety plans and emergency kits.

Conclusion(s): The biggest challenge was obtaining donations. The reward was to prepare these participants in the event of a weather emergency and to observe the enjoyment of their experience."
123- Be Healthy! If not now, then WHEN?
Ashley Bates, Chelsey Chaplin, Melissa Dunn, Catherine Labreche
"Cornerstone is a private Christian elementary school with a vision to empower students to glorify God through character development and academic excellence. The students who attend Cornerstone are partially sponsored by several businesses in the surrounding community. Lacking sufficient knowledge related to health promotion is the topic of concern at the community site.

The goal of this community project is to promote a healthier lifestyle by encouraging wellness check-ups, demonstrating proper hand hygiene, teaching exercise routines, and improving nutritional choices in elementary school students.

Cornerstone Elementary School students are the target population for this community project. The objectives of this community project are to educate on wellness check-ups, hand hygiene, exercise, and nutrition. Objectives will be met by introducing healthy topics in brief, in-class lessons each week, culminating in a health fair with four stations. Hands-on, active learning strategies that are age appropriate for this population will be utilized to demonstrate these concepts.

The project was implemented through the use of educational lesson plans as well as an integrative health fair. The project accomplished effective teaching and achievement was demonstrated through the teach-back method.

Developing age appropriate lesson plans and limited educational resources were challenges the nursing volunteers faced. The project helped to develop considerable improvements in the nursing volunteers' ability to educate on health promotion and illness prevention while working alongside the pediatric population. This experience provided a rewarding opportunity to observe actively involved students eager to learn about health."

124- A Community Approach to Increasing Literacy and Reducing Poverty
Beatriz Arcanjo, Shivani Patel, Carli Smith, and Heather Tilley
"Introduction: At Better Basics, the mission is to make a positive difference in the lives of children and their families by advancing literacy through enrichment and intervention programs. The main dilemma is the high illiteracy rates in children across central Alabama. By increasing literacy in children, poverty can hopefully be avoided in the future.

Aim(s): To enhance literacy at CJ Donald Elementary School which is lacking adequate access to books.

Method(s): First, the nursing students determined the best way to improve literacy in school age children was to construct a Little Free Library to be placed in an easily accessed area outside the school. Students would have an opportunity to check out a free book to take home and read. Once the library was ordered and received, students in kindergarten through second grade designed and painted the library. Before placement, flyers were sent home to the parents to inform them of the library and encourage utilization. After placement, WVTM 13 news interviewed students and televised the first placement of books.

Result(s): 160 books were placed in the library and in three weeks, 116 books were taken and utilized by students. This project had an impact on the school children by improving access to books and encouraging a love of reading. By increasing literacy in children, poverty can hopefully be avoided in the future.

Conclusion(s): Lack of consistency and short attention spans of the students posed a challenge at times. The nursing students will continue to monitor the status of the library through Better Basics."
125- Service Learning: Language Acquisition and Cultural Enrichment
Anna Sims
In college, students should learn more than technical information; college should spark an intellectual curiosity and help students learn more about themselves by learning more about the world. For my service learning project, I have worked in Vivian Mora's State Farm agency on Lorna Road, where a majority of the clientele is Spanish-speaking. With this community partner, I hoped to develop my ability to speak and understand Spanish, as well as connect with a population of a different culture. To achieve these goals, I work the front desk of the office where I speak with the clients as they come in. Through working in a Spanish-speaking office for a primarily Hispanic clientele, I have had the opportunity to cultivate an understanding of the Spanish-speaking population in this part of Alabama, develop a knowledge of Hispanic customs and culture, and improve my conversational Spanish. In addition to cultural enrichment, I have improved technical skills in Spanish, such as use of enlace, vowel reduction, consonant reduction, and general pronunciation. After graduation from UAB, I would like to work in editing, publishing and translation of Spanish to English. Using Spanish in a professional context with my service learning internship has equipped me with new knowledge, awareness and skills I will carry with me into the workforce.

126- Homeless Youth: Surviving Survival Sex
Christen Cline, Amber Puckett
Introduction: One Roof is an organization that facilitates resources and education for the homeless population of Birmingham, Alabama. The topic of survival sex among the homeless youth population is being addressed. Survival sex is defined as the exchange of sexual favors (vaginal, anal, oral) for money, food, shelter, gifts, drugs, or other survival needs.

Aim(s): The goal is to promote safe sexual practices for homeless youth engaging in survival sex, through improved access to condoms, birth control, and screening for sexually transmitted infections.

Method(s): A survey was developed to assess the use of safe-sex practices amongst homeless youth who participate in survival sex. Based on those needs a brochure was created that provides a definition of safe sex, signs/symptoms of sexually transmitted infections (STI), examples of proper condom usage, and resources in the community that youth can access for screening and treatment of STIs. The hope is to accomplish a central educational brochure to aide in prevention of sexually transmitted disease contraction and spreading along with access to safe sex practices.

Result(s): Implementation occurred through dissemination of the brochure to organizations working with the homeless youth population. Completed surveys were collected. A lesson learned through this experience was the importance of professional communication with people of various beliefs and backgrounds.

Conclusion(s): Familiarization with the terminology of the homeless youth population was a challenge. It was rewarding to play a small but critical role in steps towards safer sex practices for the homeless youth population. The experience was engaging and enlightening.
127- Mi Vida, Mi Salud (My Life, My Health)
Erika Alvarez, Taylor Brazier, Brennan Sehrt

"Introduction:
LEAPS program enrolls Spanish speaking mothers to guide them in adapting to a new life in American society. Latina women face a variety of health disparities including higher prevalence of diabetes, obesity, and hypertension. Low health literacy inhibits them from fully understanding, practicing, and accessing preventive health care services.

Aim:
To empower Latina women by enhancing their knowledge of common health problems, maintaining healthy lifestyles, and acquiring necessary skills to take control over their own health and their families' wellbeing.

Methods:
Twenty-five Latina mothers enrolled in LEAPS were assessed on their knowledge and practices with an 8-item questionnaire. Three teaching sessions with simultaneous translations and two screening assessments were conducted. The 15-30 minute lessons were taught at 3rd grade reading level, followed by a Q&A.

Results:
The pre-test portrayed discrepancies in the women's knowledge of healthy practices. Lesson plans were constructed from most challenging pre-test questions. Teaching session #1 covered diabetes and hypertension, and blood glucose screenings for 17 women. One woman with a blood glucose of 317 was referred to PATH clinic for follow-up.
Teaching session #2 covered healthy diet and exercise, and blood pressure screenings for 16 women. Session #3 covered flu vaccinations and the common cold for 20 women. The women portrayed confidence in their understanding of health education materials during post-assessment Q&A.

Conclusions:
Despite the language and cultural barriers, implementation of health teaching was overall successful. Women were engaged in learning and gained confidence on how to take better care of themselves and their families."

128- Educating Parents on Car Seat Safety
Sydney Bradford, Abbie McCain, Anna Parrish

"Introduction: JCCEO Early Head Start is a program designed to support parents of pre-school children with limited resources and to prepare the children for success in school. During the morning arrival time, parents were observed not strapping their child into their car seat correctly, driving over the speed limit, or holding their child in the driver's seat.

Aims: The goal of this education program is to improve car seat safety and reduce high-risk behaviors for the parents and students of Early Head Start.

Methods: The objectives are to inform parents of the importance of car seats, emphasize the legal aspect of not using car seats safely, and encourage safe car seat behaviors. The target population is the parents at Early Head Start. Two educational classes with demonstrations and handouts were provided and a poster was placed in the hallway. This combination was used to engage auditory, visual, and tactile learners in hopes of providing a safer car environment.

Results: The project was implemented through two educational sessions involving a demonstration accompanied by a handout. A total of twelve parents and seven staff members attended the educational sessions, listened attentively, asked questions and verbalized a better understanding of car seat safety.

Conclusions: The biggest challenges faced were the difficulties of getting parents to attend and finding the appropriate technology for the presentation. Rewards include parents and staff disseminating information to others. The director also plans to station a resource officer at the school during morning arrival. The presentation ran smoothly and made a visible impact on the community."
129- Effects of Smoking on Pregnancy: Patient Brochure
Daisy Cheng and Kathryn Lee
"Introduction: The Greater Alabama Health Network provides medical care information to pregnant women before pregnancy, during delivery and postpartum. An important component to patient teaching is smoking cessation during and after pregnancy. Currently, this agency solely provides referrals to smoking cessation programs.
Aim(s): The goal is to expand patient knowledge on the consequences of smoking during pregnancy.
Method(s): This pamphlet will address frequently asked questions regarding smoking during pregnancy, define risks related to smoking to the baby, and provide information for supportive services for smoking cessation. By speaking with pregnant women who smoke regarding their smoking habits, calling the smoking cessation referral hotline, and researching literature on the effects of smoking during pregnancy, students compiled evidence into a simple brochure for patients.
Result(s): This project reinforced class material and allowed students to identify a specific population and design a project that is transportable and does not require computer access. This course and service experience broadened the perspective on specific patient needs and helped identify barriers to patient compliance with smoking cessation.
Conclusion(s): One major challenge was ensuring that patients read the pamphlet. Through individual distribution, the content could be explained to each individual patient. The pamphlet is designed to be visually appealing without overwhelming the reader. Engaging the reader is vital to promote smoking cessation. This experience expanded understanding of the importance of patient education in the nursing profession."

130- Don’t Stand By, Stand Up!
Courtney Lippert, Matthew Palmer, Cory Tarvin
"Introduction: New Rising Star Church provides student enrichment and enhanced academic preparedness in children from kindergarten to eighth grade. This broad age range may contribute to the occurrence of bullying. Since bullying is a social problem that spans all ethnic groups, socioeconomic statuses, and ages, programs that serve children must include strategies to prevent bullying and effectively intervene when it occurs.
Aims: This interactive presentation is intended to: 1) assist the students to identify bullying behaviors; 2) help them understand how bullying harms others and; 3) demonstrate how to safely intervene.
Methods: Our presentation consisted of a short discussion of bullying, its consequences, and ways to intervene. This was followed by a fun and age-appropriate activity. Young children engaged in the “toothpaste” exercise while older children competed in Jeopardy.
Result: The young children expressed an understanding of how bullying may have consequences that cannot be undone “the way toothpaste cannot be put back in a tube. The older children were able to correctly answer questions about bullying prevention, intervention, and healthy ways to let out aggression.
Conclusions: Many children in our program come from complex social environments where bullying is modeled as a necessity to establish dominance and gain respect. In effect, it is a survival skill. Our lessons provided them with developmentally appropriate options for managing aggressive people and behaviors while being sensitive to the messages they may receive within their community."
131- Man's Best Friend: Canine-Assisted Therapy for Pain and Anxiety Management in Substance Use Disorder

Sarah Bailey, Katie Cyr, Deborah West

"Introduction: Aletheia House is a substance use disorder treatment facility. Many residents report having used illicit substances to manage pain and anxiety in the past. To maintain sobriety, residents must learn alternative methods to relieve pain and anxiety.

Aim: The project goal is to empower people with substance use disorder to manage their pain and anxiety using animal assisted therapy.

Methods: The project serves individuals in Aletheia House's residential programs by introducing canine-assisted therapy, a well-researched pain and anxiety management strategy. Project objectives are to allow residents to engage in canine-assisted therapy, educate them on the benefits, and provide resources for animal involvement after discharge. A partnership has been facilitated between Aletheia House and Hand-in-Paw to provide monthly pet therapy visits. During these visits, residents will be given handouts detailing benefits of human-animal interaction and ways that it can be incorporated into life after discharge via pet adoption or volunteer opportunities.

Results: In an anonymous survey administered to the 20 participants before and after the initial therapy session, participants reported an average 38% decrease in anxiety and 23% decrease in stress. Verbal feedback was positive from residents and staff members.

Conclusions: Challenges included the short project duration and scheduling conflicts between multiple parties, but these were overcome by facilitating a direct point of contact between Hand-in-Paw and Aletheia staff. The project has developed into a long-term sustainable partnership which will provide additional resources to an underserved community and increase quality of life for individuals recovering from substance use disorder."

132- Eating Healthy for Less

Clayton Baker, Nichole Cottongim, Wan Ting Min

"Introduction: The Shephard Center is a community center for adults who are 55 and older. The center provides a variety of physical and social activities for the members who attend. A free lunch is provided by Shephard Center, but its members still struggle with eating a healthy diet.

Aim(s): Provide affordable and healthy meal options for members at Shephard Center, giving them the information and tools needed to carry on a healthy diet at home.

Method(s): A blood pressure screen was provided for the members of the Shephard Center that revealed a need for dietary management education. A cookbook was created with recipes to target members living with hypertension and/or diabetes. Recipes covered breakfasts, main dishes, sides, desserts, and drinks. Health tips on managing hypertension and diabetes were also included in the cookbook.

Result(s): Members verified learning from the teaching that was implemented through the teach back method. They verbalized ways to control their salt intake and check their blood sugars regularly. It would be expected that overtime blood pressure and A1c/ glucose levels would decrease.

Conclusion(s): Teaching the members of the Shephard Center was an honor, but not at all an easy task. Learning how senior adults best retain information was a lesson learned. The members were very pleased with the cookbook that they were given and providing that for them was an awesome achievement."
133- Fats, Friend or Foe? WISEWOMAN Nutritional Education for the Prevention of Cardiovascular Disease

Dominique Gillespie, Kambria McFadden, Amanda Sherrin

"Introduction: WISEWOMAN is a nation-wide program focusing on reducing cardiovascular disease (CVD) risk factors in women aged 40-64. Health disparities contribute to the rise of CVD among Hispanics. Despite diet and exercise education provided by the WISEWOMAN program at the Shelby County Health Department, CVD risk factors continue to be a problem for the Latino community.

Aim(s): To evaluate the effectiveness of the WISEWOMAN program in reducing hyperlipidemia, poor dietary habits, and a sedentary lifestyle.

Method(s): A medical audit review of 15 client charts was performed (convenience sample). Patients had to be enrolled in the program for at least 5 months. Baseline data (blood pressure, glucose, cholesterol, diet, and exercise) were compared to information gathered via phone interviews following attendance of WISEWOMAN educational sessions.

Result(s): Sample consisted of 93% Spanish speakers, 86% Hispanics, 53% between 40-48 years, and 40% with a sixth grade education. After attending educational sessions, 53% of participants were eating the recommended fruit and vegetable servings compared to 33% at the start, and 38% got the appropriate amount of exercise weekly, compared to 13% at the start. No comparison data were available for blood pressure, blood glucose, and cholesterol at the end of the program.

Conclusion(s): Education provided by the WISEWOMAN program seems to have improved participants' diet and exercise regimen, which could result in CVD reduction. To thoroughly evaluate program impact, women's weight along with blood pressure, glucose and cholesterol should be monitored at 5 months and at the end of the program."

134- Stress Management for Homeless Women

Alex Lockett and Kaitlyn Morton

Introduction: First Light Shelter provides homeless women and their children a safe stable environment that serves as a foundation for their efforts to reach full potential. The stress of homelessness strains these women physically and emotionally. Effective stress management is critical to achieving independence.

Aim(s): Our goal was to: 1) educate First Light residents about stress management and; 2) promote healthy and inexpensive coping strategies.

Method(s): We surveyed the participants regarding their knowledge of stress and approach to stress management. We then held Stress Sessions over a four week period where topics included: 1) signs of stress and positive and negative ways to cope with stress, 2) playing the game 'Angry Bingo' to facilitate discussion about stress, 3) managing stress with breathing and stretching exercises along with guided imagery, and 4) use of creative activities like art to reduce stress.

Result(s): Twelve First Light residents participated regularly in the sessions. Art therapy and guided imagery were the most popular sessions. Five participants (41%) reported that they have used coping techniques from each session and most post-session evaluations were positive. However, a few participants did not find the sessions helpful.

Conclusion(s): Promoting stress management in a women's homeless shelter requires sensitivity to the residents' need for caring and respect. It also requires flexibility and the ability to change or adapt lesson plans quickly in response to limited space and materials. Participant satisfaction with the sessions increased as trust and rapport was built between us and the residents during the 4-week program."
135- International Service Learning in Chile: Breaking Communication Barriers in Infrastructure Development

Brandon Schoening
This international service learning project serves as a platform for the development of technological infrastructure at Cemcogas in both Santiago and Viña del Mar, Chile, through the McWane family of companies. A major area of work is the communication or not only languages, but the concept of what modern infrastructure looks like in the United States and how it will be used to benefit the working lives of everyone in the company in Chile. Another area of examination is the presence of spoken languages, and how to create a sustainable relationship free of communication barriers by hiring people with the capacity to engage in conversation in more than one language. This is carried out by the service learner visiting these sites, facilitating conversations between the local workers in Chile and the visiting Corporate workers as an interpreter and translator, and helping to bridge the gap on the specific needs of each side and finding a way to ensure communication can continue long after the service learning opportunity concludes. The overarching goal of this project is to bring a technologically outdated facility into the modern-day standard, and to have a more informed understanding of what that means in the bigger picture of international business. The implications of this study could set an example for not only other foreign McWane sites, but possibly set an example that other companies could follow when going about international expansion.

136- Fighting Stigma

Aja Miller, Courtney Zumbado
"Introduction: South Highland Presbyterian Church Mental Health Outreach program (SHOP) is for people in the Birmingham area who are living with a mental illness. SHOP ensures that the members have access to high-quality, faith-based mental illness programs that are aimed at improving their quality of life. A problem that accompanies mental illness is stigma.

Aim(s): The goal for the Community Impact Project is to provide resources to fight stigma and educate society on mental illness.

Method(s): The target population is adults living with mental illness. The objectives for this project are to educate the consumers on healthy ways to cope with stigma, and to provide them with resources on how to educate society on mental illness. A survey about stigma was conducted and a brochure providing resources to fight stigma was distributed to the SHOP participants. A major goal is to educate the community outside of SHOP.

Result(s): The survey helped identify areas of society from which people experience stigma. The brochure provided information on support groups and hotlines as well as tips to help educate society on mental illness.

Conclusion(s): This project was insightful for the consumers and helped the authors identify their own stigmas about mental illness. Recommendations for future projects include taking this information further into the community and creating an education program about stigma and mental illness."
137- Type II Diabetes: A Southern Epidemic
Katie Guiser, Edwin Tsay, and Maggie Zink
"INTRODUCTION: Cahaba Medical Care (CMC) is a Federally Qualified Health Care Center (FQHC) that receives federal funding in order to provide care to underinsured and uninsured people in the community. The mission of CMC is to provide quality and affordable healthcare to all patients, despite their socioeconomic status. Type II Diabetes is a concern because of poverty, limited availability of healthy foods, and educational deficits in the community.
AIM(S): Educate community members on how to maintain a healthy lifestyle with Type II Diabetes while living in an area with limited resources.
METHOD(S): Trifold pamphlets containing a definition of type II diabetes, glucose values, and self-care information were distributed to CMC personnel to be distributed to their diabetic patients. The population that will benefit from this project is consumers who struggle managing their diabetes because of deficient knowledge and lack of resources. The objective for this project was to teach the diabetic population how to maintain a healthy lifestyle given the resources in their community.
RESULT(S): This project was a learning experience that taught students how to assess a community for complications and implement a change. After having CMC personnel review the diabetes pamphlet, they agreed that the pamphlets would be an asset and plan to provide them to their diabetic patients.
CONCLUSION(S): Diabetes Type II continues to be a problem because of sedentary lifestyles, lack of knowledge, and poor eating habits. With the proper knowledge and resources, persons with diabetes can learn to live healthy lifestyles, even in rural settings."

138- Educational Materials for Mothers of Premature Infants
Willow Douglas, Abbey Roper
Introduction:
Nurse-Family Partnership is a community health program that works to provide better outcomes for low-income mothers that are pregnant with their first child. They want to create a bond with these mothers to help them learn skills that will create a better environment for their child. Several mothers in this program have experienced a preterm birth and need more education materials on what to expect if their child must stay in the neonatal intensive care unit.
Aim(s):
The purpose of this project is to educate the parents of premature newborns about what to expect in the neonatal intensive care unit.
Method(s):
The students are creating a pamphlet for Nurse-Family Partnership to give to the parents of premature infants. They plan to include definitions of common things typically used in the NICU, ways for the parents to be involved in care, and coping mechanisms. Their plan is for the nurses to distribute the pamphlets to whomever they see fit, particularly those with high-risk pregnancies.
Result(s):
The students researched and formatted their information at an 8th grade reading level. The students gained an understanding of the struggles mothers may face when their baby is in the NICU. This understanding will help them care for similar patients in the future.
Conclusion(s):
A challenge the students faced was choosing which information was most important to include in their brochure. They are rewarded knowing that their brochure may be helpful to new mothers by preparing them for their time in the NICU."
139- Exercises at Home for Chronic Diseases

*Margaux Jones, Blake Patterson*

Introduction: Alabama Community Care, exists to help those with chronic illnesses to get the treatment and education they need on their diagnoses. The clinical group created exercise regimens for several types of chronic illnesses, which are: COPD, diabetes, heart disease, and asthma.

Aim(s): These exercises will help improve and maintain the patient's diagnoses. The exercises can be performed at home and have been proven to improve physical and mental health in patients with these diseases.

Method(s): The clinical group began to think of what could benefit the patients and clinical site the most, noticed that education was very important when assisting the community. The idea of an exercise video and pamphlet with directions for exercises at home for those with chronic illnesses soon developed.

Result(s): Education that is taken out into the community must first be approved by Medicaid, and takes several months. This did not stop the clinical group from moving forward on the original idea of an exercise video and pamphlet. To incorporate some results into the project, a survey was done. The results showed that 50% of the people that surveyed would follow an exercise regimen if given one (43% would follow the regimen sometimes and 7% would follow the regimen never).

Conclusion(s): In conclusion, the clinical group hopes that the patients and the clinical site will utilize the education that the group has provided for them. Once approved by Medicaid, the next clinical group can continue this project and further gather information on patients who do these exercises at home.

140- Empowering Children to Adopt Healthy Eating Habits

"Dowdell, Miranda
McCray, Patton
Sellers, Anthony"

"Introduction: Step Up is an after school enrichment program started by the Promoting Empowerment Enrichment Resources (P.E.E.R.) Inc. organization for children in Birmingham's East Lake area. This part of the city is a known food desert where residents experience food insecurity. The program provides a healthy snack, homework help, and a nutritionally balanced evening meal to children ages 7-16.

Aims: The purpose of our project is to: 1) provide developmentally appropriate nutrition education to children and; 2) promote healthy eating habits within families.

Methods: After participants were surveyed to determine their nutrition knowledge and family eating habits, they were introduced to healthy eating standards from MyPlate (USDA, 2012). Interactive games were used to teach participants how to identify healthy foods and plan a healthy meal. The children were then allowed to construct their own healthy meal based on MyPlate recipes. The value of eating as a family was encouraged by allowing families to join participants at the end of the day for dinner.

Results: Children demonstrated increased knowledge of MyPlate guidelines and had more opportunities to eat as a family.

Conclusions: Nutrition education is crucial to a child's development of a healthy lifestyle. In order to keep children engaged, learning activities must be fun. While the project faced challenges with inconsistent attendance, limited attention spans of older children, and resistant attitudes, these were offset by seeing participants enjoy the learning activities, demonstrate their new knowledge, and eat dinner with their families."
141- La Casita Service Learning

Christian J. Williams

I did a service learning project of 45 hours at La Casita during the Spring Semester of 2017 as part of the FLL 333:Foreign Languages Internship/SL class. I selected Community Partner La Casita because I had the opportunity to teach an English as a Second Language class, and my career goal is to be an English as a Second Language teacher. My service learning at La Casita was significant because it taught me how to do lesson planning, teach adult learners and to inspire the students to learn. The problem that the work attempted to solve was the limited English language knowledge of the adult learners. Throughout the semester I taught an English as a Second language class. I listened to the other teachers for teaching advice, used the teaching manual from The Literacy Council, and used ESL worksheets, exercises and activities from the Internet. The scope of the project included La Casita, individuals interested in improving their English language skills in the greater Birmingham area, and the staff and tutors from The Literacy Council. The sources of evidence for the effectiveness of the ESL class at La Casita are the students, tutors and supervisors from La Casita and the Literacy Council. These sources evaluated and expressed gratitude towards the tutors at the ESL class at La Casita. I learned invaluable lessons about how to manage and teach a classroom of adult language learners. This service learning reinforced my desire to be an English as a Second Language teacher.

142- Access for All: Supporting Cahaba's Vision for Health Care

Gabrielle Brow, Nicole Lassiter

"Foreign Language Internship/SL, FLL 333-00B:

For our service-learning project, we partnered with Cahaba Valley Health Care, a nonprofit organization that provides dental and vision care to people of Jefferson and Shelby counties who have limited access to healthcare and that focuses on serving Hispanics. Cahaba Valley only has eight paid staff members; thus, its main support comes from volunteers, interns, and service-learning students. As bilingual service-learning students, we helped staff members facilitate health clinics. We catered to the organization's focus on providing care for Hispanics by serving as interpreters during clinics and communicating information about resources to Spanish-speakers. In doing so, we contributed to Cahaba Valley's mission.

As Spanish interpreters we offered a means of communication between patient and physician. Together with our community partner we worked to diminish the lack of healthcare access for underserved populations.

Initially, we felt nervous and thus made many grammatical errors. As time went on, our language skills strengthened, and this allowed us to open up to the patients. Our work showed us tangible evidence of the inequality within our healthcare system, and the specific difficulties faced by immigrants when receiving care.

Each week a reflection was required that included some discussion of a particular article. These were related to the motivations behind service learning, and also offered information on being an immigrant in America. This subject matter was beneficial in teaching how to get the most of out the experience, how to write a meaningful reflection, and in giving us more insight into the lives of our patients."
143- Salud: Teaching Latino Preschoolers
Lissette Ornelas, Lauren Ranson, Shelley Roman
"Introduction: The Pelham YMCA Preschool is a classroom of Latino students ranging from three to five years old whose parents attend the LEAPS (Learning English and Parenting Skills) program. The preschool provides basic education to children who speak English as a Second Language. The children are eager to learn despite language limitation, fluctuating attendance, and cultural differences.
Aim(s): To increase awareness of healthy lifestyles (nutrition, hand hygiene, oral care, and exercise) in order to promote healthy behaviors and overcome cultural and language barriers to facilitate assimilation into the American culture.
Methods(s): A combination of oral presentations, demonstrations, and images were implemented to provide auditory, visual and kinesthetic learning opportunities. Age-appropriate videos along with hands-on activities, such as hand washing, coloring sheets, brushing teeth, eating healthy snacks, and exercising were incorporated into 3 teaching sessions, each lasting 20 minutes.
Result(s): For the hand hygiene lesson, preschoolers were introduced to the concept of germs and how to properly wash hands using visual aids, demonstration, and repetition. For the oral care lesson, preschoolers learned the importance of dental care in reducing risk for cavities. For healthy eating and exercising, children were encouraged to taste veggies and fruit, be creative and playful by participating in exercise games.
Conclusion(s): Attendance and participation varied by session and sub-group. About half of all children correctly answered most questions at the end of each activity. Fluctuating attendance at each session made it difficult to measure impact. Overall, a positive effect on preschoolers and a meaningful service-learning experience."

144- Sugar and Spice Are Not Always Nice
Elisabeth Evans, Denisse Pulido, Giorgia Wilson
"Introduction: Introduction: Project Horseshoe Farm is a small organization created in 2007 on the ideas of service, community, and leadership development. The day program provides social interaction for older adults and people with disabilities. In this population, there is a correlation between increased consumption of salt and sugar and the occurrence of hypertension and diabetes.
Aim: The purpose of this project was to educate participants about: (1) how increased sodium and sugar intake can lead to hypertension and diabetes; and (2) how identify sodium and sugar on food labels.
Methods: The student group administered a pre-survey to 24 participants, revealing 82% did not know the daily recommendations for sodium and sugar along with 91% seeing the importance knowing these recommendations. The objectives were to teach participants how to monitor daily intake of sodium and sugar through two educational sessions. Session one, participants played „Sodium Jeopardy“ with questions based on sodium and hypertension. Session two, participants played „Wheel of Fortune“ with questions based on sugar and diabetes. Basic nutritional principals were implemented for usage about hypertension in relation to salt intake and sugar related to diabetes. The students provided a post-test to determine the academic learning.
Results: Results revealed, 70% were able to relay the correct daily sodium intake and 91% noted high intake of sugar can lead to diabetes.
Conclusions: The group concluded that health literacy can be addressed through education, leaving the participants increased knowledge about the effects of sodium and sugar in relation to hypertension and diabetes."
145- Elia's Community Service
Elias Barco

"While pursuing a certificate of Spanish for Specific purposes from UAB, I chose to do service learning to experience first hand the demands of a future career. With the help of my professor and the Department of Guest Services at UAB hospital as the community partner, I decided to use my Spanish skills. The Guest Services Department offers free medical language interpretation to patients with limited English proficiency. This approach greatly impacts our community, facilitating a better communication between patients from different cultures and the medical providers. Thus, improving the lives of these members of our society and helping doctors and nurses have a clear understanding of the patients symptoms for a better diagnosis.

Under the supervision of an experienced interpreter I applied the Spanish skills in medical terminology learned in the classroom. I worked eight hours a week for twelve weeks throughout the UAB medical center (Kirklin clinic, UAB highlands, Psychiatry Unit, Rehabilitation, Maternity Ward, ER, ICU etc.), translating for doctors and patients from English to Spanish and vice versa. The course material was a useful guideline that prepared me well in this project. This service learning project in the workforce in a professional setting has taught me punctuality and responsibility as well as respect and compassion for others.

I am very thankful for this opportunity given to me. The UAB Guest Services Department is a committed community partner, has helped me obtain a national certification in English-Spanish Medical interpretation. With this accomplishment I feel ready to use my interpreting skills to benefit Spanish speakers and medical personnel."

146- The Importance of Inclusion of Diversity
Yadira Muguia

"The Importance of Inclusion of Diversity

The city of Birmingham has gone through difficult stages in terms of diversity. Today, the city is so diverse and progressive as it strides towards including people from different origins. At this time, I am doing my internship at the Birmingham Museum of Art. I have had the opportunity to work alongside the Education Department on the museum's smart guide, translating and interpreting the information that already exists in English. Through my internship, I have witnessed and been a part of different events that take place in the museum associated with different cultures. Through my research I will be investigating the different cultures that have made a presence in our community and the influence that diversity has made in the city of Birmingham."
147- Reaching Out to Underserved Populations
Jordan Oldacre, Caitie Stovall, and Allison Thomas

"Introduction: e3 Partners is an organization whose purpose is to partner with different organizations and gather resources in communities to serve the underserved. Copious healthcare disparities were observed in the city of Tarrant, Alabama, and assembling a health clinic appeared to be the best way to provide beneficial health screenings and referrals for this low-income population.

Aim(s): A free health screening was held to assess physical and emotional setbacks and to provide necessary information for local referrals. The goal is to aid a poverty-stricken community by providing access to health screenings.

Method(s): Students assisted a poverty-stricken community by providing access to health screenings. Objectives included executing a free comprehensive health screening and making appropriate referrals for identified disparities. The objective was met by enlisting help from professionals and by obtaining necessary assessment tools to identify concerns. Implementation occurred through partnership with a local church to host the clinic. Volunteers assessed vital signs, obtained blood glucose, and provided supplemental education.

Result(s): The clinic screened over 40 patients total. The screening endeavor was accomplished by obtaining necessary resources, volunteers, and advertising to community residents.

Conclusion(s): Challenges included recruiting volunteers and finding essential resources for the screenings. It was rewarding to meet community needs by donating simple items like medications, reading glasses, and toothbrushes. It was also gratifying to hear personal testimonies and provide hope through dissemination of previously inaccessible resources. After reflecting on the experience, the clinic exceeded e3 Partner's expectations and allowed us to reach a larger population than expected."

148- Managing the Stress of Homelessness
Michael Gray, In Knoll, Tracy Smitherman, Audrey Swee

"Introduction: Homelessness is high stress life event. The Firehouse Shelter addresses chronic homelessness among men in Birmingham, Alabama, and provide services for residents to achieve their highest potential. While the Firehouse Shelter provides basic needs for food and shelter, resources to address the mental health of these men are limited.

Aims: This project intends to promote coping skills and foster stress management among Firehouse Shelter residents.

Methods: The men watched a video on stress management strategies like meditation and exercise. The video format allows the presentation to be used long term and provides a sustainable resource for Firehouse Shelter residents. The video can be presented bi-weekly during Wellness Wednesday programming or during the evenings as the men prepare for sleep.

Results: The video and a facilitated discussion of stress management was presented to Firehouse Shelter residents as part of the Wellness Wednesday programming. A post-presentation focus group revealed that the men found the program reduced their stress. They also expressed the desire to continue practicing the strategies to cope with stress.

Conclusions: Implementing stress relief programs for the homeless is complicated by low literacy levels, a chaotic environment, and limited time and resources. These challenges can be met through efforts that build rapport, establish a stable routine, and create low-cost reusable educational resources. Students gained insight to the complexity of chronic homelessness and the difficulty finding resources to address the multitude of underlying issues. This experience lead the students to build empathy, suspend judgment, and view the person holistically."
149- Healthy Pregnancy Education for New Mothers
Click, Kiley; Foley, Kristina; Jones, Morgan; Robinson, Brittany Kay.
"Introduction: Cahaba Medical Care (CMC) is a Federally Qualified Community Health Center that provides primary medical care services to a wide variety of individuals in several rural counties in Alabama, notably low-income individuals. A major health disparity in this area is related to the overwhelming availability of unhealthy food options combined with a limited knowledge and limited availability nutritious food options. This can lead to an increase in health disparities in the maternal population of this community.
Aim(s): To provide an easily accessible educational resource for pregnant women with information on healthy choices that are easy to understand and readily available.
Method(s): A phone app was created for pregnant women at CMC containing evidenced-based reading materials, pertaining to maternal health and diet, that are easy for the layperson to read. This idea came from observing that the majority of pregnant women at the clinic had smartphones. The ultimate goal was to improve maternal health, especially in regards to nutrition. A phone app provides a resource for answering a pregnant women's questions when contacting a medical person or referencing a pamphlet is not practical.
Result(s): The development of the app provides those working with the maternal population a resource that can improve maternal outcomes, while avoiding the printing costs associated with a pamphlet.
Conclusion(s): Education regarding certain aspects of pregnancy was a major request from pregnant women who were interviewed. Providing an easily downloadable phone app, will provide a means of education that will be readily accessible by the patient, and will be an easily sustained intervention."

150- Enhancing Health-Science Education in Rural Communities
Grace Morgan and Dylan Yaeger
Introduction: West Central Alabama Area Health Education Center (AHEC) is a nonprofit organization that helps small rural communities recruit healthcare providers and obtain health education resources. The identified need in the community was reproductive health education for middle school students.
Aim(s): The middle school health science teacher requested a presentation on STIs based on the middle school core curriculum. The purpose of this project was to educate middle school children in rural communities about reproduction and healthy sexuality.
Method(s): The student group developed a PowerPoint presentation and interactive ÒTabooÓ game, utilizing teamwork to educate the middle school participants about sexual health education. The objectives of the lesson included basic understanding of the reproductive system and sexually transmitted infection (STI) prevention. The student group developed and delivered a pilot presentation, adjusting the presentation based on need. During the pilot evaluation, gaps were discovered in the education material. After a reassessment was completed, the students redeveloped the teaching information to fill educational gaps and included updated teaching resources. Audience members were given a post-evaluation form to evaluate the intervention.
Result(s): Results revealed, 76.5% of the population ""strongly agreed"" that the presentation was helpful, 17.9% agreed that the presentation was ""somewhat helpful,"" 4.8% gave the presentation a ""neutral"" review and only 0.69% of the population found the presentation unsatisfactory.
Conclusion(s): The student group learned there is a deficit of knowledge related to sexual health education in this population. Recommendations include, breaking down the content into multiple lessons would allow for greater understanding of the material."
152- Comparing Urgent Care Clinics
Jill Porter, Ella Von Canon, & Gabrielle Walker
"Introduction: Cooper Green Mercy Health Services in Birmingham, Alabama is a full service ambulatory care facility that provides an urgent care clinic to serve the indigent residents of Jefferson County. Cooper Green would like to increase the quality of care in the clinic. The findings from the impact project will be used to create a course of action that may be implemented to improve medical treatment to benefit the community.
Aim(s): The goal is to insure the indigent population is being provided comparable services as other residents in Jefferson County.
Method(s): The team plans to create a viable strategy with the hope of applying a change to positively impact the quality of care. An interview style survey was conducted with four urgent care clinics in the greater Birmingham area. The survey consisted of questions related to wait times, patient volume, services offered, and the number of staff. After the surveys were conducted, feedback was analyzed to prepare qualitative data.
Result(s): Cooper Green had the longest time in the waiting room for patients at forty minutes. For exam room waiting time, Cooper Green was second fastest with a sixty minute waiting time and had the least amount of average patient volume per day at forty patients per day.
Conclusion(s): The community was impacted by offering resourceful ways to improve the clinic wait times. The suggestions included were the following: implementing a nurse’s station specific to vital signs, a telephone triage service, and an expansion of rapid laboratory testing."

153- Maximizing Mental Health: Minimizing Depression in the Elderly
Ebony Morgan, Haley Hulsey, Timothy Moorer
"Introduction: Jefferson County Housing Authority provides housing to the elderly population for those who have a fixed income and qualify for Section 8 housing. Depression and social isolation are common factors within the community that require intervention.
Aims: Our goal was to decrease social isolation while increasing mental health within the community.
Methods: Students went door to door within the community and handed out a schedule of events that increased social interest and participation, provided an information session on signs and symptoms, community interventions, and methods of communication for loved ones with depression, and provided an instructional painting class to promote creativity as well as provide an area for social enrichment. A packet filled with crossword puzzles and adult coloring pages was also provided to each resident to promote mental stimulation.
Results: 15-20 residents attended the Depression Information Session and were very engaged throughout the presentation. They asked questions and volunteered to share personal stories. For the instructional painting session, six residents attended with each resident painting their own version of the instructional artist’s painting. The painting session was so popular that residents have asked that this become a regular activity. Students were praised for implementing this activity. New residents came to each activity and one resident in particular attended every event that was provided.
Conclusions: Involvement remained the biggest challenge, however each resident that attended each activity was impacted positively and took another step towards defeating social isolation and/or depression."
154- Stress Less
Joseph Harris, Channing Huber, Katelyn Tankersley
"Introduction: Project Horseshoe Farm's mission is to create a stronger community, improve the quality of life of members, and prepare leaders in the community. Poverty, limited resources, and family relationships are factors that increase stress which can have a lifelong impact on mental and physical health of children.
Aim(s): The purpose of this project was to inform rural elementary children, grades third through fifth, about what stress is and provide resources of how to manage stress.
Method(s): The objective of the lesson was to help the participants identify factors that cause stress along with resources to manage stress. Activity one was bingo, teaching about different methods of managing stress. Activity two was animal yoga using a spinning Wheel of Fortune where participants spin and practice yoga poses. The group gave participants information to take home about methods for stress relief.
Result(s): Due to scheduling problems with the elementary school the group adjusted and presented the content to the Adult Day Program participants along with other community members. The group administered a pre-post surveying the participants with an age range of 22 to 50. Results revealed many of the individuals were not aware of many evidence-based coping strategies for stress before the intervention.
Conclusion(s): The group was successful presenting about stress to the community even though the targeted population was not available. Challenges faced allowed the group to adapt, adjust, overcome and impact the community in a positive way."

155- Poison Control: Educating School-Aged Children about Chemical Safety
"Paymon, Ciera Turman, Jessica Whitt, Georgia"
"Introduction: Urban Kids is located at the Urban Ministry building in West End Community. They have served the community for more than 20 years by providing year round, high quality youth programs without charge to families. Currently, 24 2nd-5th-grade students are enrolled in the after school program.
Aim(s): The goal is to educate the children and staff of the dangers of household chemicals and on the appropriate response in the case of a chemical emergency.
Method(s): Children and staff were educated the children and staff on the dangers of household chemicals, providing teaching materials about chemical safety and the appropriate contact information when experiencing an emergency. The target population is staff and elementary age children at Urban Kids. A game of Jeopardy was used to teach factual information about poisons and chemical safety. The children were given a poison prevention coloring book and an emergency contact worksheet for them to take home to complete with their guardians.
Result(s): The children were divided into two groups with one adult spokesperson to play a game of Jeopardy. Explanations were given throughout the presentation.
Conclusion(s): The main challenges of this service project were identifying organizations that provide resources concerning poison control. The reward is knowing that we were able to provide the staff and children with accurate and potentially life saving information on chemical safety. The children had fun while learning information about chemical safety. They were excited to take study material home to share with family and friends."
156- Sprout in Science: Growing Successful Students
Paige Severino, Lindsay Jenkins, Rebecca Slowinski, Ashley Boggs, Haley Edwards
Sprout in Science is a project focusing on expanding traditional education outside of the classroom. Sprout in Science is a website that consists of educational resources for parents, teachers, and students, such as video games, books, and at-home experiments that facilitate STEM education and exploration. The website also conducts surveys targeting parents, teachers, and students regarding their views on the importance of STEM education and the current educational resources available to each group. The surveys concluded that there is a lack of accessible resources for parents to aid them in facilitating their child's education. Teachers also expressed the belief that parent involvement and education beyond the classroom is extremely important, and that resources to aid in this are lacking. Overall, the goal is to provide a resource for students to grow in STEM and spend time outside of the classroom learning and exploring.

157- Internal Factors that Affect Group Project Success
"Simranjit Kaur, Sureena Monteiro- Pai, Alesha Amerson
The groups formed in the STH 250 Primetime Leadership course have immense opportunities and resources to plan projects and achieve success in their personalized goals. STH 250 is the second course in a two semester leadership development sequence. In the first course, STH 151 Problem Analysis and Project Planning, groups are formed and a detailed outline for a project is formed. However, groups are not always successful in completing preset goals. The failure of these groups may have internal and external contributing factors. Common internal factors include lack of communication, lack of internal organization, and insufficient leadership. External factors include loss of a stakeholder and lack of external support/funding. This study examines the correlation between internal group organization and communication and the success of the group towards achieving project-specific goals and driving their project to completion. This study was conducted by surveying students within the STH 250 class and quantifying their responses. Questions are in multiple choice format so that data can be appropriately quantified along with three short answer questions to gain understanding on each individual group's definition of success. We will use this data to educate future STH 250 students in how to build the most successful STH 250 project.
159- The Effect of Cyber Seniors on Empathy and Literature

Erika Aho, Darian Hagan, Josh Freund, Taylor LaMay

Smart phones and computers are a necessity in today's society. Everything has become digitized"maps, phone books, communication"and because of this, the older generations must adapt in order to thrive. Smartphones have been around for almost ten years, and many senior citizens are unfamiliar with their many uses. Americans are using smartphones at an increasingly high rate. As of a survey in 2015, the percentage of Americans owning a smartphone has almost doubled from 35% to 64%. A large portion of these users say that they used their phones to keep up with news and local events, as well as navigation and driving assistance. It is important that this information is accessible to everyone, including seniors. As part of our service learning project in our Literature class, we visited a group of Seniors every Friday through a program called Cyber Seniors. Cyber Seniors assists and develops the knowledge base for seniors in order for them to better utilize advanced technology. By incorporating service learning into a literature course, we are given a chance to look deeper into the motivations and thinking of our seniors, making us more empathetic and understanding towards them, and therefore better able to understand the characters and meanings of works of literature. By making students more empathetic, we create a tolerant and patient work place.

160- Practicing Empathy Through Service Learning with Seniors

Bella Tylicki, Sara Harper, Bo Brown, Flint Bateman

"The intent of our project was to evaluate our experience in a service-learning course to enable empathy in the realm of literature. We applied that experience to empathize with the characters in the novels and short stories we read in class.

At the Levite Jewish Community Center, we volunteered to help senior citizens understand technology. They would bring in phones, laptops, and tablets and ask us about things like e-mail, texting, and social media. Our evidence is from personal interactions with the seniors as they shared their stories, as well as in class reading assignments. We read about characters who went through hardships, and listening to the seniors tell about their lives helped us to better empathize with these characters.

We learned that to fully empathize with someone, we must be willing to hear his or her story. When reading literature, this mindset leads to a new perspective of each character. Direct interaction with our Cyber Seniors was an effective way for us to exercise empathy first hand. At the end of our sessions with the cyber seniors, we completed two character analyses “one of our seniors and one comparing ourselves to a character from the class readings.

This service-learning experience and the practice of empathy encouraged us to ignore the intergenerational gap and interact with the seniors more personally, allowing us to build unlikely relationships. It was enriching for both the seniors and students. We gained a new sense of empathy that made us more effective readers of literature."
161- Fostering Empathy and Connecting with Literary Characters Through Service Learning

Angie Lee, Nikki Mallepalli, Shruti Simlot, Allen Yazdi

The Oxford Dictionary defines empathy as “the ability to understand and share the feelings of another.” It has been found that the ability for college students to empathize with others has significantly dropped since 2000. Now called “Generation Me,” today’s college students are exposed to various factors which may have caused this drop in empathy, including the rise of social media (Swanbrow, 2010). To amend this decline in empathy, students in the Service Learning Introduction to Literature course at UAB collaborated with Collat Jewish Family Services in a program entitled “Cyber Seniors.” Each literature student was paired with a senior citizen with the purpose of teaching them to perform basic functions with their technology, including texting and taking pictures. The UAB students met with their Cyber Senior students on a weekly basis for six weeks. While the main purpose of the program was to ease the senior citizen students into using technology to remain up-to-date in society, the UAB students emerged with an enhanced ability to empathize with others based on the personal relationships they developed with their Cyber Senior students. A recurring theme throughout the literature class involved using empathy developed through the service learning experience when analyzing characters that would normally garner apathy.

162- Empathy within Literature and Volunteering

"Gopiann Shah
Kara Rhodes
Miranda White
Keyley Jackson"

"Technology has been such an important part of our daily lives. As a society, we have gotten so attached to our phones because of all the services they can provide for us: instant connection to our family and friends, maps, weather apps, and many more. If we didn't have our phones for a day, we would feel so lost and disconnected, and this is how some of our Cyber Seniors felt. Through this program, we hoped to connect our students with their friends and family and to teach them the world of technology.

As an English class, we all went to the Levite Jewish Community Center to help out the seniors in their program. Everyone was paired up with a single cyber senior, and we stayed with that senior for the entire six weeks. This helped us create a close relationship with our senior. We spent time helping them with any questions that they had about anything in the realm of technology. For example, we answered questions about working the Facebook app, creating Calendar events, and making albums. For most of this project, we relied on information about empathy that we learned from various stories and poems we read in class, and then we compared it to our own experience. By connecting ideas from literature and the actual experience, we gathered a more holistic meaning of empathy, which is the main focus of stories we read in class."
163- Gender differences among UAB students use of the recreation center and their perception of attractiveness

Aubrey Baker, Tressa Buckland, Jeffrey Franks, Raven Johnson, Austin Merritt, David Shepard, and Nkereuwem Samuel Unawana

We set out to study the University of Alabama at Birmingham's college student's health behaviors and use of local health facilities/parks. It is suggested to perform more than 150 minutes of moderate physical activity each week. However, many college students fall short of these guidelines, which led us to the question of: What determines a student's exercise adherence? Our data was gathered from a quota sample of 234 students at the University of Alabama at Birmingham. Paper surveys were distributed across campus during a 2-week period in February 2017. These surveys included questions from a similar community-based study, as well as measures endorsed by the BRFSS and the National College Health Survey. We found there to be a relationship between gender and time spent using the university recreation center (p=0.01) as well as gender and opinions on whether or not people think physical activity makes you more attractive (p=0.0097). According to the Exercise and Sport Science Reviews journal, a determinant of exercise adherence is an individual's self-efficacy. However, our data showed that another major determinant of an individual's exercise adherence was self-perception of attractiveness based on exercising. From our data we can gain a better understanding of people's motives for physical activity and use this knowledge to create interventions focused on increasing physical activity.

164- Using Empathy to Bridge the Generation Gap between Senior Citizens and Undergraduate Students

Cody Clemens, Gail Hoffman, Anna Krum, and Megan Richard

"Motivation: Cyber Seniors is a service-based organization that aims to bridge the generation gap between senior citizens and undergraduate college students by educating seniors on current technology.

Methods: Each student worked one-on-one with a senior citizen, known as a cyber senior, at the Jewish Community Center in Homewood, Alabama over the duration of six weeks in order to educate the seniors and advance their knowledge of technology. Over the duration of the project, a relationship with the seniors was established. Each student implemented his or her experience from these relationships into a comprehensive project titled an I-land map. Additionally, our experiences with the cyber seniors were applied to our analysis of short stories and poems related to empathy.

Results: The seniors were open to learning new things, interested in applying knowledge to their personal interests, and overall, the generation gap was not as wide as expected. The I-land maps created by the students aided in fostering the development of relationships between the cyber seniors and undergraduate students.

Implications: Creating an I-land map helped us to develop a deeper relationship with the senior we worked with. The I-land map served as an analysis of the character of our senior partner. The creation of the I-land map forced us to understand each senior as a character and develop a relationship with them. The relationships built allowed us to empathize with the seniors we worked with. In the same turn, the more we empathized with our senior pal, the easier it was to train them and work with them in a way that benefitted them the most."
165- 2017 Science Olympiad Regional Tournament
Courtney Barkley, Angela Chieh, Katelynne Herron, Amanda Lawrence, Sureena Monteiro-Pai, Ian Thompson, Dionna Walker
Science Olympiad is an annual tournament held at UAB in which middle school and high school students are given the opportunity to demonstrate both their knowledge and their critical thinking skills in a variety of scientific disciplines, ranging from astronomy to aerodynamics to forensics. This competition also functions as a recruitment event by allowing UAB an opportunity to showcase its facilities to prospective students. Preliminary data suggested that students with positive experiences at UAB’s Science Olympiad had a higher interest in attending college at UAB, so the final goal of this project was to make the experience enjoyable for all participants. This project aimed to improve the overall quality of the UAB’s Science Olympiad in the future by reorganizing the leadership roles and the infrastructure of the tournament. To measure success, all parties involved in the tournament were asked to answer a short survey to indicate their satisfaction with the execution of the competition.

166- Alabama Wildlife Center Partnership
Michael Casper, Shannon Lukens, Jesse Stillwell
As the city of Birmingham and its surrounding urbanized areas grow, the wildlife that Alabama is home to suffers. Thus, organizations like the Alabama Wildlife Center are integral to preserving native wildlife through rescue and rehabilitation efforts. The Alabama Wildlife Center rescues approximately two thousand injured birds annually, and makes every effort to return them to their natural habitats after nursing them back to health. However, the center is a completely nonprofit organization, and thus relies on the efforts of volunteers. Our goal is to create a partnership with the Alabama Wildlife Center to provide financial and volunteer support. Further, this project had the secondary goal of introducing university students to the vibrant wildlife that coexists around them in an effort to create a group of students wishing to volunteer with the center. This project aims to create a long-term project to provide these support systems. If the project garners enough interest, the project will become a university organization that can continue to provide the AWC with the aid they need. This organization would allow the partnership to grow and as it does so, it will result in more support for the center. This past semester, our group established a strategy for how we will implement this plan.
167- Better Cost, Better Cause

Amanda Mays, Cheyenne Sanchez, Jared Sluss, Amber Jones, Daniel Hughes, Kewsi Butler

"We are Workshops Hydroponics, we focus on growth in job skills and in produce. We do this by training people with disabilities in farming skills that can be duplicated in the outside job force.

Workshops, Inc, is a nonprofit that is seeking to develop a new enterprise that will allow them to create employment and training opportunities for people with varying disabilities and other potential job entry barriers.

Through the growth, harvesting, and selling of the produce by use of hydroponics, Workshops, Inc. will have the capability to employ more people and train them for future jobs. Some of job skills that Workshops, Inc.'s clients will develop include communication, customer service, product management, and strong work values. These skills will be acquired by selling the product to customers, learning how to describe what they do to others to increase sales, and daily plant care. Equipment failure, which is bound to happen at some point, will teach employees problem solving skills of how to think on their feet to handle situations and stress without letting it take control of them, by making a supervisor aware there is a problem and assisting in fixing the problem. System failures will teach employees that things don't always go as planned and duties may change as a new need arises. These newly acquired skills will help to enable these clients to transition into the job market in potentially new areas than traditionally seen with Workshops, Inc."

168- Cones 4 a Cause: Sweet and Savory Cones

Kesha Oduyela, Brystin Arnold, Brenton Capers, Jesse Shoop, Clarissa Parker, Namisha Adamson, and Bashar Khalaf

We are working with Workshops Inc. to provide them with a way to provide training and employment opportunities to the mentally and physically disabled people they serve in the city of Birmingham. We are doing this as part of our Non-Profit and Entrepreneurship strategies class at UAB and because we are all interested in how non-profits work in general. We have pitched for them to open a food truck that sells sweet and savory cones filled with different pie fillings of the customer's choice from our daily menu. Our intent is to work with the Board of Directors and the Avondale community to bring this idea to life and serve not only the workers of Workshops Inc. but also the people of Avondale and Birmingham delightful food. This food truck would help employ and train a portion of the 35 people on the waitlist of Workshops Inc and provide Workshops a revenue stream in which they can pay to hire these new people.
169- Animal-Assisted Therapy in Patients Hospitalized with Traumatic Spinal Cord Injuries
Maggie Leopard

Spinal cord injury (SCI) is a serious impairment in which the spine is damaged causing permanent motor and sensory deficits. These injuries often occur through traumatic events such as gun shots or motor vehicle crashes, creating a situation where there are frequently drastic changes in affect or onset of psychological disorders like depression. Changes in the affect of a patient may determine how well a patient recovers from an SCI. Animal Assisted Therapy (AAT) has been defined as a goal-directed intervention in which an animal meeting specific criteria is an integral part of the treatment process. This study evaluates the emotional affect and rate of rehabilitation engagement among 23 patients who were recently (within the last several weeks) diagnosed with a traumatic SCI and are currently in a rehabilitation hospital. Patients were randomly assigned to receive occupational therapy with AAT or without AAT. The Positive and Negative Affect Scale (PANAS) was used to measure affect before and after each AAT session while the Hopkins Rehabilitation Engagement Rating Scale (HRERS) measured the extent to which the patient engaged in therapy. Patients who received AAT expressed greater reduction in negative affect than patients who did not receive AAT (t(20) = -1.82, p<.10) during the first OT session. No other between-group differences were statistically significant. This could be due to other experiences that might change the patients affect, such as pain or illness. Future research should recruit a larger sample size for higher validity and consider more objective mood measures.

170- Preventing Multiple Inflammasome Subset Assembly Diminishes Nociceptive Sensitivity in Mice
Erin Ross, Catherine Jones, Savannah Dewberry, Tammie Quinn, Robert Sorge

The inflammasome, a general name for a family of protein complexes, is critical for activating pro-inflammatory cytokines and initiating cell death in the inflammatory response. Additionally, persistent inflammasome activity is associated with elevated nociceptive processing and chronic pain states. Therefore, seven mouse knockout strains (AIM2, ASC, NLRP3, Casp1, Casp11, IPAF, and ASC/IPAF) were tested to investigate the role of inflammasome activation in nociception and persistent inflammatory hypersensitivity. Assays included tests for thermal nociception (radiant heat paw withdrawal, tail-withdrawal, and hot plate), mechanical sensitivity (von Frey), and ongoing inflammatory nociception (Complete Freund’s Adjuvant). Overall, thresholds of single knockout strains did not produce a significant trend when compared to wild type controls. However, caspase-11 and IPAF/-/- animals tended to be less sensitive on multiple tests. Double knockouts of ASC and IPAF were created effectively reduce numerous inflammasome subsets. The ASC/IPAF/-/- mice consistently demonstrated reduced sensitivity in all tests, suggesting that preventing assembly of many inflammasome subsets effectively diminishes nociceptive sensitivity. Inflammasome demobilization has future clinical implications as a target for treating multiple human chronic pain states.
171- Human Sex Trafficking
Noah Probst, Kristen Baars, Nick Arnold, Becca Brooks
The International Bill of rights states in Article 4 that “No one shall be held in slavery or servitude; slavery and the slave trade shall be prohibited in all their forms.” Human trafficking is commonly called “modern day slavery” and is the fastest growing criminal industry in the world. Worldwide, there are still 45.8 million slaves. Human trafficking can be defined by forced labor, sexual exploitation, or organ trafficking, however the fastest growing is the sex trafficking industry. Sex trafficking is more prevalent in countries with weak justice systems, where it is unlikely to be legally punished for any sort of sexual trafficking acts. Out if the 4.5 million people being sexually exploited globally, 2 million are children. Children are the most vulnerable, since they have no legal control over their lives, and no means for providing for themselves.

172- The Influence of Media Bias on the College Voter
Benjamin J Harvey, Sierra Anderson, Josiah Robinson
"With the trends of the past year having been consumed by the American political race, a plethora of underlying issues rose to the surface of public knowledge. One of the most controversial of these would be the reality of media bias. Be it through hyperbole or a lack of information, the large media outlets have been shown to conduct their reporting through a lense of a particular political agenda. This then creates a difficult situation for a voter to listen to the correct information and thus make an informed vote.

In this existence where the popular press has far reaching capabilities, it is imperative to gauge their influence over the population. A specific and significant demographic to focus on is college students who are arguably a key pillar of the future of this country. To determine the extent to which college students have been impacted by media bias, we conducted a survey on the UAB campus, also including preliminary research on examples of unreliable news in this past election cycle.

What the study has found is that there is immense distrust among college students in the media source that is associated with the opposite political party. However the largest discovery is that though there is an overwhelming lack of satisfaction with the government, the majority of college students deemed modern media as “Reputable.” Though this data confirms already understood knowledge of media bias, the revelation of a larger disconnect in the understanding between the government’s quality and its media’s reputability."
173- How Do United States' Politics Affect Clean Energy?
*Abigail Franks, Sara Harper, Megan Richard*

The problem that we are researching focuses on the impact politics have on the earth, specifically the use of clean energy. Due to unpredictable weather patterns and the rise in sea level, it is becoming more evident that the human population and its behavior is negatively impacting the environment. Because of this, something must be done. Through this poster, we will explore how politics and group efforts are affecting the environment, while presenting evidence proving how political change can either help or harm the fight for sustainability and clean energy. Through our research and interviews, it can be shown that clean energy positively affects job growth, natural resources, and saves money in the long run. Because of our country's fear of change, however, both sides of the political spectrum are struggling to find a balance. By exploring the interconnection of policies' actions, starting locally on UAB's campus, and showing how it affects state and national policies, we will explain the vitality of clean energy policies. Sara Harper's research focuses on local government and policies, and she will explain what our community is doing to combat this issue. Abigail Franks will then proceed to the state's impact and policies, and what actions are affecting Alabama. Megan Richard will focus on the national repercussions, and explain how all policies affect each other. In conclusion, more needs to be done at the political level to promote clean energy use and to save our planet against the strain of the human population.

175- Family Court Crisis
*Kimberlie Payne*

"This policy analysis determines the efficiency of laws that address child custody when domestic violence is present. The significance for this policy analysis lies in the question of whether or not it is achieving its objectives. This Policy analysis is a systematic examination and explanation of these policies. It includes why they were developed and the components that determine the efficiency of the policy. This work defines domestic violence (DV) as a social problem. This problem is expanded when it pertains to child custody. It is critical to understand the definition of problems that require government intervention. The way in which a social problem is defined will determine how corresponding policy is designed.

The research uncovers possible causes that have been studied for decades. Included is a survey of professionals such as child custody evaluators, judges, attorneys, and domestic violence program workers. This survey seeks to understand the state of mind of professionals who encounter DV and child custody which would influence the behavior and/or decisions. I introduce arguments that arise from activist groups and those who serve in the courts. Opposing arguments are controversially divided along gender lines.

Although this paper is educational and resourceful, the overall objective is to ensure that the policy is achieving a reasonable level of justice; therefore, recommendations are included in this work. The recommendations derive from my own observation, the Department of Justice, victims, and an array of experts who have specialized in the field of domestic violence."
176- Obesity and symptomatic knee osteoarthritis

Marie Michenkova1, Chirag Y. Patel1, Kathryn A. Thompson, B.S.1, Kristen M. Woods, M.A.2, Ethan W. Gossett, B.S.2, Adriana Sotolongo, M.P.H.2, Roger B. Fillingim, Ph.D.3, Laurence A. Bradley, Ph.D.2, Burel R. Goodin, Ph.D.1, & the Understanding Pain and Limitations in OsteoArthritic Disease (UPLOAD) Study Team

Symptomatic knee osteoarthritis (KOA) affects roughly 16% of the American population over 45 years of age (10 million) and produces significant functional impairment of the lower extremities. This study sought to characterize the associations of obesity with subjective and objective measures of KOA clinical symptoms. The sample consisted of 120 middle-aged and older (age 45-77), community-dwelling adults (58% men) with KOA. Participants completed the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), a self-report measure of KOA-related pain, stiffness, and physical functioning. They also completed the Short Physical Performance Battery (SPPB), which consists of three measures of lower-extremity function: standing balance, 4-meter walking speed, and ability to rise from a chair. Performance on the SPPB is quantified into a single index of overall physical function. Height and weight measurements were collected to calculate body mass index (BMI), which was categorized as normal (18.5 “ 24.9), overweight (25 “ 29.9), and obese (30). Results revealed that 51% of the sample was obese, 30% was overweight, and 19% were normal weight. Obese participants reported significantly greater symptoms of pain (p = .038), stiffness (p = .003), and physical functioning impairment (p = .001) on the WOMAC compared to overweight and normal weight participants. Similarly, obese participants also demonstrated significantly worse lower extremity function on the SPPB compared to the overweight (p = .021) and normal weight (p = .042) groups. Results suggest that obesity is a modifiable risk factor that likely contributes to greater severity of KOA symptoms in middle-aged and older adults.

177- Baclofen and opioid synergism in mice: New insights and potential treatments

Remy Y. Meir, Stacie K. Totsch, Aaron R. Landis, Tammie L. Quinn & Robert E. Sorg

There is a desperate need for opioid analgesic options for chronic pain to address the recent recommendations of the CDC and FDA. Unfortunately, there are few alternatives for moderate to severe chronic pain aside from opioid drugs. Therefore multimodal therapies may be the answer. The overlapping expression of GABA and opioid receptors in the central nervous system suggests that the two systems are likely interrelated. The GABA B receptor agonist baclofen has been used as a treatment for spasticity and addiction, but there is evidence supporting its potential as a weak analgesic. We have been interested in the interaction between baclofen and opioid analgesics with respect to analgesic efficacy and abuse potential. Analgesic interactions were assessed in hot plate testing, whereas rewarding interactions were assessed via the conditioned place preference procedure with outbred CD1 mice. To date, we have tested the interactions between baclofen and the opioids morphine, oxycodone, buprenorphine and fentanyl using isobolographic analyses. All opioids tested with baclofen show synergism in analgesia and no significant interactions in place conditioning. This effect is also consistent in another common strain of mice (C57BL/6J) and in rats. In tests of tolerance, the combination of baclofen and morphine, given repeatedly, showed less tolerance and constipation than an equipotent dose of morphine alone. Finally, acute administration of baclofen reduced the self-administration of morphine, suggesting a reward-reducing effect. Together these data support the use of baclofen coupled with opioids to enhance the analgesia, reduce the abuse liability and associated side effects of opioid drugs.
178- The Effects of Speed of Processing on the Cognition of Parkinson's Patients
Mallack Jaber
Parkinson's Disease (PD) is heavily characterized by non-motor symptoms including cognitive impairment, increased risky behaviors, depression, sleep disorders, and visual processing speed abnormalities. In healthy older adults, there is a natural decline in visual processing speed as well as an increase in risky behavior, placing them at risk as well. The purpose of this study was to determine the effects of processing speed training on the cognition of PD patients measured by the cognitive assessments that test the participant's integration of visual sensory information and higher-order cognitive processing. The program used to train the participants in processing speed is Speed of Processing Training (SOPC), a self-administered computer-based training program. The cognitive tests used were Epworth Sleepiness Scale (ESS), Montreal Cognitive Assessment (MoCA), Trail Making Tests (TMT) A and B, Stroop Test, and the Useful Field of View (UFOV) test. PD patients of all genders, all ethnicities and above the age of 50 were compared to healthy control subjects of the same demographics who do not have PD. Each cognitive assessment yielded unique results in relation to our hypothesis. SOPC significantly improved performance on the MoCA, a measure of global cognition, in HC participants but did not significantly affect PD participants. In the TMT tests, which are measures of executive function, the PD group revealed significant improvements. In contrast, participants with PD did not show improvement in any of the Stroop tests, which also measure executive functioning. Surprisingly, none of the UFOV or ESS scores improved among the PD participants either.

179- The Effects of Media Use and Gender on Anxiety
Hosein, Darya; Louie, Tinnie; Prabhakar, Durga; Elliott, Lindsey, MA; Fobian, Aaron D., Ph.D

"Introduction: Anxiety affects roughly 18% of the US population. Over 25% of adolescents will be diagnosed with an anxiety disorder within their lives, and it is more prevalent in females. About 92% of adolescents go online at least once a day, and media use varies by gender. For example, males play videogames more frequently, while females spend more time using social media. Although there is evidence that media use and anxiety have a high positive correlation, there is little information about the effects of both gender and media use on anxiety. This study aims to examine the relationship between gender, media use, and anxiety.

Methods: Twenty-eight adolescents (mean age=15.96, SD=0.744; 60.7% African American, 35.7% Caucasian, 3.6% Hispanic; 28.6% male) who slept less than 8 hours average on weekdays were recruited. Participants completed a demographics questionnaire, Adolescent Media Scale and Beck Anxiety Inventory.

Results: Linear regression was performed with anxiety as dependent variable and average weekly media use and gender as independent variables. Gender was an independent significant predictor of anxiety (t=2.54, p&lt;0.05). Together, average weekly media use and gender significantly accounted for 20.3% variance in anxiety, Adj. R²=0.203, F(2,23)=4.19, p&lt;0.05.

Conclusion: Results showed that female gender and decreased media use significantly predicted increased adolescent anxiety. Contrary to other findings, we found that decreased media use predicted increased anxiety. This could be because adolescents receive social support through media. Further research is needed to further assess the relationship between media use, gender and anxiety."
180- After-work work-related contact is associated with poor sleep and stress in surgical residents

Jeffrey T. Martin, Benjamin McManus, M.A., Despina Stavrinos, PhD

“Background: Workers who receive job-related contact afterhours are more likely to report multiple health issues (e.g., gastrointestinal, cardiovascular). The current study examined associations between work-related communication conducted during non-work hours with sleep and stress in surgical residents, a population that often experiences poor sleep quality and burnout due to stress.

Method: Five surgical residents, enrolled in an ongoing study, completed a survey assessing work-related correspondence occurring during non-work hours. Participants reported the number of work-related emails, phone calls, and text messages, the amount of time spent corresponding during non-work hours, the amount of non-work time using a computer for work-related tasks, and ratings of self-perceived need to connect to work during non-work hours. Participants also completed the Pittsburgh Sleep Quality Index, assessing participants’ subjective sleep quality, and the Workplace Stress Scale, a self-report assessment of job stress levels. Pearson correlations determined associations of work-related correspondence conducted during non-work hours with subjective sleep quality and self-reported workplace stress.

Findings: Poorer subjective sleep quality was significantly associated with work-related correspondence that occurs after-work (r = .89, p = .04) and on off-days (r = .96, p = .01). Poorer subjective sleep quality was also significantly correlated with greater time spent using a computer for work-related tasks on off-days (r = .95, p = .01). Work-related correspondence during non-work hours was significantly correlated with indicators of workplace stress, including negative physical well-being (r = 1.0, p &lt; .01).

Conclusion: After-hours work-related communication may contribute to sleep quality and workplace stress. Results are preliminary.”

181- Smoking Cessation Among Cancer Patients

Stephanie Diei, Mickeah Hugley, Samantha Schiavon, M.A., Jori May, M.D., Karen Cropsey, Psy.D.

“Smoking is the leading cause of preventable deaths in the United States. Nearly 50% of lung cancer patients are current smokers and up to 83% continue to smoke after diagnosis. Smoking during chemotherapy can increase side effects and infection risk. Despite these risks, there is limited research on how to assist this population to achieve smoking cessation. The present study examined how patients with cancer perceive smoking cessation and what cessation strategies have been most effective in their efforts to quit.

381 participants were recruited at the Kirklin Hematology & Oncology Clinic at UAB. Questionnaires assessed participants’ smoking history, use of smoking cessation aids, demographics, and other variables. All participants were categorized into three groups: never-smokers, active smokers and former smokers. Participants were classified as former smokers if they reported they had not smoked within the last 30 days.

Descriptive statistics were only conducted among participants classified as former smokers (N = 172). Among former smokers, 74.3% quit smoking after their cancer diagnosis. Only 21.6% used any form of smoking cessation aid, while the majority (78.4%) quit smoking cold turkey without the use of cessation aids.

These results suggest that among patients with cancer who were able to successfully quit smoking, the majority did so after their cancer diagnosis and without assistance. A diagnosis of cancer may serve as a teachable moment to spur cessation attempts. The future aim of this study is to determine how providers can best support patients to increase the likelihood that they achieve smoking abstinence.”
182- Training and Administration of Naloxone to Prevent Fatal Opioid Overdose
Janaki Kher, Stephanie Diei, Anna Khan, Cheyenne Daniels, Samantha Schiavon, M.A., and Karen Cropsey, Psy.D.
"Drug overdose is the leading cause of accidental deaths in the U.S., with opioid use as the primary cause. However, opioid overdoses are preventable. Opioid users can be trained on how to recognize an overdose and administer naloxone as proficiently as medical experts. Over a 14 year span, naloxone distribution resulted in 10,000 overdose rescues nationwide. Despite evidence of prevention success, perceptions persist that nonmedical persons cannot train opioid users. The present study examined training of opioid users from nonmedical personnel on how to recognize an overdose, and administer naloxone.

Participants were 202 high-risk opioid users recruited in Birmingham (54% male, M age = 34.3 years). A paired samples t-test was used to determine effectiveness of training through the difference between pre- and post-training tests. A one-way analysis of covariance (ANCOVA) was used to examine whether post-training scores differed by age, gender, or education level while controlling for pre-training scores. Results showed that on average participants scored higher on post-training tests compared to pre-training tests. Seven out of nine questions showed significant improvement in learning post-training. Age, gender, and educational level did not significantly influence changes on post-training scores, controlling for pre-training scores.

The naloxone training was effective in teaching participants to recognize the signs of an opioid overdose and administer naloxone. This training was effective regardless of age, gender and education level. This demonstrates that training from nonmedical personnel can be effectively implemented to a range of opioid users. Ultimately, this training may save lives through reversing opioid overdoses."

206- c
"Jessica Vaughn Ankit Bansal"
Individuals' feelings of political efficacy are key in understanding participation in politics, and thus policy output. Research exists confirming a positive correlation between levels of political participation and sense of political efficacy; however, research does not exist to examine this relationship exclusively on a college campus. Further, few investigations examine factors that alter ratings of political efficacy, and how this affects the larger political sphere. This study is an investigation into three questions - what is the relationship between political participation and political efficacy on a college campus? How does an understanding of the Electoral College process affect ratings of efficacy? How did the concurrent 2016 general election affect ratings of efficacy? An unchanging survey was used to collect data. For testing the Electoral College primer, cohorts were compared that received information against those who did not. For analyzing the effect of the general election, cohorts that were administered the survey before the election were compared against those who were surveyed afterwards. Political participation levels and respective ratings of political efficacy revealed a positive correlation for external efficacy, but a negative correlation for internal efficacy. Further, it was found that the Electoral College primer increased ratings of efficacy, and ratings of efficacy were higher before the conclusion of the 2016 election. Our findings provide valuable indications of how an individual's sense of political efficacy is built and changed, and is a critical piece of understanding the American political climate, and representativeness in politics as it influences the composition of policies.
183- Using Digital Media to Introduce Completion Pathways Offered by the UAB Science and Technology Honors Program

Monima Anam, Caleb Osburn, David Glover

"The UAB Science and Technology Honors program offers three distinct pathways for completion. Information regarding these pathways is not readily available for prospective students. To meet this need, the STH 250 video production team is animating a short video series that showcases each pathway.

Each of 4 video will be under one minute, communicating via motion graphics synced to narration. The first video will introduce the SciTech program, while the other three videos will describe completion options. A rough draft for each video was presented to a focus group. After receiving feedback via surveys, the series will be finalized and published on the official STHonors YouTube page."

184- Applications of Chalcone Derivatives

Alicia Mulqueen, Katie Cook, Kenneth Davis, Kyle Landers, Lauren Buchan

"Chalcones are known for having a wide array of applications depending on their functionalizations. They are alpha beta unsaturated ketones with two aromatic rings and are precursors of open chain flavonoids and isoflavonoids. Chalcones show biological functionality due to the presence of alternating double bonds that enable use in anti-bacterial, anti-microbial, and anti-cancer applications. In addition, some derivatives are also capable of producing coordination compounds and may have anti-corrosive properties.

The aim was to explore some of the key characteristics and applications of a series of chalcone derivatives generated using simple organic synthesis techniques. After the synthesis of target chalcones, products were characterized using TLC, NMR spectroscopy, and IR spectroscopy. The products were then tested for anti-bacterial potential against E. coli, their ability to provide corrosion resistance, and their ability to form coordination compounds with transition metals."
185- The Impact of HP1b Overexpression on Drosophila melanogaster
Mina Y. Momeni, Heidi M. Johnson, Nicole C. Riddle
Chromatin is a complex of DNA and proteins that aids in the control of gene expression. Chromatin appears in two main forms: euchromatin (which is transcriptionally competent) and heterochromatin (which is typically transcriptionally silent). The establishment and maintenance of both chromatin forms is vital for the health of organisms and is achieved in part by chromatin proteins. The Heterochromatin Protein 1 (HP1) family is a highly conserved chromatin protein family that impacts gene regulation and maintains chromatin structure. Previous research has revealed the importance of HP1a in aging and senescence in the Drosophila melanogaster model. However, there is a significant deficit in our knowledge of HP1B, the Drosophila HP1 protein that most closely resembles the human HP1 paralogs. This study investigates the roles of HP1B by characterizing lines genetically engineered to overexpress this protein. To do so, a six generation backcross was performed in order to establish a 98% similarity in genetic backgrounds between the control line and the overexpression line. With this newly established overexpression line, assays for a variety of organisinal phenotypes are planned. They include a larval crawling assay to assess the locomotor abilities of the animals carrying the transgene. Here, we present our progress in the backcross and exhibit available data from larval crawling assays in order to illustrate the impact of HP1b overexpression on chromatin structure, animal health, and behavior.

186- A Spontaneously Developing Intraperitoneal Ovarian Cancer Mouse Model
Carol Y. Lin, Ashwini Katre MS, Uma Mudunuru MS, Angelina I. Londono PhD, Dylana J. Moore, Haller J. Smith MD, Troy D. Randall PhD, Rebecca C. Arend MD
"Background: Ovarian cancer is the fifth leading cause of cancer-related deaths among women. It is most often diagnosed at later stages where the cancer is widely disseminated in the peritoneal cavity. In this study, mice expressing a transgene encoding T Antigen under the control of the mullerian inhibiting substance type II receptor-low (MISIIIR) were implanted with MOVCAR (murine ovarian carcinoma) cells to study the development of intraperitoneal tumors. MOVCAR cells were collected from the intraperitoneal fluid of the spontaneously developing ovarian cancer mouse model, MISIIIR mice. The objective of this study was to establish in our lab an immunocompetent ovarian cancer mouse colony using the MISIIIR-low/MOVCAR transgene model.

Methods: Four female MISIIIR-low mice from a C57BL/6J background were implanted with MOVCAR cells, which were transduced with a retrovirus encoding the luciferase firefly gene. One million MOVCAR cells were implanted intraperitoneally into MISSIR-low immunocompetent mice. Optical imaging using the IVIS Lumina III in vivo imaging system to detect the luciferase reporter was done weekly to follow tumor progression.

Results: MISIIIR-low mice that were implanted with MOVCAR 5009-luciferase cells developed peritoneal tumors that could be visualized in-vivo using a luciferase reporter. After 5 weeks, 75% of mice had fluorescence generated by MOVCAR-luciferase tagged cells.

Conclusions: This is a model that we can potentially utilize for translational ovarian cancer research. However, we need to optimize the model to ensure a consistent tumor take for future lab based ovarian tumor studies."
187- Analyzing Human Sorting Nexin 27 and its role in the neurodegenerative effects of Down Syndrome and Alzheimer's Disease

Gavin J. Gilliland

Endocytic protein regulation is essential to the health of brain cells to prevent neurodegeneration and becomes important in the reuptake and recycling of proteins and microtubules for use in the plasma membrane of cells. When this pathway is interrupted, products begin to build up outside of cells like neurons, errors can occur in growth and development of cells, resulting in memory problems like Alzheimer's Disease and developmental problems in Down Syndrome. Human Sorting Nexin 27 is one of several regulatory proteins linked to both Alzheimer's Disease and Down Syndrome. Snx27 is one of the receptor proteins on the membrane that signals when a protein should be recycled instead of lysed. Here, I propose that further research into binding constants, mutation assays, and protein-protein interactions using a Down Syndrome fibroblast cell culture will reveal unique features of snx27 that are specific to Down Syndrome. Furthermore, minimal research is present on the effects of snx27 in Alzheimer's Disease and Down Syndrome in vivo. I aim to use rat models of Alzheimer's Disease (Tg478/Tg1116/Tg11587) and Down Syndrome (Ts65Dn) to track the activity of snx27 using microdialysis which involves the insertion of a semipermeable probe into the brain of the animals to measure protein concentration. Then sacrifice the animals and analyze fibril formation using binding-site barriers. Overall, this research is important to potentially gain a better understanding of the biochemical mechanisms of snx27 in DS and could lead to therapies to treat developmental delays in DS or in treatment of Alzheimer's Disease.

188- Designing 3Cpro inhibitors and determining 3CD structure using X-ray crystallography (CH 461 Final Project “ NIH F31 Example Application)

Jessica Pham

Hand, foot and mouth disease (HFMD) is an illness that spreads easily and is common in children. Enterovirus 71 (EV71), part of the Picornaviridae family, is one of the major causes of HFMD, and 3C protease is necessary for almost all polyprotein processing. Because this viral protease plays such an essential role in viral survival and reproduction, they are potential targets for inhibitors. The other viruses in the family also have 3C proteases with a conserved structure. The goal of this project is to further investigate these potential 3C protease inhibitors by using a molecular modeling program and crystal structures from the protein data bank (PDB) to design new inhibitors, synthesizing the inhibitors in the lab, and performing an in vitro evaluation by protease assay of the inhibitor on EV71 3C protease and rhinoviral 3C protease. Another goal is to investigate the structure of 3CD, which is a precursor to 3C protease, using X-ray crystallography and model the crystal structure. Precursor 3CD enters the nucleus due to a nuclear localization sequence and then proceeds to undergo auto-proteolysis which yields the 3C protease. This is a hypothesized mechanism for the development of the mature 3C protease. The inhibitors developed for the 3C proteases could potentially be targeted to 3CD as well, which would inhibit the protease from initially making its way into the nucleus.
189- The effects of herd-mentality on exercise levels of Drosophila melanogaster
Cameron Gordon, Michael Azar, Louis P. Watanabe, Nicole C. Riddle
Many studies have highlighted relationships between the population density of experimental animals and various behavioral phenotypes. The behavioral phenotypes impacted by population density include measurements of exercise performance; studies have noted that herd-mentality, or alterations in individual behavior as a result of other individuals' actions, can have a significant impact on exercise performance and on the physiological effects of exercise in humans. To gain a better understanding of how population density impacts exercise, we utilize the fruit fly Drosophila melanogaster. Our research utilizes a novel fly exercise machine called the Rotating Exercise Quantification System (REQS) to quantify and compare the exercise levels of 200 isogenic lines of Drosophila melanogaster from the Drosophila Genetics Reference Panel 2 (DGRP2). Our study is designed to determine whether there are any effects related to population density on the exercise levels in D. melanogaster. To address this question, we are collecting exercise data using different population sizes from the 40 core lines from the DGRP2. Preliminary analysis of the data collected to date suggests that population density impacts activity levels in these animals. Not only are such effects present, but they vary in both magnitude and direction based on genotype. Once data from all lines have been collected, a genome-wide association study will be conducted in order to identify candidate genes that may contribute to this herd-mentality response. Together with other on-going studies in the lab, these experiments will help to elucidate the genetic mechanisms that control exercise performance.

190- Generation of Nonsense NF1 Patient Mutation Plasmids for Evaluating Nonsense Suppression Therapy
Enrique P. Romero, Claire M. Wilson, Ashley N. Turner, M.S., Anil K. Challa, Ph.D., and Robert A. Kesterson, Ph.D.
Neurofibromatosis type 1 (NF1) is a genetic neurological disorder that can affect the brain, spinal cord, nerves, and skin and occurs in 1 in 3,500 people worldwide. NF1 is caused by mutations in the NF1 gene that provides instructions for making a protein called neurofibromin. Approximately 20% of the NF1 patient population is impacted by nonsense mutations that render the NF1 gene not functional at producing full-length neurofibromin. The purpose of this research is to determine the efficiency of different nonsense suppressor drug compounds to suppress specific nonsense NF1 patient mutations. To achieve this, we attempted to construct a series of read-through cassette plasmids containing different nonsense NF1 patient mutations and surrounding gene sequence. These plasmids will be used in a dual luciferase assay to determine the efficiency of nonsense suppressor drug compounds. For this project, we chose nonsense mutations in three different exons and designed oligos to generate the mutation region in exons 5, 29, and 30. The plasmid containing the nonsense NF1 mutation insert will be transfected into HEK 293 cells and these cells will be treated with nonsense suppressor drugs PTC 124, clitocine, gentamicin, and amlexanox. A dual luciferase assay will be conducted to test how each drug leads to the expression of the complete fusion protein. Following treatment if we are able to increase read-through of NF1 nonsense mutation cassettes in-vitro, this holds the potential for this nonsense suppression therapy to increase actual neurofibromin protein levels in NF1 patients affected by nonsense mutations.
191- Generation of Nonsense NF1 Patient Mutation Plasmids for Evaluating Nonsense Suppression Therapy
"Claire M. Wilson, Enrique P. Romero, Ashley N. Turner, M.S., Anil K. Challa, Ph.D., and Robert A. Kesterson, Ph.D."

NF1 is a complex and extremely variable disorder characterized by the occurrence of neurofibromas and café-au-lait macules, and currently there is no treatment for patients. Mutations in NF1 can manifest in numerous tissues because of loss of neurofibromin protein function, one of which is negative regulation of p21ras (Ras) signaling. One promising therapy is nonsense suppression therapy that enhances the insertion of an amino acid at a PTC and allows translation to proceed to produce a full-length protein. Nonsense mutations comprise nearly 20% of NF1 mutations characterized; therefore, this class of genetic mutations affects a large number of NF1 patients. Our objective this semester is to construct a series of read-through cassette plasmids containing different nonsense NF1 patient mutations to be utilized in a dual luciferase assay for determining the efficiency of different nonsense suppressor drug compounds. The data we obtain from this assay will show which drug has the highest propensity for nonsense suppression and at which dose this drug can be most effective for a given nonsense mutation. Testing these drugs on different exons throughout the NF1 gene will give more insight into viable treatment options for a wide number of patients, because NF1 mutations are often specific to one exon, creating a unique disease in each patient. In this study I will focus on stop exons 18 and 51 and use nonsense suppressor drugs PTC 124, clitocine, and gentamicin. This project will potentially offer NF1 patients suffering with nonsense mutations a treatment without side effects.

192- Case study in the integration of Mathworks Matlab and Microsoft Outlook for improving instructor-student feedback loops.
Chassidie Hairston and Jesse Birt

The goal of our project is to create a tool whose purpose is to better organize and utilize emailing systems. Through utilizing campus licenses for Matlab and Mathworks, we were able to create a program that can effectively connect to an outside Outlook email account and sort through a user’s inbox based on set criteria and organize messages accordingly. Not only can users create a Masterfile of keywords that the program can match with subject lines in emails and place them into a corresponding folder with a push of a button, there are other ways of utilizing the program that might be useful on a larger scale. An automated message can be customized based on an individual’s requirements and sent once certain criteria have been met. This could be utilized in a class setting to ensure students who are having trouble get the help they need. For example, if a student were to email a teacher and say words meeting predefined conditions stored in text files, our script will notify the user and they can then search through their inbox for emails containing these words. Users whose emails meet specifications are then displayed on a GUI for easy access and processing. If a minimum number of matches for a keyword is exceeded, the program can be set to automatically send a friendly message to a TA or anybody else who could be of assistance stating that a student might need extra attention. Something such as this could be of use in almost any class and with a few more tweaks could be utilized for business purposes in larger companies as well.
193- Case Study On the Use of an Integrated Organization and Knowledge Management Tool in Matlab

Matthew Manuel

"The goal of this project is to create an interactive tool for the simplification and organization of digital, student-generated material in a course. The initial target course for this tool is EGR150 - Introduction to Engineering Methods, taught exclusively using mapped network resources. Currently, all class notes and assignments are individually opened to determine the topics explored within. In order to improve knowledge retention, aid in studying, improve topic cohesion and correlation, this tool aims to eliminate the need to manually search class materials in search of specific content.

When run by the student, the tool will iterate through an individual's network drive, extract file information, open and parse all files that are relevant to the student's notes and assignments. All titles from class outlines and homework files are then extracted and displayed to the user in the user interface. This allows for a quick reference to the topics that are discussed within each file. Additional features include buttons that allow the user to open a selected file or its file location, and a search bar that allows the user to search for a specific term within all class materials. Keywords and patterns are aggregated and used to generate a word cloud and mind map to help the student see the relationships between topics and lectures visually. The hope is to develop this into efficient organization and knowledge management tool that is tailored to each individual student's materials."

194- Characterization of Swine Influenza A Virus Activity in the Sipsey Wilderness

Nicholas Bolin

Influenza strains that affect swine are known simply as swine influenza viruses (SIV). These viruses have resulted in significant infection in both swine herds and human populations throughout the world. Understanding the dynamics of these viruses at the interface between swine and other vertebrate species is key for designing optimal surveillance and control strategies. The evolutionary history of the three dominant circulating subtypes of influenza A viruses (H1N1, H1N2, and H3N2) reflects multiple introductions into swine from other vertebrates. Besides introduction from humans, many avian groups present an important reservoir for potential SIV's, most notably waterfowl and perching birds. In areas where swine drink from water sources frequented by large numbers of waterfowl such as ducks, there is a precedent for the transmission of avian-derived influenza into the swine. Therefore, the assessment of SIV threat levels in an area should include density approximations of waterfowl and other potential avian vectors. The Sipsey Wilderness area in northern Alabama is frequented by recreational hikers, birders, and hunters and is characterized by many creeks, rivers, and ponds. Such an environment presents a prime opportunity to research influenza transmission among swine populations and between swine and waterfowl populations, and this study's aim is to provide a novel assessment of swlAV activity and threat levels in the Sipsey Wilderness. SA1 will be to characterize virus activity in swine, and SA2 will be to characterize virus activity in waterfowl. Major techniques include viral RNA isolation and protein purification, PCR, and genomic sequencing by Sanger chain.
195- Modification of the Rev Coding Sequence in HIV to prevent the progression of HCV in co-infected patients (CH 461 Final Project “ NIH F31 Example Application)

Lauren Silverwood

Human Immunodeficiency Virus (HIV) is a virus that attacks CD4+ T cells. These cells are a critical component of the immune system as they are responsible for alerting other immune cells that infectious particles are present. In the United States, 25% of people who are infected with HIV are also infected with Hepatitis C (HCV). HCV is a virus that is the leading cause of chronic liver disease and cirrhosis. There are currently a few limited treatment options for patients with HCV. However, in patients that are coinfected with HIV and HCV, these treatments are often ineffective since HIV disables the CD4+ T cells that are important for eliciting immune responses that combat the HCV virus. It has recently been noted that a regulatory protein known as Rev plays a vital role in stabilizing other mRNAs produced by this viral genome. Since the sequence coding for Rev is highly conserved, it is likely that this sequence could be more easily targeted for epigenetic modification, such as the demethylation of methylated-6-adenine (m6A) bases via CRISPR/Cas9 editing, that would prevent Rev from being produced. Measuring biological factors, such as liver enzyme levels and CD4+ T cell counts, from blood samples will provide insight into the status of liver function. Return to more normal levels of certain biological agents would indicate that the HCV infection has not progressed. Without the Rev protein, HIV mRNAs would be destabilized leaving the virus virtually incapacitated.

196- Antibody Dependent Enhancement of Dengue Virus Enhances Zika Virus- (CH 461 Final Project- NIH F31 Example Application)

Payal K. Patel

"Dengue sero-cross-reactivity causes enhancement of Zika virus. This proposed project will examine the implications for disease pathogenesis and future vaccine programs directed towards Zika and Dengue. Zika and Dengue are mosquito-transmitted human flavivirus that commonly affect the same geographic locations. Previous studies have indicated that Dengue and Zika viruses have extensive antigenic similarities due to their protein structures being closely related. The mechanism that links Zika to Dengue is known as antibody dependent enhancement (ADE). In other words, anti-Dengue antibodies enhance the infectivity of Dengue for immune cells in the body, which causes an increased viral production that correlates to severe disease outcomes. Correspondingly, Zika also undergoes ADE in response to the presence of other flaviviruses, while most notably in the presence of Dengue.

Preliminary data shows cross-reactivity of Dengue and Zika in blood serum; however, the specific antibodies that are involved in the antibody-dependent enhancement will be examined in this project. This project will attempt to identify specific antibodies that are involved in Dengue that enhance Zika via pull-down assay and 2D polyacrylamide gel. Based on these findings, investigation will be done on specific antibodies to trace localization within cell membranes and eventually throughout the body via fluorescence labeling.

The outcome of this research will provide a more concrete understanding of the link between Dengue and Zika. This information may prove to be critical in terms of public health especially in several regions that co-circulate Dengue and Zika. Eventually using this information to design and develop a vaccine."
197- Examination of p53 Activation and Expression Levels in a Neural Progenitor Cell Model of African and Asian Strains of Zika Virus (CH 461 Final Project - NIH F31 Example Application)

Ryan Murphy

The Asian-derived American lineage of Zika virus has stirred up much more controversy and panic recently in comparison to the African strain due to the high rate of severe birth defects associated with affected fetuses. Phenotypic differences resulting from infection in fetuses, such as the development of microcephaly, are apparent, though the specific mechanisms behind the difference in progression of the two virus strains are still largely unknown. While increased p53 activation and cell apoptosis have been characterized in cells infected with the Asian-derived American lineage of Zika virus, studies have not been conducted comparing activation of p53 between the different strains of Zika. Furthermore, little is known pertaining to the exact mechanism involved in p53 activation in this particular variety of flaviviruses. First, we aim to compare the activity of p53 and subsequent cell apoptosis between the two strains of Zika virus by quantifying levels of p53 and cell apoptosis in representative populations via fluorescence imaging to definitively determine if this could be a cause of phenotypic difference between the two strains. Second, we aim to characterize the effects of p53 activity on DNA damage by measuring damage levels prior to and post activation of p53 using DNA fingerprinting methodology. The outcome of this research will provide insight into additional phenotypic differences between the African and Asian strains of Zika virus, as well as key mechanistic information relating to the progression of severe birth defects in affected fetuses.

198- Inducing HIV latency via promoter methylation using Clustered Regularly Interspaced Short Palindromic Repeats dcas9-DNA methyltransferase 3a3L system (CRISPR/dcas9-DNMT3a3L).

Jeremiah Bell

It has been shown that DNA methylation is one of the regulatory mechanisms for gene expression. Genes with methylated cysteine-phosphate-guanine (CpG) sites in their promoter region have lower levels of expression of that gene. This has been found to be true in the genomes of individuals with latent human-immunodeficiency virus (HIV). Studies on individuals with latent-HIV have shown that their 5' LTR (promoter) region of the integrated HIV genome are hypermethylated and it is believed that this plays a role in maintaining latency. The goal of this study is to explore the effect of hypermethylating the 5' LTR in a HIV Jurkat model cell line. This will be done by genetically editing the 5' LTRs of cells using a CRISPR/cas9 system. The CRISPR/cas9 system with the aid of guide RNAs will be used to specifically target and methylate the 5' LTR region of the HIV genome in the cells. The cells will then be grown and the levels of HIV provirus and levels of CpG methylation will be recorded using CHIP sequencing. The study will shed new light on how targeted DNA methylation can be used to regulate gene expression for the purpose of treating disease.
199- A Vaccine for Zika Virus
Sayantoni Dhar
Zika virus is a virus that is mainly transferred from the Aedes aegypti mosquito to humans. Most people who are infected with the virus show no symptoms of the virus. However, a few mild symptoms of the virus include conjunctivitis, fever, headaches, pain in joints and muscles, and rash. These symptoms usually last for a few days to a few weeks. Serious symptoms of the virus include birth defects such as, microcephaly, in newborns. (Zika virus can also spread from mothers to their children during pregnancy.) Currently, there aren't any vaccines for the virus on the market. However, ZPIV, an experimental vaccine, has been effective in targeting a virus known as Japanese encephalitis, which is also a flavivirus. So, it is possible that the vaccine can also be used to target Zika virus if it targets similar proteins of both Zika virus and Japanese encephalitis. Since the vaccine is in phase one of clinical trials, there is no data on the effectiveness of the vaccine yet. However, its effectiveness can be predicted by comparing Zika virus and Japanese encephalitis by studying the proteins of the two viruses via techniques, such as x-ray crystallography.

200- Identification of the HIV-inhibitory Polyphenols in Cistus incanus extract (CH 461 Final Project - NIH F31 Example Application)
Christine Nguyen
This study's focus is on the identification and characterization of the polyphenols present in Cistus incanus, pink rockrose, a plant extract that inhibits HIV transmission. Several plant extracts decrease HIV transmission by inhibiting the enzymes involved in the replication of HIV, such as Prunella vulgaris, Sambucus racemose, and Geranium phaeum; however, the HIV-inhibitory property of Cistus incanus is different from these extracts. Cistus incanus extract blocks the fusion between the HIV virus and the target cell. Specifically, the binding of glycoprotein 120 (gp120), one of the glycoproteins involved in HIV binding, to heparin is affected. Cistus incanus extract contains polyphenols present that are responsible for inhibiting HIV, but studies on the identity and characteristics of these HIV-inhibiting polyphenols are limited. The extract from commercial Cistus incanus preparation, Cistus incanus green tea, and self-grown Cistus incanus plants will be used to study these polyphenols. The polyphenols in the extracts will be processed and analyzed via LC/MS-MS and HPLC-HRMS. These methods will allow for the identification and characterization of the polyphenols present in each of these three forms of Cistus incanus extract. Ligand binding assays will be used to determine if the polyphenols in the Cistus incanus extract are more effective in inhibiting HIV when used with other plant extracts that inhibit HIV at the transcription level.
201- Design and Characterization of Novel Inhibitors for S100A8 to Prevent Metastasis

Fornoush Zeidabadi (Graduate Student, as part of 761 course project)

Inhibiting the proteins that are involved in cancer pathways is a popular approach in cancer treatment. Recognizing and design inhibitors for new targets is important to search for more effective drugs with less side effects. We select S100A8 as a target, because it is strongly up-regulated in some cancer cells, and especially it plays key role to settle of premetastatic positions in goal organs as a member of myeloid-derived suppressor cells (MDSC) and we know accumulation of MDSC will inhibit dendritic cell (DC) differentiation and consequently suppress the antitumor immune reactions and then, inhibiting this protein can prevent metastases. Currently, scientists work on targets to find appropriate approach for taking care of metastasis like Heat shock protein, mitogen activated protein kinase, urokinase plasminogen activator adhesion molecules and related receptors, some tyrosine kinase receptors, signaling pathways, matrix metalloproteinases (MMPs), and angiogenesis pathway, but there is no effort on designing the inhibitor for S100A8. To design inhibitor for S100A8, first we will do computational drug design. Because there is no reported inhibitor for S100A8 till now, we will start our design and generate molecule database based on Adamantine backbone which works as an inhibitor for influenza A M2 protein channel, the protein which contains four helices bundle like S100A8. Based on these findings, we will choose potential inhibitor of S100A8 and study their inhibitory effect by analytical method, frontal affinity chromatography coupled with mass spectrometry (FAC-MS), differential scanning fluorimetry (Thermal shift assay) and saturation transfer difference NMR spectroscopy (STDNMR) methods.

202- Synthesis of Novel and more potent PARP Inhibitors

Anne Mushimiyimana (Graduate student), as part of 561 class project

¢ Poly(ADP-ribose) polymerase (PARPs) are a large enzyme family comprising 18 proteins that catalyze poly(ADP-ribose)lation of proteins involved in various cellular processes, including modulation of chromatin structure, transcription, replication, recombination, and DNA repair. PARP enzymes are encoded by different genes; however, they display a highly conserved catalytic domain whose catalytic activity was shown to be stimulated by DNA strand breaks in two well characterized members of this enzyme family, PARP-1 and PARP-2. Since the discovery of Poly (ADP-ribose) polymerase (PARP) and its contribution to cell survival, PARP inhibition has been of great emphasis in targeted cancer therapy. Two potential mechanisms of PARP inhibition pathway have been suggested based on the analysis of inhibitory activity of PARP inhibitors that are being tested in different ongoing clinical trials. One mechanism involves the inhibition of Nicotinamide adenine dinucleotide (NAD) binding to the catalytic domain and for the second mechanism, PARP inhibitor binds in the NAD+ site which allosterically activates the binding of DNA to PARP’s N-terminal zinc finger domain. Shifting the emphasis to characterizing the structure and enzymatic activity of members of PARP family other than PARP-1 and PARP2, specifically tankyrase 1 (PARP 5a) and PARP-4 will facilitate the synthesis of novel and more potent inhibitors to target cancer cells. The overall goal is to synthesize the novel inhibitors for catalytic and noncatalytic domains of the PARP enzymes and identify variant cancer cells as well as PARP mutant cells to utilize in assessing DNA binding activity in the presence and absence of these inhibitors.
203- Effects of Poly(ADP-ribose) Glycohydrolase Inhibition (CH 461 Final Project - NIH F31 Example Application)

Justin Catt
Several diseases like Parkinson's disease and certain types of cancer are connected to Poly(ADP-ribose) polymerases and the parthanatos pathway, leading to cellular death through apoptosis. Poly(ADP-ribose) glycohydrolase metabolizes Poly(ADP-ribose) and PARP to limit the availability of PAR, which would result in the parthanatos pathway. Using previous PARG crystallization data, different ADP-ribose analogues can be created and then compared through use of an enzyme assay to a previously found PARG inhibitor, Adenosine diphosphate (hydroxymethyl)pyrrolidine diol, to determine the efficacy of the new inhibitors. Following the development of an inhibitor, the effects of PARG inhibition on neurodegenerative diseases, like Parkinson's, and cancer can be determined through the effects on the parthanatos pathway through inhibition of PARG in a cell culture, such as t. curvata, followed by Western blotting to quantify the presence of parthanatos-related proteins. Finally, using the inhibitors and the resulting data, an animal model using adult mice can be run to determine if there is an increase or decrease in either the rate of PARP1-related cancers or neuron death, resulting in Parkinson's disease-like symptoms, from the PARG inhibition.

204- Intracellular tail mutations of the CD95 receptor reduces its apoptotic function (CH 461 Final Project-NIH F31 Example Application)

Jared A. Hood
The CD95 receptor and ligand are members of the tumor necrosis factor superfamily and their interaction initiates apoptosis. Biochemical studies that are centered on cancer research observe this interaction due to one of the major characteristics of cancer being the avoidance of apoptosis. Arginine-234, Aspartic Acid-244, and Valine-251 have been the popular amino acids of choice for mutations in other research due to them aiding homotypic aggregation of the receptor and FADD (Fas associated death domain) recruitment. This experiment will focus on the same amino acids but the difference their position. The 3 amino acids that were previously mentioned are all within the Death Domain in the intracellular portion. This study will focus on mutating Arginine-328, Aspartic-Acid-321, and Valine 335 by site-directed mutagenesis to observe the functioning of the receptor-ligand interaction. This is significant due to the intracellular portion of the receptor containing 6-antiparallel alpha helices. After receptor/ligand binding, there is a helix shift followed by recruitment of the death domain and an enzymatic cascade. Type 2 cells (cells that utilize the mitochondrial release of proapoptotic factors in apoptosis) will be analyzed and the presence of the SMAC/Diablo protein will be monitored as it activates caspase 3 and cytochrome c to help form the apoptosome. A cDNA sequence will be cloned using PCR and after the mutation is introduced, an invitrogen transfection kit (vector) will carry the mutated DNA into hepatic G2 cells. After transfection, the binding interaction will be analyzed using Isothermal Titration Calorimetry and binding assay analysis.
207- Role of USP14 in the Degradation of Aggregate-Prone Proteins
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Chronic neurodegenerative disorders such as amyotrophic lateral sclerosis, Parkinson’s disease, and Alzheimer’s disease are associated with the build-up of aggregate-prone proteins. These diseases pose an ever-growing burden to our health care system and to the families of afflicted individuals. The build-up of aggregate-prone proteins is correlated with a decline in the activity of the ubiquitin proteasome pathway (UPP). USP14, ubiquitin-specific protease 14, is a proteasomal associated deubiquitinating enzyme that disassembles ubiquitin chains on proteins that have been targeted to the proteasome for destruction. Since the ubiquitin chain both targets proteins to the proteasome and sterically prevents the protein from entering the proteasome, removing the chain prior to a stable interaction with the proteasome can prevent the protein's degradation while delaying the removal of the chain could stall the entry of the protein into the proteasome. This investigation utilized a genetic approach to investigate the role of USP14 in the degradation of aggregate-prone proteins. Loss of the ubiquitin hydrolase activity of USP14 in vivo reduces the abundance of prion protein and TAR DNA-binding protein 43 while no significant change was observed in the abundance of TAU and Î±-synuclein, suggesting proteasomal substrate specificity. This study enhances the understanding of the underlying mechanisms involved in the removal of toxic proteins known to cause neurodegenerative disorders. Because the ubiquitin proteasome pathway is the major pathway for the degradation of intracellular proteins, it is critical that we have a fundamental understanding of it to develop therapies to lower the aggregate burden associated with these neurological diseases.