Abass, Nermeen (G)  
**Title:** Genotype-environment interactions for survival and growth rate at varying salinity for channel catfish, albino catfish, and transgenic channel catfish by cDNA growth hormone (GH)  
**Primary Author (and presenter):** Abass, Nermeen  
**Additional Authors:** Dunham, Rex  
**Department:** Fisheries  
**College/School:** College of Agriculture  
**Description:** Fresh water is emerging as the most critical resource issue facing humanity. Ongoing climate change will reduce fresh water supplies. The world’s population and demand for the resource continues to expand rapidly. Fish is a major source of animal protein in most countries. There is a great need for the genetic improvement of cultured fishes. Catfish represents the largest domestic aquaculture industry in the United States. Swim-up fry channel catfish, *Ictalurus punctatus*, Albino catfish, channel catfish transgenic for the catfish growth hormone gene driven by the rainbow trout metallothionein promoter (MT-ccGH), and channel catfish transgenic for the catfish growth hormone gene driven by the antifreeze protein promoter (AFP-ccGH) were investigated at 0, 2.5, 5, and 7.5 parts per thousand (ppt) salinity. The two transgenes were of interest as growth hormone not only affects growth, but also affects osmoregulation. Survival were 100% for all genetic groups at 0 and 2.5 ppt. Increasing salinity to 5 ppt decreased overall survival as survival rates of channel catfish, albino catfish, MT-ccGH transgenic (T), MT-ccGH control (C), AFP-ccGH (T), and AFP-ccGH (C) was 89, 40, 83, 82, 83 and 77%, respectively. Raising salinity to 7.5 ppt had a strong negative impact on survival with means for channel catfish, albino catfish, MT-ccGH transgenic (T), MT-ccGH control (C), AFP-ccGH (T), and AFP-ccGH (C) was 18, 7, 67, 13, 67 and 10%, respectively. There are significant differences in survival rate were observed in 7.5 ppt (P < 0.001) and in final body weights among genetic groups at varying salinity (P < 0.0001). GH could play an important role under salinity stress, which has relevance for aquaculture management for future climate change. The US Food and Drug Administration (FDA) approved the first genetically modified fish (Atlantic salmon) on November 19, 2015 for human food that will lead the other genetically modified animals produce for human consumption.

Abdelrahman, Hisham (G)  
**Title:** Water temperature as a possible cause of variations in performance of Pacific white shrimp *Litopenaeus vannamei* in inland ponds for low-salinity culture  
**Primary Author (and presenter):** Abdelrahman, Hisham A.  
**Additional Authors:** Boyd, Claude E.  
**Department:** Aquaculture and Aquatic Sciences  
**College/School:** College of Agriculture  
**Description:** There is considerable interest in the culture of Whiteleg shrimp (*Litopenaeus vannamei*) in inland low-salinity water in Alabama and other states in the Sunbelt region of the US. However, the growing season is truncated as compared to
tropical or subtropical areas where this species is typically cultured, and the temperature is thought to be a major factor influencing shrimp production in the US. The objectives of this study were to determine water temperature patterns on a shrimp farm in different ponds and different years; and to seek possible effects of bottom water temperature in ponds to variation in shrimp survival, growth and production. The study was conducted at Greene Prairie Aquafarm located in west-central Alabama. Water temperature at 1.2 m depth in 20 ponds and air temperature were monitored at 1-h intervals during the 2012 and 2013 growing seasons. The farm owner provided records of stocking rates, survival rates, and production. Linear mixed model analysis of variance was used. Results showed that the hourly water temperatures were different among ponds. The weekly differences in shrimp weight and survival rate among individual ponds were correlated with the hourly average of water temperature in all ponds (farm mean). Pond variability represented 4.85 % of the variability in weekly growth rate (%/week). In conclusion, results suggest that variation in water temperature patterns has a major influence on shrimp growth and survival in ponds.

Ademokoya, Blessing (G)
Title: Attractiveness of the kudzu bug (Megacopta cribraria) to different legume varieties: In the quest for better management options
Primary Author (and presenter): Ademokoya, Blessing
Additional Authors: Balusu, Rammohan and Fadamiro, Henry
Department: Department of Entomology and Plant Pathology
College/School: College of Agriculture
Description: The kudzu bug, Megacopta cribraria (F.) (Hemiptera:Plataspidae), originally from Asia was first detected in the United States in Georgia in 2009. Its distribution since then has rapidly expanded across the Southeast, and it is currently established in 14 states. Megacopta cribraria is a pest of legumes especially soybeans, an economically important crop in the United States with an estimated annual market value of about $42 billion. As the threat posed by this invasive insect species is rapidly increasing, no effective control strategies other than chemical insecticides are currently available to soybean farmers in the region. This increased use of chemical insecticides is not sustainable and could result in the development of pest resistance. Hence there is a need to develop an alternative management strategy for the invasive kudzu bug which has recently emerged as the top yield-limiting pest of soybean in the Southeastern U.S. To develop this, we compared the attractiveness of M. cribraria to different legume varieties (soybean, fordhook lima bean, speck bean and Jackson bean) in a screen house experiment. The ultimate goal is to identify potential trap crops that can be used to manage M. cribraria in soybean production. Attractiveness of M. cribraria to the legume varieties was evaluated based on multiple-choice bioassays conducted in the screen house. Result showed that M. cribraria has preference for fordhook lima and giant speckled beans over soybean indicating that these two legumes can serve as candidate trap crops for managing M. cribraria. The prospects of this result will be discussed within the context of IPM (Integrated Pest Management).
Ajayi, Olufemi (G)  
**Title:** Nutritional ecology and its fitness impacts in *Pseudacteon* species (Diptera: Phoridae), parasitoids of imported fire ants (Hymenoptera: Formicidae)  
**Primary Author (and presenter):** Ajayi, Olufemi S.  
**Additional Author:** Fadamiro, Henry  
**Department:** Entomology and Plant Pathology  
**College/School:** College of Agriculture  
**Description:** Several species of *Pseudacteon* phorid flies have been introduced into the Southern U.S.A. for biological control of imported fire ants, *Solenopsis* species. However, very little is known about some aspects of their nutritional ecology and fitness components, essential for conservation biocontrol. The goal of this study was to address some important questions related to their nutritional ecology, and fitness components specifically longevity. In the first objective, series of biochemical tests were used to investigate if *P. curvatus* utilizes sugar and lipid sources in the field, by comparing the nutrient levels in flies from field and laboratory. Field-collected flies showed similar levels of gut sugars, body sugars and glycogen as, but significantly higher lipid levels than laboratory-reared flies. Effects of sugar feeding on longevity of three *Pseudacteon* species of different body sizes, *P. cultellatus*, *P. curvatus*, and *P. obtusus*, were investigated in the second objective. For all three species, sugar-fed flies lived longer than sugar-starved individuals. However, the degree to which sugar feeding enhanced longevity varies by species and was highest for *P. obtusus*. The data also indicate that longevity in *Pseudacteon* phorid flies is related to body size. The ecological significance and practical implications of these results are discussed.

AlAsmari, Abdullah (G)  
**Title:** Elucidating the cardioprotective role of HIF-1α-frataxin signaling against ischemia-reperfusion injury  
**Primary Author (and presenter):** AlAsmari, Abdullah F.  
**Additional Authors:** Nanayakkara, Gayani; Mouli, Shravanthi; Quindry, John; Zhong, Juming and Amin, Rajesh  
**Department:** Department of Drug Discovery and Development, School of Kinesiology and Department of Anatomy, Physiology and Pharmacology.  
**College/School:** Harrison School of Pharmacy, School of Kinesiology and College of Veterinary Medicine  
**Description:** Previous studies have demonstrated the protective signaling of hypoxia-inducible factor (HIF-1α) against ischemia-reperfusion (IR) injury in the heart. In the present study, we provide further evidence for a cardioprotective mechanism by HIF-1α against IR injury exerted via the mitochondrial protein frataxin (FXN), which regulates mitochondrial Fe-S cluster formation. Disruption of FXN has been found to induce mitochondrial iron overload and subsequent ROS production. We observed that FXN expression was elevated in mice hearts subjected to IR injury, and this response was blunted in cardiomyocyte-specific HIF-1α knockout (KO) mice. Furthermore, these HIF-
1α KO mice sustained extensive cardiac damage from IR injury compared with control mice. Therefore, we postulated that HIF-1α transcriptionally regulates FXN expression in response to hypoxia and offers a cardioprotective mechanism against ischemic injury by preventing the dysregulation of myocardial bioenergetics. Our promoter activity and chromatin immunoprecipitation assays confirmed the presence of a functional hypoxia response element in the FXN promoter. Our data also suggest that increased FXN mitigated mitochondrial iron overload and subsequent ROS production in response to hypoxia, thus preserving mitochondrial membrane integrity and viability of cardiomyocytes. Unexpectedly, we identified for the first time that FXN expression is increased during the reperfusion stage of IR injury resulting in regulating mitochondrial iron homeostasis and the ensuing mitochondrial ROS. Surprisingly, we observed that enhanced FXN expression displayed elevated levels of glutathione (GSH) and superoxide dismutase (SOD). Furthermore, these findings were supported in our FXN over-expressing and knockdown cells under the same IR condition. Together, these results demonstrate that increased expression of FXN is cardio-protective against IR injury through its anti-oxidant effect and by improving mitochondrial energetics.

Aldawsari, Mohammed (G)

Title: Acyclovir nanogel formulation for human skin cadaver permeation enhancement

Primary Author (and presenter): Aldawsari, Mohammed

Additional Authors: Ramapuram, Jay

Department: Drug Discovery and Development

College/School: Harrison School of Pharmacy

Description: Topical application of ACV has a potential purpose to target Herpes Labialis infection. There is a need to enhance the permeation of ACV to reach deep layers of skin and treat the infection. We proposed formulating ACV nanoparticles based gel to enhance the drug permeation across skin layers. Acyclovir nanoparticles were prepared via ball milling method. The physicochemical evaluations were tested such as PH, viscosity, uniformity, drug content and particle size. We have made modification on the formula utilizing different chemical penetration enhancers with various % and compositions (Ethanol, PG, Oleic acid, Transcutol p, n-methyl-2-pyrrolidone (pharmasolve). In vitro release and permeation kinetics using regenerated cellulose membrane and dermatome human cadaver skin, respectively were studied in comparison with the commercial product (Zovirax), the acyclovir concentrations in the samples were analyzed by a validated HPLC-UV method. Ball milling produced acyclovir particle size at 269.5 nm with PI, 0.321. These nanoparticles in the gel formulations showed a pH 6, viscosity 7177 cP (5 rpm), and drug content 24.9 mg/gm (99.6%). This formulation showed a skin permeation of 0.22 µg/cm²/hr. The modified formula with various chemical penetration enhancers showed a permeation enhancement 0.50 µg/cm²/hr. (5% ethanol) and 2.68 µg/cm²/hr (10% ethanol), which were 15 and 81 fold higher as compared with the flux produced by Zovirax (0.033 µg/cm²/hr). Ethanol as a penetration enhancer in the nanogel formulation showed pronounced effect ACV permeation as a topical formulation.
Alexander, Kimberly (G)

**Title:** Improved adherence of B12 injections with education on self-administration

**Primary Author (and presenter):** Alexander, Kimberly J.

**Additional Author:** Hamilton, Cam

**College/School:** School of Nursing

**Description:** There is compelling evidence suggesting brain atrophy and cognitive decline may be reduced with the supplementation of vitamin B12 in patients with mild cognitive impairment. A regional Veteran’s Administration geriatric outpatient clinic was identified with non-adherence of ordered monthly vitamin B12 injections affecting some patients. The purpose of this project was to improve patient adherence of monthly vitamin B12 injections by providing patient education on injection self-administration. The target population included geriatric male veterans with prescriptions for vitamin B12 injections. Following informed consent, the Teach-Back method was used to explain the steps of vitamin B12 injection self-administration and the patient repeated the steps in his own words. The nurse provided injection demonstration with patient return demonstration. The patient was asked prior to and after teaching if he felt comfortable with self-injections. Descriptive statistics were used to describe the patient population, serum vitamin B12 levels, effectiveness of teaching, and return demonstrations. The pre-post comfort levels with injection self-administration were compared with paired t-tests. X consented to participate, average age of X (sd) yrs. X % had < a high school education and X% reported driving > 20 miles to the clinic. X % had < 200pg/mL serum B12 levels, X% repeated all self-injection steps correctly, and X% performed return demonstration correctly. Among patients agreeing to participate in learning self-administration of B12 injections, a significant increase (p=<0.05) in comfort level with self-injection improved from pre- (mean, sd) to post (mean, sd). Adherence to B12 injections can be improved with education on self-administration. Recommendations are to expand teaching injection self-administration to all agreeable patients with orders for vitamin B12 injections and measuring injection compliance pre-post teaching.

Alhowail, Ahmad (G)

**Title:** Doxorubicin alters mechanisms of memory formation in *ex vivo* and *in vivo* models of Chemobrain

**Primary Author (and presenter):** Alhowail, Ahmad

**Department:** Pharmacology

**College/School:** Harrison School of Pharmacy

**Description:** Doxorubicin (DOX) is a widely used chemotherapeutic agent. The optimal clinical effectiveness of DOX is limited due to its secondary effects including memory impairment. The chemotherapy induced memory loss is referred as “chemobrain” or “chemofog.” Chemobrain is observed in about 75% of cancer survivors exposed to chemotherapy, and persistent in 17-34% of cancer survivors. Although the exact mechanism of cognitive dysfunction induced by these drugs are not known, some chemotherapeutic agents may trigger memory impairment by accessing the brain via the blood-brain barrier. Our studies indicate that animals treated with DOX showed reduction in long-term potentiation (LTP – cellular model of memory) and altered
expression of AMPA-type glutamate receptors, brain derived neurotrophic factor (BDNF) and α-stargazin in a rodent model of chemobrain. Furthermore, DOX treated animals showed increased GluR2 (AMPA receptor subunit) expression and no significant changes in synaptic proteins including PSD-95, pro-BDNF, synaptophysin as well as CaMKII expression compared to control. To further investigate the molecular mechanisms, we explored the direct effects of DOX by incubating brain slices in a concentration (250nM) that is similar to brain DOX concentrations due to peripheral injection. Using DOX treated slices, we assessed LTP and long-term depression (LTD) as well as hippocampal protein expression and oxidative stress. The results indicated that DOX-incubated (4hrs) slices exhibited reduced LTP, LTD and basal synaptic transmission as well as a decrease in mitochondrial complex I activity. In addition, phosphorylations of AKT, GSK3β, ERK1/2 and lipid peroxidation were increased in DOX-incubated slices compared to control without significant changes in total protein expression. Therefore, we conclude that doxorubicin directly modulates glutamate receptor and associated synaptic protein expression and signaling and thereby cause memory impairment.

Alrbyawi, Hamad (G)
Title: Short -chain ceramides for enhanced cytotoxicity of liposome-encapsulated Doxorubicin toward human breast cancer cells (MDA-MB231)
Primary Author (and presenter): Alrbyawi, Hamad
Additional Authors: Arnold, Robert D and Ramapuram, Jay
Department: Pharmaceutics
College/School: Harrison School of Pharmacy
Description: To enhance the cytotoxicity and cellular uptake of liposomal Doxorubicin against breast cancer cells (MDA-MB231) by PEGylated lipid-based liposomes made with short chain sphingolipids (C6-ceramide and C8-ceramide). Mechanism in which sphingolipids enhance cytotoxicity is currently unclear, but it is hypothesized that they promote cell apoptosis and cause pores in the cell membrane. Liposomes, containing disparate ceramides, were prepared in certain molar ratio (44:40:4:12 mol% of DOTAP/cholesterol/PEG2000-DSPE/Ceramide, respectively) using lipid film hydration method and loaded with doxorubicin (ratio of 0.2:1). Liposomes were characterized by measuring size, polydispersity index, release profile and doxorubicin content. In addition, vitro cytotoxicity and cellular uptake were evaluated. Doxorubicin liposomes enriched with either C6 or C8 ceramide exhibited high drug encapsulation efficiency (>90%) and small size (~ 94 nm). The release profile of Doxorubicin from liposome was determined by dialysis method. As expected, liposome formulation showed slower release compared to free Doxorubicin solution as additional time required for the release of drug from the liposome lipid bilayer. Synergistic cytotoxic effects were noticed between Doxorubicin and both C6 and C8 ceramide in MDA-MB231 tumor cell lines. Doxorubicin enriched with C6 and C8-ceramide exhibited highest cytotoxicity against MDA-MB231 cells compared to liposome formulation that dose not contain ceramide and free Doxorubicin, resulting in up to 6 fold lower IC50. Furthermore, cellular uptake of liposomal
Doxorubicin enriched with C6 and C8-ceramide was higher than both free Doxorubicin and liposome formulation without ceramide, resulting in 7 fold higher cellular uptake. Doxorubicin-loaded PEGylated liposomes with C6 or C8 ceramide might be useful for delivering amphiphilic anticancer drugs, such as Doxorubicin. Cytotoxicity of Doxorubicin liposomes enriched with ceramide was greater than that of free Doxorubicin and liposomal Doxorubicin without ceramide.

**Al Saqr, Ahmed (G)**

**Title:** Evaluation of diacetyl boldine loaded microemulsion formulations for topical drug delivery: preparation, characterization, in vitro release and cytotoxicity studies

**Primary Author (and presenter):** Al Saqr, Ahmed

**Additional Authors:** H. Alrbyawi, RJ. Babu

**Department:** Drug Discovery and Development

**College/School:** Harrison School of Pharmacy

**Description:** The object of this study was to prepare novel microemulsion formulations of Diacetyl Boldine (DAB) for topical delivery and to evaluate in vitro cytotoxicity of microemulsion formulations against melanoma cell line (B16 BL6). A simple, reproducible, accurate and sensitive method was developed for quantitative analysis of DAB in microemulsions using high performance liquid chromatography (HPLC) with UV detection. Pseudo-ternary phase diagrams was plotted to identify the formulation region and optimal microemulsions were characterized for their particle size, viscosity, pH and in vitro release properties. Permeation studies were performed using excised human skin using Franz diffusion cells. The cytotoxicity of the reported formulations on B16BL6 melanoma cell lines were evaluated by MTT assay. HPLC method for DAB was established by optimizing isocratic flow parameters of the mobile phase. Based on the pseudo-ternary phase diagram, four microemulsion formulations were selected, and the PH of the selected formulations ranged from 5.26 to 6.5. Optimized formulations showed globule size of <50 nm, and polydispersity index of 0.31. The ex vivo skin permeation study demonstrated that the microemulsions exhibited a potent skin enhancement effect to penetrate skin layers up to 8-13 fold higher compared with the control (DAB-MCT oil). Furthermore, there is a significant increase in cancer cell death for all DAB microemulsions compared to the control. The optimized formulations showed 160-180% higher cytotoxicity toward B16BL6 cell lines compared to control. The half-maximal inhibitory concentrations (IC50) of F12, F20, F26, and MCT formulations against B16BL6 cells were calculated to be 1 µg/mL, 10 µg/mL, 10 µg/mL, and 50 µg/mL respectively. By comparison, the IC50 of F12 was 50 fold lower relative to that of the DAB-MCT formulation. Results of present study suggest that microemulsion could be a promising formulation for topical administration of DAB.

**Alturki, Mansour (G)**

**Title:** LC-MS based approach to characterize non-specific binding inhibitors to *Mycobacterium tuberculosis* Shikimate Kinase (*MtSK*)

**Primary Author (and presenter):** Alturki, Mansour S.
**Additional Authors:** Jarrard, Madison; Ngouli, Rene; Goodwin, Douglas and Calderón, Angela  
**Department:** Department of Drug Discovery and Development, Department of Chemistry and Biochemistry  
**College/School:** Harrison School of Pharmacy, College of Sciences and Mathematics  
**Description:** The emergence of multidrug-resistant tuberculosis and extensively drug-resistant tuberculosis increased the demand for the discovery of new antitubercular drugs. The shikimate pathway in (*Mt*) is essential for its survival, due to the production of essential amino acids but absent from mammals. Shikimate kinase catalyzes a phosphate transfer from ATP to shikimate, producing shikimate-3-phosphate (S3P) and ADP. The goal of this study is to understand the inhibitory mechanism of the most active compounds from a set of 14 oxadiazole-amide and 2-aminobenzothiazole containing compounds with IC50 value <50 µM against *MtSK* using an LC-MS based approach. From the list of the 14 compounds, oxadiazole-amides 3 and 7 and 2 aminobenzothiazole 14 with reported low IC50 values were tested at 100 µM against *MtSK* at 0.02 and 0.2µM. At 0.02 µM enzyme concentration, all test compounds showed ≥90% *MtSK* inhibition while a substantial reduction in inhibition was observed when tested at 0.2 µM indicating non-specific binding. Another confirmatory experiment was performed by testing the compounds in the presence of a detergent (0.01% Triton X-100) on *MtSK* at 0.02 µM, their inhibitory activity was largely reduced by ≥50% indicating non-specific inhibition. A dose response curve for all three compounds displayed curve steepness and hill coefficient >1, which is a common pattern among non-specific inhibitors. A dynamic light scattering instrument was used as a complimentary tool to confirm non-specific inhibition by aggregate formation. Compounds were dissolved in ammonium acetate buffer and water, in which they displayed high light scattering intensity and particle size suggesting aggregation. On the other hand, aggregates were dissolved showed low light scattering intensity and particle size when the detergent was added. Novel aspect of this project is the characterization of compounds acting as non-specific inhibitors of *MtSK* by LC-MS based strategy.

**Armstrong, William (UG)**  
**Title:** Is a steric effect the controlling factor in rhodopsin photoisomerization?  
**Primary Author (and presenter):** Armstrong, William  
**Additional Authors:** Squillacote, Michael  
**Department:** Chemistry and Biochemistry  
**College/School:** College of Sciences and Mathematics  
**Description:** The usual explanation for the specificity of the photoisomerization of the 11-12 double bond of the retinal molecule embedded in the rhodopsin protein complex is that a steric effect between a methyl and a hydrogen causes rotation about the double bond in which the steric interaction occurs. However, our lab has produced results on the photoisomerization of E,Z-6,6-dimethyl heptadiene which has a huge steric strain between a t-butyl group and a hydrogen yet this steric strain causes only a 3.5:1 selectivity. Note that in rhodopsin, the 11-12 double bond isomerizes with 100% selectivity. Our result calls into question whether or not the accepted steric explanation for this selectivity is entirely correct. The work which
we have undertaken to explain the selectivity of the photoisomerization in rhodopsin involves the investigation of simple model 1,3 dienes which will further delineate the relative importance of steric, mass, and electronic effects in the photoisomerization process. The molecules to be examined will be Z,E-trifluorohexadiene and E,Z-2,4-nonadiene. The size and electron withdrawing effects of the trifluoro group of the former will provide information on the relative importance of steric and electronic effects on the photoseselectivity of the diene system. In the latter, the extended carbon chain will provide insight into the importance of the exact geometry of the steric effect as well as any effect that may be caused by solvent viscosity.

Arnold, Megan (G)
Title: Strain and baseline-dependent effects of scopolamine on operant variations
Primary Author (and presenter): Arnold, Megan A.
Additional Authors: Newland, Christopher
Department: Psychology
College/School: College of Liberal Arts
Description: Variability is an operant dimension of behavior, so the degree of variability observed depends upon the reinforcement contingency. The underlying mechanism responsible for behavioral variations is not completely understood, but it has been suggested that memory for recently completed sequences is required for successfully satisfying reinforcement criterion. Although findings from procedural manipulations, such as increasing the variability criterion and increasing the time between trials, indicate that memorial processes are not likely involved in operant variations, to date no studies have tested this hypothesis with memory disrupting drugs, such as scopolamine. Response variations were compared for 18 BALB/c and 18 C57BL/6 male mice. Half of the mice in each strain were required to respond in a highly variable manner (VAR), on a threshold procedure, whereas their littermates earned a reinforcer following any response (ANY). Response variability of the C57BL/6 strain was not affected by scopolamine. In contrast, the highest dose of scopolamine produced behavioral effects in the BALB/c strain and the direction of these effects depended upon baseline levels of response variability. These findings raise questions regarding gene x environment interactions in these strains.

Baltaci, Enis (G)
Title: Assessment of rain barrels and permeable pavements as LID practices on urban flooding
Primary Author (and presenter): Baltaci, Enis
Additional Authors: Kalin, Latif
Department: Natural Resources
College/School: School of Forestry and Wildlife Sciences
Description: Urbanization is known to cause increases in volume of stormwater runoff and peak flow rates, which leads to changes in natural flow regime and increases the likelihood of flooding. Conventional stormwater management practices mainly focus on
reducing peak flow rates; surface runoff volume reduction has traditionally been ignored. Conversely, Low Impact Development (LID) practices seek to increase the area available for infiltration to reduce runoff volume and peak flow as close to the source as possible, and are generally considered being a more sustainable solution for urban stormwater management. In this study, the effectiveness of two LID practices, Rain Barrel and Permeable Pavements, in mitigating urban flooding was tested within the 7.95 km² Toulmins Spring Branch Watershed (TSBW) in southwest Alabama. The main motivation of studying the flooding problem in the TSBW was the frequent complaints of its residents about chronic flooding. The EPA Stormwater Management Model (SWMM) was first calibrated with observed stage data in multiples sites then was used to identify the areas prone to flooding. Effectiveness of various LIDs in reducing peak flow and runoff volume at these areas was then explored with SWMM. Results indicate that LID controls can have considerable impacts on stormwater management by reducing runoff volume and peak flow rate, potentially returning watersheds to their natural flow regime, thereby preventing the flooding of urbanized area. However, the effectiveness of LIDs especially for the runoff volume quickly diminish as the return period of the storm increases. Rain barrels were the most economical and effective LID strategies within the TSBW drainage system.

Barrows, Emily (UG)
Title: Children's of Ochsner Health System
Primary Author (and presenter): Barrows, Emily, L
Additional Authors: Bradley, Taylor; Caldwell, Marlee; Warren, Kelsey
Department: Consumer and Design Sciences
College/School: Human Sciences
Description: In 2005, Hurricane Katrina not only proved to be a natural disaster, but more importantly a man-made disaster. Many lessons were learned as a result because of poor planning and fault in the government system. Hurricane Katrina wiped out the healthcare in New Orleans, where it no longer met the needs of the population. Ochsner Health System is an existing system in Louisiana that is at the forefront at solving this social need. As a result, The Children’s of Ochsner Health System facility is set to be developed in an existing structure, granted by the city of New Orleans. The hospital will primarily cater to children in a pediatric facility. The structure is set on Lake Pontchartrain that is just outside of the city center. This presents an environmental design challenge with hurricane season because it is on the large waterfront. Through collaboration with a design team of architects and engineers, building improvements will be set in place to prevent future devastations like that of Katrina. The healthcare facility’s location will target a market that is culturally diverse, high-risk high-need, and primarily lower income. The design goal for this facility is to create an environment that appeals to both children and their caretakers. Creating a functional, innovative, and approachable atmosphere that meet the needs of the target clientele proposes a design challenge. This will be resolved by the use of quality finishes, the integration of natural elements, and the infusion of the New Orleans culture. The Children’s of Ochsner Health System facility will be an asset to the city of New Orleans through its location, services, and range of appeal.

Barstow, Carla (G)
Diagnosis and treatment of a pregnant bitch with immune-mediated polyarthritis

Barstow, Carla L

Hall, Kelly

Department of Clinical Sciences; Department of Veterinary Clinical Sciences

College/School: College of Veterinary Medicine

Description: Immune mediated polyarthritis is a relatively common disease in dogs resulting in painful joint effusion. It is a type III hypersensitivity reaction where immune complexes deposit into joints, causing inflammation and cytokine release, thereby attracting neutrophils which cause further damage. The stifle and carpal joints are most commonly affected in middle age, medium to large breed dogs. Currently, glucocorticoids are the cornerstone of treating animals with immune mediated polyarthritis. A 2 year old intact female Golden Retriever presented to the University of Minnesota Veterinary Medical Center for acute onset of lethargy with shifting leg lameness and a stilted gait. FAST ultrasound indicated 3 puppies with normal heart rates, approximately 34 days old. Bilateral carpal and stifle effusion was noted. An inflammatory leukogram with a mild anemia and mild hypoproteinemia, consistent with systemic inflammatory response, was present. SNAP 4Dx Plus was negative. Cytology of fluid obtained via arthrocentesis demonstrated marked non-degenerate neutrophilic inflammation with no organisms, confirming a diagnosis of immune mediated polyarthritis. Treatment options discussed with the owner included: Prednisone, Niacinamide and Doxycycline, or delaying therapy until after whelping. Prednisone can lower gonadotropin concentration in bitches and can lead to spontaneous abortion. Doxycycline, while synergistic with the Niacinamide, can affect bone formation in developing puppies. The owner elected Niacinamide therapy only. The dog showed signs of improvement within 24 hours and went on to deliver 7 healthy puppies. Pregnant animals can be difficult to treat with the recommended drug protocols, as drugs may have deleterious effects to the unborn fetuses. This case emphasizes the importance of having multiple treatment options available and communication with owner regarding risk and benefit of various therapies for the safety of both the bitch and her unborn puppies.

Bartholomew, Megan (G)

Title: Long term vegetation response to hydrologic recovery in isolated cypress domes of west-central Florida

Primary Author: Bartholomew, Megan

Department: Natural Resources

College/School: School of Forestry and Wildlife Sciences

Description: Hydrology is the most important determinant of wetland type and processes and normally guides wetland restoration planning. However, many restoration efforts fail to return wetland vegetation to pre-impact communities because the restored hydrology is not necessarily appropriate for the re-establishment of the historic communities. An investigation into how wetland vegetative communities respond to hydrologic alteration was conducted at J.B. Starkey Wilderness Park, in New Port Richie, Florida. As a municipal wellfield, Starkey has a varied hydrologic history. Groundwater withdrawal for municipal water supplies to the Tampa Bay region began in
the mid-1970’s and progressed at such a rate that by the early 1980’s wetlands within the park had been visibly altered. Pumping steadily increased until 2008 when alternate water supplies were secured and groundwater withdrawals were cut by 75%. Due to these reductions, many wetlands have been able to hydrologically recover while others have not. As part of ongoing monitoring efforts detailed hydrologic and vegetation data has been collected in isolated cypress domes throughout the park. Using these data sets, we compared wetland vegetation communities before and after pumping reductions were implemented in 2008 to assess responses to hydrologic recovery. To assess vegetation responses to hydrologic restoration, prevalence index scores were calculated on an annual basis to track how hydrology affected overall understory community composition. Vegetation data from wetlands relatively unaffected by historical pumping were also used to determine reference community assemblages and to adjust for natural fluctuations associated with annual climatic variation. Results from this study can help natural resource managers develop reliable restoration milestones and accurately determine when a restoration project has reached completion.

Benesh, Kasey (UG)
Title: The range stability of *Etheostoma tallapoosae* and *Etheostoma stigmaeum*
Primary Author (and presenter): Benesh, Kasey, C
Additional Authors: Tan, Milton; Armbruster, Jonathan
Department: Biological Sciences
College/School: Auburn University
Description: Alabama has a great wealth of freshwater diversity; regrettably, it is becoming increasingly threatened. We are currently investigating if the Tallapoosa Darter, *Etheostoma tallapoosae*, despite its endemicity, has been stable in its limited range overtime. The Tallapoosa Darter’s range is restricted to the Tallapoosa River drainage. Comparatively, we are studying the range stability of another darter species in Alabama the Speckled Darter, *Etheostoma stigmaeum*, which has a much broader range throughout most of Alabama. This dichotomy provided an interesting opportunity to investigate if the initial size of a species range had an impact on stability of range overtime. We predict that areas with a high percentage of anthropogenically altered land cover (land classified as urbanized or pastoral) would have a greater time period since *E. tallapoosae* or *E. stigmaeum* specimens were collected within the area. This is potentially due to it being more difficult to find specimens indicating a decrease in the number of individuals in the area. To investigate the impact of pastoral land and urbanized land on the range stability of *E. tallapoosae* and *E. stigmaeum*, assessment maps were constructed based on occurrence records utilizing ARCGIS 10.1 (Geographic Information Systems) software (ESRI 2011). The impact of land cover types was evaluated with four linear regressions. Based on the assessment map, *E. tallapoosae* has a relatively stable range. However, *E. stigmaeum*’s range appears to be changing with numerous areas having relatively long periods of time since last capture. We fail to reject the null hypothesis that states there is no effect of the proportion of pastoral land or urbanized land on time since last occurrence for either species.

Bennett, Mary (G)
Title: Above the tunnels: Habitat use of the southeastern pocket gopher
Primary Author (and presenter): Bennett, Mary E.
The southeastern pocket gopher (SEPG; *Geomys pinetis*) is a burrowing small mammal native to southeast Alabama, southern Georgia, and Florida. It is considered an ecosystem engineer, in that its burrowing activities mix soil and create open patches for seeds to germinate. In Alabama, the SEPG is a species of high conservation concern due to its limited distribution, conversion of suitable open pine habitat into denser forest stands, and current absence from many areas of restored habitat. The Barbour Wildlife Management Area and Wehle Forever Wild Tract in Barbour and Bullock Counties, Alabama, support significant populations of the SEPG, and make up an important conservation landscape for the species. We identified areas used by SEPGs based on natural resource managers' reports and a visual survey of this landscape for evidence of pocket gopher presence (i.e., soil mounds) we performed using GoogleEarth® imagery. In summer 2015, we measured habitat attributes of 62 sites with SEPGs present and 62 random sites in two portions of the landscape, with additional broad scale sampling in areas with deep sandy soils planned for 2016. Initial field observations indicated that a majority of SEPG mounds occurred within areas of open pine habitat that contained mixed shrub and forb/grass patches, as well as some areas of recent longleaf pine restoration. Replanted, clear cut areas with dense shrub cover, as well as clear cut areas with altered non-woody vegetation, appeared to be less suitable for SEPGs. There appears to be a relationship between use and location within the study area which may corresponds to the availability of suitable habitat within each location. Additional work will help to identify specific habitat requirements for the SEPG as well as provide management recommendations for increasing suitable habitat in this landscape and elsewhere in southern Alabama.

Beverly, Kristen (G)
**Title:** Interactive fall prevention strategies
**Primary Author (and presenter):** Beverly, Kristen P
**Additional Authors:** Sanderson, Bonnie
**College/School:** School of Nursing

**Description:** Fall prevention is a priority for health care organizations. A third of elderly adults fall each year. Evidence suggests that a combination of fall risk assessments and personalized strength and balance exercise programs provide the best results in increasing safety knowledge and reducing falls and fall related injuries. The purpose of this project is to provide the best available evidence in relation to methods of fall prevention and education, to promote home safety, and reduce fall rates. Patients will undergo fall risk assessments and Timed Get Up and Go Tests (TUG) at the beginning and end of project. Population is frail elderly, 65yrs and older who reside in an independent living facility in Auburn Alabama. Following informed consent, participants completed an initial fall risk assessment and a TUG. The TUG test measures the time it takes for a participant to stand from a seated position, walk ten feet, and return to their chair. Residents reviewed a home safety check list for education. Demographic data was collected from participants, including age, gender, and history of falls within the last
three months. For four weeks participants met twice a week for 20 – 30 min, in a group setting, and exercised using strengthening DVDs. Follow-up assessments were completed at the end of four weeks to reevaluate fall rates and to re-test TUG scores. X consented to participate (% females), average age of X (sd) yrs. X% (n=X) of participants reported having a fall in the last 3 months. Follow-up assessment indicated that X% (n=X) reported a fall during or at completion of the project. The mean TUG time scores improved from pre-(mean, sd) to post (mean, sd) significantly (p=<0.05). The findings suggest that increasing strength, using specific interactive exercises, improves balance. Therefore decreasing fall risk and fall rates.

Bittner, Sean (UG)
Title: Controlled release of antibiotic agents from PLGA/halloysite nanocomposites
Primary Author (and presenter): Bittner, Sean, M.
Additional Authors: Robeson, Lee; Davis, Edward, W.;
Department: Chemical Engineering
College/School: Samuel Ginn College of Engineering
Description: Halloysite is a promising drug delivery alternative. It can be loaded with 30 wt% chemical agent, extending release from minutes to several hours or days. However, literature experiments with biologically relevant polymers are limited. Additionally, most studies use tetracycline and other small, water soluble antibiotics. Novel antibiotics are larger, imposing release limitations. This project aims to advance understanding of controlled release from Halloysite systems. Gentamicin sulfate is mixed with halloysite, yielding 24wt% loaded nanotubes. Vacuum and pressurization cycles result in fizzing, indicating air removal. The solution is mixed and left to dry, and loading and vacuum procedures are repeated. The resulting drug-loaded halloysite is ground and stored. Films are prepared via solution casting; a 25% w/v PLGA solution is prepared using a 3:1v/v THF-DMF solution and mixing until dissolved. DLH-polymer composites are dissolved by stirring, and solutions are then cast and dried. To evaluate release, DLH films are added to deionized water in a shaking bath. Periodic samples are then tested by UV spectrophotometry. Release rates are quantified by sample absorbance and antibiotic concentration. Using tetracycline as a model, it was confirmed that antibiotic release from composite films was significantly reduced compared to PLGA films, which released 80% loaded drug after two hours. Additionally, the effects of the LA:GL ratio on degradation were studied, and it was shown that 85:15-formulated PLGA significantly increased the release rate compared to 50:50 varieties. However, the performance of 85:15 PLGA was tailored to match that of 50:50 formulations on the addition of halloysite nanotubes. The use of drug-loaded halloysite films is a promising technique for long-term controlled antibiotic release. These materials are exciting for the treatment of infected wounds, prophylactic treatment of battle field injuries and the development of antimicrobial surfaces.

Blair, Brittany (G)
Title: Timely hospice referrals in terminal cancer patients
Primary Author (and presenter): Blair, Brittany A
Additional Authors: Ellison, Kathy J.
College/School: School of Nursing
Description: Evidence suggests that timely hospice referrals can actually improve a person’s quality of life. Often times, hospice referrals are being given much too late. Evidence based guidelines and the newly developed Oncology Care Model recommend advanced care coordination for terminally ill cancer patients. The purpose of this project was to provide an advanced care meeting to enhance patient/provider communication so that timely referrals are given. Target population included adults at a local outpatient cancer center who have been diagnosed with a terminal cancer, with a prognosis of six months or less. Following a signed agreement, participants completed a one-time session of advanced care planning that discussed patients end of life wishes and completion of any advanced directives. Physicians were provided with the information and appropriate referrals were made. Follow up phone calls were made one week later to review patient’s satisfaction. Descriptive statistics were used to describe the patient population, completion of advanced directives and treatment recommendations. Hospice referrals and physician documentation of end of life wishes pre/post advanced care coordination were compared using the t-test. X consented to participate (% females), average age of X years, X% of patients had lung cancer. X% of patients were referred to hospice, X% wanted to continue aggressive treatment. X% of patients reported X% satisfaction with the advanced care coordination. Comparison with current hospice referrals, physician referrals increased X% and X% of the patient’s end of life wishes were documented in the physician notes. A t-score of X.XX with a p-value of <.XXX was obtained. Providing patients with the opportunity to discuss end of life issues allowed physicians to gain knowledge about their patient’s wishes and timelier hospice referrals were given. Questionnaires pre/post hospice should to be utilized to measure quality of life.

Blankenship, Mary R. (G)  
Title: Effects of health literacy and education on hypertension management  
Primary Author (and presenter): Blankenship, Mary R.  
Additional Authors: Sanderson, Bonnie  
College/School: School of Nursing  
Description: Health literacy impacts both health and health care. Unfortunately, many patients with the most extensive and complicated health care problems are at greatest risk for misunderstanding their diagnosis, medications, and instructions on how to take care of their medical problems. Evidence-based guidelines recommend health literacy screening for patients. The purpose of this project is to help patients to maintain an adequate blood pressure (BP) through individualized education and self-management based on their level of health literacy. Target population included adults (25 yrs. & older) with hypertension in a family practice clinic. Following informed consent, participants completed a validated health literacy measurement test (REALM). Follow up phone calls were made weekly. A final phone call at 4 weeks was made to obtain blood pressure measurements and adherence with recommended treatment. Descriptive statistics were used to describe the patient population, comorbidities, blood pressure measurements, and medication adherence. Among patients with uncontrolled hypertension, the pre-post measurements were compared with paired t-tests. X consented to participate,
average age of X (sd) yrs. X% were identified with uncontrolled hypertension, X% were identified with diabetes and renal disease. X % were below tenth grade reading level after receiving REALM test. Follow-up indicated improved adherence to treatment and blood pressure readings after receiving individualized education and counseling. Among those with hypertension, the mean blood pressure improved from pre- (mean, sd) to post (mean, sd) significantly (p=<0.05). Screening for inadequate health literacy among hypertensive patients identified issues that guided appropriate educational material given, treatment recommendations, improved blood pressure measurements, and overall health. Identification of limited health literacy, individualized education, and treatment among hypertensive patients are achievable in a primary care setting.

Boling, Anna (UG)
Title: Population dynamics of murine spleenocytes as a function of age
Primary Author (and presenter): Boling, Anna, N
Additional Authors: Panizzi, Peter
College/School: Harrison School of Pharmacy
Description: Cellular profiling is a powerful tool in immunologic studies that help us understand how the immune system is working through the spleen in response to external triggers. Understanding the makeup of the cells in the spleen and how they change as we age or dynamics during diseases explains why our immune system works. We worked to identify, isolate, and study different populations of spleenocytes using antibody markers and flow cytometry. To do this we took the spleens from mice and isolated single cell suspension of spleenocytes. At the beginning, we chose mice of the same age to identify appropriate cell types and to determine mouse-to-mouse variability. After harvesting the spleens, we pushed the organ through a 30 μm micro mesh to isolate the spleenocytes and washed the cells in phosphate buffer supplemented with 2 % fetal bovine serum and 0.5% BSA. The washed spleenocytes were treated with AcK Lysis buffer to lyse the red blood cells. After centrifuging, we added antibodies and ran them though the flow cytometer. We viewed the positive results in three different channels: FL1, FL2, and FL3. The antibodies CD8a, FITC Cd11b, NK 1.1 were used in separate samples, and then a lineage group of FITC-conjugated to CD11b, NK 1.1, B220, CD49b, and PE Ly6G was created. After we obtained control data, we focused on the differences between mice of different ages. The CD8a and NK labelled samples observed the older mouse showing a higher percentage of positively labelled cells and a higher level of fluorescence in the labelled cells. The CD8a had a significantly higher percentage of T cells in the older mice. In the FITC- CD11b positive cells, we observed the same relative percentage of positively labelled cells, but we observed a more concentrated population in the positive labelled area in the older mouse. These findings show that in the older mouse the spleen has higher percentages of T cells and NK cells than the younger mouse.

Bottcher, Mary (G)
Title: Nutrition knowledge and Mediterranean diet adherence: Validation of a field based survey instrument
Primary Author (and presenter): Bottcher, Mary R
Description: Nutrition knowledge influences food choice and diet quality. Mediterranean diet (MD) adherence has been demonstrated to reduce chronic disease. However, the relationship between nutrition knowledge and MD adherence is lacking. The objectives of the present study were: 1) develop and validate a survey instrument to assess nutrition knowledge of the MD and 2) determine whether nutrition knowledge correlated with diet adherence. A MD Knowledge (MDK) questionnaire was developed from previously validated instruments; 15 questions were selected that paralleled a short previously validated MD Adherence Screener (MEDAS). The population included 127 college students enrolled in three courses with varying exposure to nutrition education: political science (n=29), introductory nutrition (n=56), and human nutrient metabolism (n=42). Test-retest reliability was performed in the introductory nutrition class. Cronbach’s $\alpha$ for internal validity of MDK was acceptable for a short questionnaire (0.653); test-retest reliability was established ($r=0.853$). Total MDK and MEDAS scores significantly increased with nutrition education ($p<0.001$). The distribution of MEDAS scores towards high MD adherence significantly increased with nutrition education ($p=0.002$). There was a significant weak association between MDK and MEDAS scores ($r=0.06$, $p=0.004$). The MDK survey is a valid and reliable instrument for assessing baseline knowledge. It was further demonstrated that nutrition knowledge correlates with diet adherence. Together the MDK and MEDAS questionnaires can be effective tools for assessing baseline knowledge and adherence for targeted interventions.

Bowen, Ryan (UG)

Title: Generation of new landscape forms through mold making, digital, and mixed media experimentation

Primary Author (and presenter): Bowen, Ryan, Z

Department: School of Architecture, Planning, and Landscape Architecture

College/School: College of Architecture, Design, and Construction

Description: This research focuses on using a plaster-to-digital-to-mixed media experimentation of form to determine new functions and programs of landscapes. Program and function commonly define the form of a landscape, but this experimentation seeks to reverse this system and work to transform program within the landscape. In a world with a heavy digital presence complete with many 3D modelling programs, our ability to push landscape form has increased. This push offers a chance to challenge the baseline form and development provoking landscapes that define new programs. Beginning with the keywords folds and undulating, and using fabric and cardboard molds for plaster, multiple iterations of rolling stitched forms with crevices and ridges were created. Then, using 123D Catch, software that creates digital meshes from physical molds, a digital model was constructed for manipulation. Rhino’s 3D modelling capacity allowed for the dimensionless construction and exaggeration of the folds and undulations of the plaster model. Multiple mixed media models were then constructed from foam and chipboard using a C&C router and laser cutter. These models helped address the limitations of moving from digital from to physical forms and offer insight as to how new construction techniques and material uses can
promote unconventional landscape forms created from digital platforms. The results of these experiments can be used to further new material explorations and construction techniques as well as create new iterative design techniques utilizing all medias in ways that challenge the ideas of traditional landscape form.

Bowen, Trae (G)
Title: An impervious surface analysis of the locust watershed located in Birmingham, Al
Primary Author: Bowen, Trae
Department: Geosciences
College/School: COSAM
Description: Between 1960 and 2000, there has been a 130% increase in urban land development throughout the United States (Alig et al. 2004). It has been well documented that as impervious surfaces increases there is a marked decrease of water quality in watersheds (Pitt et al 1995). Impervious surfaces are defined as any material that prevents the infiltration of water into the soil, and includes sidewalks, roadways, rooftops, patios and even compacted soils. A study of Village Creek in Birmingham, AL found that as urbanized area increased upstream of a study site, there was an increase in nutrients, trace elements and synthetic organic compounds (USGS, 2002). The present study aims to build upon the USGS 2002 study using contemporary geospatial techniques. The Impervious Surface Analysis Tool (ISAT) will be used in ArcGIS to perform a land use analysis of the locus watershed located in Birmingham, AL for 2001. This will allow us to analyze the USGS data not only spatially, but temporally for I will be comparing the land use and water quality in 2001, when the USGS study was conducted. Using the ISAT modeler, I expect to find that where there is greater population density and more impervious area neighboring Village Creek, the water quality will rank from fair to poor. Through this analysis, I found that twenty-seven of the forty-nine (55%) polygons which had a population density greater than 2500 people per square mile, were considered degraded and had poor water quality. This result matched the data of the USGS study. The overall results of the study found that decreased diversity in the aquatic communities and elevated concentrations of trace elements and organic contaminants in the water column, bed sediment, and fish tissues at Village Creek, most likely resulted from the effects of urbanization (Mcpherson et al. 2002). Executing this modelling tool could be an effective predictor of contaminated sites prior to water quality sampling. ISAT can serve as a method to determine the possible water quality of local streams and rivers amongst cities or any urbanized area, this diagnoses could foster needed urban planning reform or additional storm water mitigation techniques.

Brannen, Andrew (G)
Title: Segmental 360° bioluminescent imaging using the Mouse Imaging Spinner (MiSpinner) shows potential for accurate monitoring of tumor development
Primary Author (and presenter): Brannen, Andrew D
Additional Authors: Eggert, Matthew; Smith, Mary; Arnold, Robert; Panizzi, Peter
Department: Department of Drug Discovery and Development, Harrison School of Pharmacy

Description: There exist inherent biases in the in vivo tracking of tumor development created during bioluminescence imaging (BLI) sessions, with regard to positioning of the tumor relative to the detector. Slight inconsistencies of positioning can significantly increase variability in the small animal imaged over time, thereby reducing accurate measurement of bioluminescent tumor signal and ultimately increasing animal usage to reach statistical power. Our goal was to develop an improved method for longitudinal BLI of xenograft tumor models through the collection of 360° data, thereby maximizing the information collected from a single mouse at a single point in time. Our prototype for collection of such images is a novel device developed to expand the capabilities of IVIS Lumina XRMS system (PerkinElmer Inc.), whereby we converted it into a full 360° imager. Our invention is named the Mouse Imagine Spinner (MiSpinner; PROVISIONAL PATENT APPLICATION NO.: 62/020,056), automating the actuated rotation of the animal during the imaging process. Progressive BLI of tumor growth in athymic NCR nude mice implanted with luciferase-expressing human prostate cancer cells (PC-3-luc2) was performed with IVIS Lumina XRMS and MiSpinner. The rate of photon flux for each iteration around this 360° rotation was plotted against the total rotated degrees for each weekly time point and the peak flux was used as a means of standardization for week-to-week comparisons of tumor development. Furthermore, the integral of this curve correlated more significantly with tumor volumes determined from both digital caliper measurements and in silico tumor segmentation of Multi-Spectral Optoacoustic Tomography (MSOT) scans than the peak flux alone. This method of segmental 360° bioluminescent imaging provides a powerful new tool for the collection non-invasive BLI data and reduces the ambiguity of signal due to inconsistent animal positioning, particularly for longitudinal studies with tumor models.

Brazel, Morgan (G)
Title: Understanding cardiac arrhythmias using 3D models of hiPSCs from control and Timothy Syndrome cell lines
Primary Author (and presenter): Brazel, Morgan, E
Additional Authors: Kerscher, Petra; Lipke PhD, Elizabeth
Department: Chemical Engineering
College/School: College of Engineering

Description: Currently, mechanisms for studying arrhythmias in the heart are limited due to the inability to perform experiments on native human heart tissue. While animal models give some insight into heart function and abnormalities, they frequently cannot accurately recapitulate to human disease processes, especially those occurring during human development. Constructing cardiac tissue models using human induced pluripotent stem cells (hiPSCs) will allow for an applicable prediction of mechanical, chemical and electrophysiological properties that occur in the native heart during development. In this study two hiPSC lines, a control line (IMR90) and a disease line (T-3-5 derived from a patient with Timothy Syndrome (TS)), were compared in vitro to study differences between normally functioning cardiac tissue and tissues composed of cells that result in congenital heart disease. TS is a genetic
disorder, affecting the calcium channel gene, resulting in prolonged repolarization of heart tissue. First, 2D sheets of each cell line were differentiated into monolayers to ensure that both lines would result in contracting cardiomyocytes. Next, 3D models were created by combining hiPSCs with liquid PEG-fibrinogen precursor solution and photocrosslinked to form cell-laden hydrogels. Tissues from both cell lines were differentiated into 3D developing human engineered cardiac tissues (3D-dhECT) to study the differences that are not present in 2D models. Tissue growth, onset of spontaneous contraction, frequency and force of contraction, and protein expression visualized by immunofluorescences will be used to compare control and TS 3D-dhECTs. We expect that 2D and 3D models derived from the TS cell lines will show prolonged contraction rates when compared to the control models. In summary, TS cell lines can be used to model congenital heart disease resulting in long QT syndrome. With our new 3D model, further studies involving drug testing of current and new medications can be performed.

Britton, Erica (UG)
Title: Antecedents and mediators of personal growth initiative: work-role ambiguity and interpersonal conflict in the workplace
Primary Author (and presenter): Britton, Erica
Additional Authors: Brower, Cheyna; Hartman, Paige; O’Neill, Sadie; Michel, Jesse S.
Department: Psychology
College/School: Liberal Arts
Description: Personal growth initiative (PGI) is defined as active, intentional involvement in changing and developing as a person (Robitschek, 1998). Research has shown that PGI predicts three mental health domains: social, psychological, and emotional-well being (Robitschek & Keyes, 2009). An individual’s level of PGI, as well as the affected mental health domains, are prevalent in all aspects of one’s life, including one’s work environment. We hypothesized that interpersonal conflict at work (IPC) (i.e., a lack of positive interactions) would act as a mediator in work-role ambiguity (WRA) predicting PGI. Our hypothesis was based on previous findings that positive interactions with others leads to increased levels of PGI (Stevic & Ward, 2008). Additionally, the broaden-and-build theory of positive emotions suggests that “positive emotions broaden attention and cognition, enabling flexible and creative thinking” (Fredrickson & Joiner, 2002). Using pre-obtained data from a survey of college students, our regression analysis revealed WRA as a strong predictor of PGI. Additionally, IPC mediated the relationship between WRA and PGI. Previous research examined PGI in settings that included family life as well as young adults in college, while the data used in the present study used exclusively college students. We recommend that future studies seek to replicate this study using employed adults; allowing further inference on how PGI and its antecedents directly affect the workplace.

Britton, Keely (G)
Title: Examination of mentoring mindsets of faculty (mentors) and graduate students (protégés/mentees): Mentoring framework exploratory study
Primary Author (and presenter): Britton, Keely
Department: Educational Foundations, Leadership, and Technology
Description: There exists disconnects between mentor and protégés/mentees. One objective of the study is to test the mentoring mindset framework. Indicators tested include: (1) initiative, (2) learning orientation, (3) goal orientation, (4) relational, and (5) reflection. 1) What constitutes a mentoring mindset in graduate students aspiring to earn PhDs from the viewpoint of the mentor? 2) What constitutes a mentoring mindset in graduate students aspiring to earn PhDs based on mentor expectations from the viewpoint of the protégé/mentee? There exists a desire to mend disconnects that sometimes arise between mentor and protégé/mentee. Previous research has focused on what protégés desire characteristically in mentors. The presence and absence of a mentoring mindset in protégés from the mentor viewpoint is tested because there is a dearth of such research. Unexpectedly, mentors are less prone to criticize protégés/mentees. This study provides an avenue for articulation. Tested is whether or not the defined and described protégé mentoring mindset of the original study is applicable to the participants in the current study. The current study uses mixed methods. Interviews of mentors and protégés/mentees are ongoing as is online survey data collection. Results so far indicate that protégés must possess a high level of persistence and understanding from the viewpoint of the mentor to maximize the benefits of the relationship. The members of two professional higher education organizations were invited to participate because these members are deeply involved in the mentoring process for graduate students aspiring to earn PhDs. The significance of the study results will serve to enhance the understanding of important phases of the mentoring process in the framework of participant experiences. The inferences will potentially provide faculty and administrators with additional knowledge in order to fashion improved and valuable mentoring programs.

Bronston, Fraser (UG)
Title: Gallium-catalyzed aqueous epoxidation
Primary Author (and presenter): Bronston, Fraser, M.
Additional Authors: Goldsmith, Christian
Department: Department of Chemistry and Biochemistry
College/School: College of Sciences and Mathematics
Description: Catalysts capable of allowing common synthetic reactions to take place in an aqueous environment instead of the usual organic solvents have long been sought after because of their potential to offset both the cost and the environmental impact of research. The majority of catalysts used in modern synthetic chemistry fall victim to a number of issues related to solubility, stability, and unfavorable solvent interactions which render them ineffective when exposed to aqueous and near-aqueous environments. Furthermore, compounds that do catalyze reactions in such environments often rely on chemical species whose actively catalytic forms are transient and poorly characterized, suffer from inconvenient interactions with certain moieties, or show poor selectivity for their target reaction. Recent work in the Goldsmith laboratory has shown that two gallium(III)-based catalysts having N₄Cl₂ inner-spheres are capable of catalyzing the epoxidation of alkenes with by peracetic acid in both fully-aqueous environments and acetonitrile, showing exceptional selectivity for the epoxide in both environments at a 1% catalyst loading. Further investigation of the aqueous activity in buffered solutions showed that both catalysts are equally effective under both highly acidic and basic conditions, but nearly completely
inactive at near-neutral pH values. Functional group tolerance experiments conducted in acetonitrile suggest that alcohols, ketones, and chlorides are not affected by the presence of the catalysts, but that amines and aldehydes might result in a complex mixture of products or otherwise adversely affect their activity. A cobalt-based catalyst bearing a similar ligand to the two used in the gallium investigation is currently being examined for its ability to activate benzylic C-H bonds for reaction with iodosobenzene in acetonitrile.

Brown, Chloe (G)
Title: Starving Artist
Primary Author (and presenter): Brown, Chloe E
Department: Department of Art
College/School: College of Art and Sciences
Description: I am an artist who uses drawings to study the mind of an anorexic. In my works I hope to delve more deeply into the motives of an anorexic. I explore the routine actions, and behaviors of a disordered mind. The drawings that I make are realistic. They depict settings that absorb the anorexic mind. Kitchens, grocery store shelves, cardio machines, these are all places that shape an anorexic identity. The black and white ink expresses the good and evil mind-set of a disordered thinker. Restrictors allow no grey space or color; the anorexic operates according to rules that must be followed. Eat less and you will lose weight, evade unhealthy foods and you will be healthy. The realism and attention to detail, also describes these clear rules that the anorexic follows. Disordered thinkers yearn for control and stability, which they feel is provided by anorexia, similarly the drawings are arranged in a symmetrical, horizontal composition that communicates stability and control to the viewer. These scenes are normally places filled with people, shoppers, diners, fitness enthusiasts, however in my drawings people are absent. The scenes describe the isolation of an anorexic. The illness does not allow space for the chaos of other people; similarly the drawings do not attempt to capture the life and complexities of other human beings. This body of work is influenced by Chinese painting and political cartoons. The Chinese painters often created long paintings on scrolls, similar to the long drawings that I have created. They also are influenced by the ridged societal rules about interactions that the Chinese painters followed as created by the Confucius and Laozi. These rules described the way that humans should act, similarly anorexics compose strict rules to their eating behaviors. Political cartoons and prints from the 1800's have a similar line quality, and illustrate a societal issue. Similarly I strive to highlight an issue of humanity. This is a vital issue within our contemporary world, as anorexia has the highest mortality rate of any mental illness, and only 50% of those affected fully recover. Through these drawings I hope to expose this illness and create and aid those affected.

Buckley, Rachel (UG)
Title: Genome editing in non-coding regions with CRISPR
Primary Author (and presenter): Rachel Buckley
Additional Authors: Rita M. Graze, Tiffany Howard
College/School: College of Sciences and Mathematics
Department: Department of Biological Sciences
The CRISPR/Cas9 system can be employed to edit noncoding regions and manipulate gene expression in the model organism *Drosophila melanogaster*. Our goal is to edit regulatory regions in the fruit fly genome to help understand the function of regulatory 'code'. Single guide RNAs, or sgRNAs that are together with Cas9 protein allow targeted enzymatic cleavage of DNA based on sequence complementarity. To test viability and vector efficiency sgRNAs were designed that uniquely targeted the classic *white* locus of *Drosophila*, mutations in this gene result in a white eye color as opposed to normally red eyes. Plasmid cloning by restriction enzyme digest was used to clone sequence complementary to the *white* gene into the vector’s sgRNA cassette. Competent *E. coli* cells were transformed with this plasmid. Plasmid DNA was purified from bacterial culture, presence of the insert was verified, and the expression vector was injected into early stage fruit fly embryos. Currently, the experimental conditions are being optimized to create a targeted deletion in the fruit fly genome and alter expression of the *bric-à-brac* gene.

**Burns, Kara (G)**
**Title:** Improving outcomes and quality of life in females with chronic pelvic pain  
**Primary Author (and presenter):** Burns, Kara S.  
**College/School:** School of Nursing

**Description:** New evidence suggests somatocognitive therapy, when used with standard of care, is effective in decreasing pain and improving symptoms related to chronic pelvic pain (CPP) for longer periods of time. The purpose of this project was to implement a simple adjuvant intervention on top of the usual administered care in women who have chronic pelvic pain. This project looked at educating patients in somatocognitive therapies based on posture (standing and sitting), movement and coordination, gait, and respiration. Target population included females (18+) with CPP and a diagnosis of myofascial pelvic pain or Interstitial Cystitis (IC). A numeric rating scale for pain (0-10) was used for immediate pre- and post- treatment pain scores and one day, three day, and seven day follow up pain scores. Following informed consent, participants were placed into either a standard of care group, or standard of care with somatocognitive therapy group. Participants in the standard of care treatment with somatocognitive therapy group were taught daily exercises to perform. Pre- and post-treatment pain scores were compared using paired t-tests. 10 females consented to participate, average age of X (sd) yrs. X% were identified with myofascial pelvic pain, X% were identified with IC, 50% were in the standard of care group, 50% were in the standard of care with somatocognitive therapy group. Pre- (mean, sd) and post- (mean, sd) treatment pain scores from the standard of care group were compared to pre- (mean, sd) and post- (mean, sd) treatment pain scores in the standard of care with somatocognitive therapy group and showed significance in the improvement of pain with somatocognitive therapy (p=< 0.05). Somatocognitive therapy combined with standard of care treatment relieved pain and symptoms related to CPP more effectively than using current standard of care alone.

**Busler, Jessica (G)**
**Title:** Cultural differences in emotion processing: A BrainMap meta-analysis  
**Primary Author (and presenter):** Busler, Jessica N.
Additional Authors: Robinson, Jennifer  
Department: Psychology  
College/School: Liberal Arts  
Description: Neurological differences in emotion processing due to culture has scarcely been explored. To elucidate these differences, we conducted three meta-analyses of the BrainMap database within the ‘Emotion’ behavioral domain: Native English speakers (Meta-analysis 1), only Native German speakers (Meta-analysis 2), and finally, only Native Chinese speakers (Meta-analysis 3). A total of 53 papers were included in our study. For the English meta-analysis, 34 papers were identified (753 subjects, 205 experiments, 144 conditions, and 1395 locations), while German meta-analysis yielded 14 papers (260 subjects, 43 experiments, 60 conditions, and 337 locations). Finally, the Chinese meta-analysis yielded a total of 5 papers (74 subjects, 15 experiments, 14 conditions, and 138 locations). Activation likelihood estimation (ALE) was performed on the resultant sets of coordinates for each meta-analysis to determine regions of convergence within emotional processing networks and resultant ALE maps were then qualitatively compared. English and German ALE maps showed the most convergence across a distributed network of regions including the amygdala, parahippocampus (BA28), anterior cingulate (BA24/32), inferior frontal gyrus (BA45/46), putamen, portions of the thalamus, and left insula (BA13), with the Chinese ALE map showing the most divergent (i.e., culture-specific) results (e.g., precuneus [BA7], inferior parietal lobule [BA39], right insula [BA13]). These results suggest that cultural differences may exist at the neurophysiological level in the processing of emotion.

Byrne, Brendan (UG)  
Title: Traffic impact analysis of augmented bicycle facilities on Auburn University's campus  
Primary Author (and presenter): Byrne, Brendan  
Department: Environmental Design  
College/School: College of Architecture, Planning, and Landscape Architecture  
Description: Previous Auburn University campus surveys have shown an increase in bicycle and pedestrian modal shares. As the student population that bikes increases and the amount of students attending Auburn increases we could see more congestion on Auburn’s concourses. As this congestion increases, so does the likelihood of pedestrian and bicycle conflict. This study of the current conditions and implemented bicycle facilities based was conducted to curb the potential pedestrian and bicyclist accidents. The studied areas were the Thach Concourse, Roosevelt Concourse, and Heisman Loop. Research was broken into two phases to collect data on current and proposed conditions. The first phase studied current conditions and the second phase was of proposed conditions. In the second phase, bike lanes were placed on the observed areas and signs were added to increase awareness for students. The data collection methods were the same for both phases. The methods included in field observation such as amount of users and travel patterns to determine level of service. Then a survey was conducted on location to determine crash patterns. In field observations were conducted during peak morning, lunch, and afternoon hours. The research is still ongoing, however data thus far suggests that bicycle traffic is still below critical mass compared to the sheer numbers of
pedestrians on campus. The bicyclists-pedestrian accidents also appear to be minimal compared to the entire student population. However, the findings have to show high conflict areas on Auburn’s concourses. The findings have shown the high conflict areas that need to be addressed as the student population grows. It also denotes that as of now the current concourse infrastructure is the favorable layout. Bicyclists must slow down, but it allows for maneuverability to avoid accidents with pedestrians. Once the bicycle commuter share increases to even out the modal share then retrofitting the concourse will be a viable option.

Cannon, Ashley (G)
Title: Adjunct therapy for peripheral neuropathy
Primary Author (and presenter): Cannon, Ashley B.
Additional Authors: Ellison, Kathy
College/School: Auburn University School of Nursing
Description: There is strong evidence that peripheral neuropathy leads to dose reductions or changing of regimen in cancer patients receiving a taxane form of chemotherapy. Evidence-based guidelines recommend the use of omega 3 fatty acids to reduce peripheral neuropathy symptoms. The purpose of this project was to implement the use of omega 3 fatty acids in patients receiving a taxane chemotherapy in an attempt to reduce neuropathy symptoms. Target population included adults (over age 18) with a treatment regimen including a taxane chemotherapy. Following obtaining informed consent, participants completed a validated neuropathy questionnaire (QLQ-CIPN20). Following review by an oncologist, omega 3 fatty acids were prescribed and education was offered. Patients were assessed before treatment, mid treatment, and end of treatment for neuropathy. Descriptive statistics were used to describe patient population, significance of neuropathy, treatment regimen, and medication adherence. Among patients receiving a taxane chemotherapy, the pre-post QLQ-CIPN20 responses were compared with paired t-tests. X% consented to participate (% females), average age of X (sd) years. X% were identified with the potential to have neuropathy, and X% were prescribed omega 3. Data was compared to those patients, in the previous population, who received a pain medication alone to those receiving omega 3 fatty acids during treatment. Follow up indicated X% adhered to treatment. Among those with peripheral neuropathy, the mean QLQ-CIPN20 scores improved from pre- (mean, sd) to post (mean, sd) significantly as compared to the previous population receiving pain medication alone for the neuropathy symptoms. Screening for neuropathy symptoms among cancer patients identified symptoms that guided treatment recommendations and improved quality of life. Further implementation of the evidence-based protocol is warranted in cancer patients in this oncology outpatient setting.

Cave, Carlie (UG)
Title: The role of anxious attachment on multiple domains of functioning following couple and relationship education participation
Primary Author (and presenter): Cave, Carlie, N
Additional Authors: McGill, Julianne; Adler-Baeder, Francesca
Department: Human Development and Family Studies
College/School: College of Human Sciences
Description: Couple relationship education (CRE) programs teach skills to support healthy relationships and have been found to positively affect participants in multiple domains. Studies report CRE programs promote increases in individual empowerment, couple quality, and parenting efficacy for the average participant. A new wave of CRE evaluation studies address moderators and influences on program outcomes. A systems perspective expects influence of environmental elements (i.e., program participation) on the individual, but also expects that individual differences influence how someone responds to their environment. In this study we considered individuals’ level of anxious attachment. High anxious attachment is marked by concern of rejection and negative self-views in relationships, which may influence their experience in and change experienced by CRE. Pre- and post-program data from 1118 adults in a CRE evaluation study were used. Anxious attachment was split at the mean to create high and low groups. Repeated measures analyses of variance were used to determine whether there were main effects for time and whether there were interaction effects for time X anxious attachment. Analyses revealed no time by group interaction for individual empowerment and couple quality. There was a main effect for time [F(1, 1019) = 72.575, \(p < .001\); F(1, 669) = 7.750, \(p < .01\)], suggesting all participants reported improvements in these areas, regardless of level of anxious attachment. Participants however, with high anxious attachment reported significantly more positive change in parenting efficacy compared to participants with lower levels of anxious attachment. [F(1, 713) = 6.241, \(p < .01\)]. These results suggest those with anxious attachment experience positive change in several domains, and possibly magnified change for parents. Considering individual characteristics is a vital part of understanding for whom CRE works best and continues the effort to have a “do no harm” approach to programs.

Celikbag, Yusuf (G)
Title: The role of ethanol and temperature on hydroxyl and carbonyl groups in bio-oil produced by hydrothermal liquefaction of loblolly pine
Primary Author (and presenter): Celikbag, Yusuf
Additional Authors: Via, Brian K.; Adhikari, Sushil; Auad, Maria L. and Buschle-Diller, Gisela
Department: Forestry
College/School: School of Forestry and Wildlife Sciences
Description: Bio-oil has attracted interest to be used as a bio-based polyol to synthesize bio-based polymers. Hydrothermal liquefaction (HTL) is a thermomechanical conversion technique to produce bio-oil where lignocellulosic biomass is converted into bio-oil, gas and solid products using subcritical or supercritical water at elevated temperature and pressure. Characterization of hydroxyl and carbonyl groups in the bio-oil plays an important role in the improvement of bio-oil for the utilization as a polyol. Therefore, a comprehensive hydroxyl and carbonyl group analysis is necessary to understand the source and variation of hydroxyl and carbonyl groups which will make it possible to engineer the properties of bio-based polymers synthesized by bio-oil in future studies. Thus, the objective of this study was to investigate the effect of ethanol on the hydroxyl and carbonyl groups in the bio-oil produced from loblolly pine. HTL of loblolly pine (Pinus spp) carried out at 250, 300, 350 and 390 °C for 30 min. Water (W-HTL) and water/ethanol (W/E-HTL) mixture (1/1, wt/wt) were used as liquefying solvent in the
HTL experiments. It was found that 300 °C and water/ethanol solvent was the optimum liquefaction temperature and solvent, respectively, yielding up to 68.1 wt.% bio-oil and 2.4 wt.% solid residue. P-NMR analysis showed that biopolyol produced by W-HTL was rich in phenolic OH while W/E- HTL produced more aliphatic OH rich biopolyols. Moreover, biopolyols with higher hydroxyl concentration were produced by W/E-HTL. Carbonyl groups were analyzed by F-NMR which showed that ethanol reduced the concentration of carbonyl groups.

Cero, Ian (G)
**Title:** Sine qua non: Modern suicide theory and the availability of lethal means
**Primary Author (and presenter):** Cero, Ian J.
**Additional Authors:**
**Department:** Clinical Psychology
**College/School:** College of Liberal Arts
**Description:** Suicide is a leading cause of mortality in the United States and around the world, accounting for approximately 800,000 global fatalities a year (WHO, 2015). But despite the earnest attempts of researchers and clinicians, theories of suicidal behavior remain significantly underdeveloped. Evidence of this underdevelopment is observed (a) in the fact that predictive models of suicide risk are typically only a marginal improvement on chance (Ribeiro et al., 2014), (b) that individual-level interventions seldom achieve demonstrable influence over risk of death (Mann et al., 2005), and (c) that population suicide rates have not meaningfully decreased in decades (CDC, 2016). Recent meta-analytic evidence indicates this stagnation in suicide science is likely a noisy data problem - researchers have long confined their analyses to essentially the same set of low-signal variables (e.g., demographics, social circumstances; Franklin et al., 2014) whose value has already been tapped. Thus, I argue for a pragmatic remedy: the availability of lethal means represents a ‘sine qua non’ of suicide. Without a lethal method, a suicide cannot occur. This means data on means availability will be intimately connected with the primary outcome of concern, death by suicide, almost by definition. Given such findings are largely neglected in modern suicide theories, findings on means availability represent an untapped opportunity for theory enhancement. Discussion will first establish three reliable findings on means availability as ‘key criteria’ that any comprehensive theory of suicide must address. Second, the most popular explanation relating means availability to suicidal behavior is described and critiqued. Finally, the benefit of integrating means availability concepts into contemporary models is demonstrated using an already existing theory of suicide.

Chandler, Madison (G)
**Title:** Breast cancer susceptibility gene panel screening using next generation sequencing technology in an African American cohort in Alabama
**Primary Author (and presenter):** Chandler, Madison R.
**Additional Authors:** Merner, Nancy
**Department:** Department of Drug Discovery and Development
**College/School:** Harrison School of Pharmacy
**Description:** The African American (AA) population in Alabama provides a unique opportunity to address breast cancer (BC) disparities in the United States; although many
disparities can be attributed to social economic factors, biological factors have been reported to contribute to specific disparities. For example, AA women are diagnosed with BC at a higher rate under the age of 40 compared to Caucasian women and are more often diagnosed with triple-negative BC, a less treatable and more aggressive BC subtype. Since an early age of disease onset is a key characteristic of hereditary cancer and the Black Women’s Health Study demonstrated that AA BC displays a strong familial component, these AA BC disparities are most likely due to genetic risk factors. Prior to searching for novel BC susceptibility genes that harbour genetic risk variants, known BC susceptibility genes must initially be excluded. Traditionally, Sanger sequencing was used in order to screen individuals for mutations in known disease genes; however, following the introduction of next-generation sequencing, gene screening panels have been implemented; this innovative approach involves designing probes for target-capture, amplification, and massively-parallel sequencing of genes of interests. Forty-six hereditary BC cases were screened for 87 known and candidate BC susceptibility genes using a custom-designed Agilent Technologies HaloPlex probe capture kit, called BRAP (Breast And Prostate). Both AA and Caucasian cases were sequenced in order to compare ethnicities. This data provides great insight towards the complete array of mutations in known BC susceptibility genes that contributes towards hereditary BC in AA women. Furthermore, non-mutation individuals/families identified through this screening will be whole-genome sequenced in order to identify novel, BC susceptibility genes that may contribute towards disease disparity.

Chanysheva, Alina (G)

Title: Organophosphorus neurotoxin detection via electrochemical methods

Primary Author (and presenter): Chanysheva, Alina

Additional Authors: Arugula, Mary and Simonian, Aleksandr

Department: Materials Engineering

College/School: Samuel Ginn College of Engineering

Description: Over the past 30 years, the reports of bleed-air incidents on commercial airliners have introduced an increased interest to the problem of illness of cabin crew and passengers. At a cruising altitude of 11,000 m (37,000 ft) the environment control system (ECS) provides passengers and crew members with safe and comfortable environment conditions and protects from the ambient air temperature of -55°C (-67 F), the atmospheric pressure of about 30 kPa, and the moisture content of around zero. The ECS design employs cabin air delivery method of mixing the bled air and the recirculated air. Consequently, leakage of engine-oil seals introduces a threat of contamination of the cabin air with jet engine oil fumes. Organophosphorus compound, tricresyl phosphate (TCP), known to be a neurotoxin, is widely used as an additive in jet engine oils. The development of a highly-sensitive, robust, portable device for TCP detection on board of a commercial airliner is of an increased practical interest. Electrochemical detection method was chosen as it proved to be the most efficient tool for TCP detection. Non-electroactive p-TCP was hydrolyzed and detected via electrochemical methods. Ultrasonic irradiation is employed in the novel approach to accelerating the alkaline hydrolysis reaction of p-TCP.
Chen, Han (G)
Title: Cultural tourism: An analysis of engagement, cultural contact, memorable tourism experience and destination loyalty
Primary Author (and presenter): Chen, Han
Additional Authors: Rahman, Imran
Department: Nutrition, Dietetics, & Hospitality Management
College/School: College of Human Sciences
Description: This study examines the interplay between visitor engagement, cultural contact, memorable tourism experience (MTE), and destination loyalty in cultural tourism. The research was conducted with 320 individuals who have visited cultural tourist destinations within the past five years. Results, employing structural equations modeling, showed that visitor engagement positively influenced cultural contact and cultural contact positively influenced memorable tourism experience. In addition, memorable tourism experience had positive effects on tourist’s intention to revisit the cultural destination and intention to recommend the destination to others. Furthermore, cultural contact was found to fully mediate the relationship between visitor engagement and memorable tourism experience. Findings underscore the importance of cross-cultural interactions in creating memorable tourism experiences in cultural tourism. Avenues used to engage tourists such as guided tours, media and materials, and staff members must address the cultural tourists’ need for deeper cultural experience in order to successfully create MTEs.

Chen, Rui (G)
Title: The impact of HACCP implementation on U.S. fishery imports
Primary Author (and presenter): Chen, Rui
Additional Authors: Wilson, Norbert L
Department: Department of Agricultural Economics and Rural Sociology
College/School: College of Agriculture
Description: Hazard analysis and critical control points (HACCP) is a preventive approach to control for food safety along the food chain. The U.S. implemented HACCP in 1998, while the European Union implemented HACCP in 2006. The findings of previous papers suggest mixed effects of HACCP. HACCP increases the compliance cost for the producers; thus, it may decrease trade. On the other hand, HACCP supports safer foods; thus, it increases consumers’ confidence in food safety which may enhance trade. This paper is the first to estimate HACCP implementation using difference-in-differences, gravity specification. In the trade model, we assume that the treatment (U.S. fishery imports) and control (EU fishery imports) have the same trend in the imports in the pre- (1988-1997) and post-HACCP period (1998-2006) to control for the changes caused by existing differences between those two groups. Empirical results show that the implementation of HACCP increased market access for other trading exporters and imports by 11.5%, which is different from those predicted by Anders and Caswell (2009) with an overall 27.3% decrease, and Li, Saghaian and Reed (2013) with a 56% increase in U.S. mollusks exports.
Chen, Zhou (G)
Title: The immune gene expression and pyrethroid resistance in house flies *Musca domestica*
Primary Author (and presenter): Chen, Zhou
Additional Authors: Liu, Nannan
Department: Entomology and Plant Pathology
College/School: College of Agriculture
Description: Previous studies showed that the mosquito immunity against nonself infections in pyrethroid insecticide resistant mosquitoes *Anopheles gambiae* and *Culex pipiens* was varied from their susceptible counterparts. However, the molecular mechanisms beyond these phenomena remain largely unknown. The house fly *Musca domestica* is not only an important vector of infectious disease pathogens for humans, livestock, and poultry but also has developed resistance to different insecticides, including pyrethroids. Cluster analysis showed that the house fly shared the immune component patterns similar with the fruit fly *Drosophila melanogaster*. Transcriptome analysis and real-time quantitative PCR (qPCR) validation revealed that multiple immune genes in the house fly were differentially expressed between the permethrin-resistant and -susceptible strains, and these differentially expressed genes were mainly from the toll and the immune deficiency (IMD) pathways in arthropod innate immune system, which account for the fungal / Gram-positive (Gram⁺) and Gram-negative (Gram⁻) bacterial infections, respectively. These discoveries strongly indicate a linkage of the immune system with the insecticide resistance in house flies.

Clark, Kara (G)
Title: Improving cardiac rehabilitation participation to decrease heart failure readmissions
Primary Author (and presenter): Clark, Kara E.
Additional Authors: Sanderson, Bonnie
College/School: School of Nursing
Description: Cardiac Rehab (CR) is a supervised program designed to educate and counsel patients with heart disease to reduce risk of future heart issues. It has been shown that education along with regular follow-up telephone calls that promote self efficacy among heart failure patients improve self-management skills and may help reduce the rate of 30 day acute care readmissions. The purpose of this project was to implement follow-up phone calls to eligible heart failure patients to help them adhere to discharge instructions and increase CR enrollment. A staff in-service was provided on CR with pre-post evaluation of their understanding the benefits of CR for heart failure patients. Target population for patients included adults (65-88 yrs) with heart failure who did not enroll in CR. Following telephone consent, participants were called and asked a series of questions about their follow-up care and CR enrollment. A follow up phone call was done at days 7 and 21 to assess the patient’s adherence to discharge instructions and their intention of enrolling in CR. Descriptive statistics were used to describe the patient population, adherence to discharge education, if the patient enrolled in CR, and if not, the reason the patient did not enroll. Staff in-service included X participants and the results indicated an improvement in understanding of CR and the benefits for HR patients from
pre education (mean, sd) to post education (mean, sd) (p<0.05) X patients consented to participate (% females), average age of X (sd) yrs. X % were followed up through telephone calls, X% committed to CR, and X% denied CR. Follow-up indicated that X% enrolled in CR compared to % percent who enrolled prior to project. The staff education increased awareness of CR benefits and CR enrollment rates increased following telephone calls that raised their awareness.

**Clausell, Sekeita (G)**
**Title:** Hypertension screenings
**Primary Author (and presenter):** Clausell, Sekeita B.
**Additional Author/Advisor:** Dr. Hamilton, Cam
**College/School:** School of Nursing
**Description:** Hypertension is a modifiable risk factor which leads to the most prominent cause of death in America, cardiovascular disease. Evidence has shown that nurse-led interventions are effective for blood pressure control (Glynn, Murphy, Smith, Schroeder & Fahey, 2010). The purpose of this project was to examine improvement in blood pressure control in participants following nurse-led community hypertension screening and education. The relationship between nurse-led interventions and participant behavior change was assessed. The target population included African American women ages 40-80 screened in a church. Following informed consent, each participant completed an amended version of the Chronic Disease Self-Management Program questionnaire and had their blood pressure checked and recorded by a nurse. Nurses educated participants on hypertension management including diet, exercise, and medication compliance. Descriptive statistics were used to describe the participant population, self-monitoring of blood pressure and comorbidities. Questionnaire responses and blood pressure readings from the initial screening and the follow-up screening were compared using paired t-tests. X consented to participate (98% female), average age of X (sd) years. X% were identified with hypertension, X% were referred for primary care evaluation, and X% were referred for emergency department care. Follow-up indicated that the mean blood pressure readings improved from the initial screening (mean, sd) to the one month follow-up screening (mean, sd) significantly (p<=0.05). Nurse-led community blood pressure screenings and education among hypertensive participants led to significant blood pressure control and management. A correlation was found with identification and follow-up of hypertensive participants when nurses are involved with a community intervention.

**Cole, Andrea (G)**
**Title:** Effect of growth rate on *Amylostereum* spp. fungus by terpenes
**Primary Author (and presenter):** Cole, Andrea B.
**Additional Authors:** Eckhardt, Lori G. and Slippers, Bernard
**College/School:** School of Forestry and Wildlife Sciences
**Description:** *Sirex noctilio* is a species of woodwasp native to Europe that has been identified as invasive in Australia, South Africa, and the Northeastern United States, but has not yet been identified in the southeast. This pest has caused significant economic and ecological damage, and in some cases mortality of previously healthy trees. Females
cause damage to Pinus spp. by drilling into the xylem to oviposit eggs, venom, and a mutualistic fungus, causing trees to begin to die within days of inoculation. Certain chemicals emitted by stressed pines have been observed to serve as chemical attractants to the wasps. As a means of exploring pine resistance to Sirex associated fungi, the effect of these mentioned host plant secondary metabolites on the growth of these fungi were tested. Eighteen isolates of Amylostereum spp. collected worldwide were grown in saturated atmospheres or in direct contact with pure monoterpenes for 7 days. Fungal growth in the saturated atmosphere was measured on day 7 while the tactile experiment was measured at 3, 5, and 7 days. These experiments showed that certain metabolites such as 4AA, α-Phellandrene, (+) Camphene, and (-) Limonene were shown to significantly reduce growth of isolates compared to control treatments. Conversely, α-Pinene and β-Pinene treatments tended to increase growth rates of the fungal isolates. A difference in growth rates between isolates from the northern hemisphere and southern hemisphere was also observed. The treatments (+) α- Pinene and β- Myrcene resulted in the highest percentage of fungal growth for all isolates tested when comparing fungal growth as a percent area relative to the controls.

Cole, Meghan (G)
Title: Improving transition into primary care
Primary Author (and presenter): Cole, Meghan M
Additional Authors: Sanderson, Bonnie
College/School: School of Nursing
Description: There is strong evidence that shows improving the transition of care to the primary care from the Emergency Department (ED) improves continuity of care and decreases return visits. Evidence-based guidelines suggest a follow-up processes including a follow-up phone call discharge from the ED. Follow-up phone calls will serve as the most cost-effective communication with the patients. The purpose of this project is monitor readmissions and patient’s compliance with instructions after the implementation. Patient adherence to medication compliance and follow-up appointment will be assessed. Target population include patients (>65) with chronic illness in a primary care setting recently discharged from the ED. Following informed consent, participants were contacted by phone for a questionnaire 72 hours after discharge. Adherence to making the follow-up appointments, medications compliance, and understanding discharge instructions will be assessed. Another follow-up phone call will be made after 30 days to assess adherence with medications, follow-up appointments, and to assess if the patient returned to the hospital. Descriptive statistics were utilized to define the results. Patient’s level of understanding of instructions will be measured with a likert scale (0=no understanding- 10= complete understanding will be compared between initial and 30 day post discharged using a paired t-test. X consented to participate (% females) and (% male), average age of X (sd) yrs. X % were identified with compliance with follow-up appointment. Follow-up indicated the X% that adhered to the medication. The patients discharged after the EBP process was implemented, the mean pre (mean=x, sd=x) to post (mean=x, sd=x), significantly (p=x). Follow-up process with patients discharging from the ED is to monitor continuity of care and improve transition to primary care. Early assessments of compliance are achievable in the primary care setting.
Collier, Caroline (UG)
**Title:** Ethereal Militia
**Primary Author (and presenter):** Collier, Caroline, M
**College/School:** College of Human Sciences
**Description:** The idea behind Ethereal Militia is to provide a fresh take on luxury garments with a social mission. With this challenge in mind, I have designed and constructed a formal coat and evening gown using only sustainable materials and artisan techniques. The elements in my design include vintage military and Boy Scout patches, non-toxic dye, surplus fabric, vintage sleeves and recycled thread. This design has been entered into the annual International Textile and Apparel Association competition and the winnings are given to the most well-constructed, innovative design. However, I do not only see upcycling my materials as a competitive edge, but a lifestyle choice. There is a nostalgic spirit that accompanies vintage shopping, like playfully rummaging through my grandmother’s closet. I have a love for salvaged materials not only because of their uniqueness, but also because of their ceremonial aesthetic and quiet ability to tell a love story. I believe that Ethereal Militia encapsulates both my love for vintage clothing, and the world’s need to take a more ethical approach to couture.

Cook, Jonathan (G)
**Title:** Synthesis of functionalized polyaniline as a conductive curing agent for epoxy resins
**Primary Author (and presenter):** Cook, Jonathan E.
**Additional Authors:** Zhang, Xinyu
**Department:** Polymer and Fiber Engineering
**College/School:** Samuel Ginn College of Engineering
**Description:** Intrinsically conducting polymers comprise a unique class of organic materials capable of electrical conductivity in the semiconductor and metallic ranges. Of these polymers, polyaniline is the most studied due to its ease of synthesis and morphological control, as well as its multiple accessible oxidation states and reversible doping pathways. This work makes use of the fully oxidized pernigraniline state to produce amine functionalized polyanilines via a two step process. Oxidation of the emeraldine base is followed by reductive nucleophilic addition to yield covalently modified conducting polyaniline. Reaction progress was monitored by UV-Vis spectroscopy following the shift in absorption at 550nm to 650nm that occurs during the transition from pernigraniline to emeraldine oxidation state. The substrate scope of the reaction included a variety of diamines and polyamines, and was found to be tolerant of a range of organic solvents, as well as water. Higher temperatures allow for a greater degree of substitution, while room temperature synthesis provided the substituted emeraldine state only. Preliminary investigations via DSC showed promising potential for these materials as functional curing agents for epoxy resins, with exothermic curing peaks in the range of 170-210 °C depending on the amine used. These results provide a fast, simple, and more environmentally friendly route to producing polyaniline derivatives for use in new composite materials.
Copley, Kirk (UG)
**Title:** Standardization of agriculture production budget models using python
**Primary Author (and presenter):** Copley, Kirk, D
**Additional Authors:** Brandt, Craig; Webb, Erin
**Department:** Biosystems Engineering
**College/School:** Engineering
**Description:** The Billion-Ton Studies (Perlack et al. 2005; U.S. Department of Energy, 2011) were commissioned to conservatively assess the feasibility of producing one billion dry tons of biomass annually in a sustainable manner. Updates to this study aim to improve accuracy and increase transparency of biomass production budgets of the resource assessment projections. Biomass resource assessment production budgets used in the billion-ton projections were created using Excel spreadsheets using built-in cell functions and hardcoded values. While this method works in the short term, problems such as poor usability, errors, and multiple file versions emerge in the long term. Most of these errors can be negated by implementing a top down design approach. The goal is to standardize the method of creating biomass production budgets in such a way that parameters can be added and adjusted without causing errors in the execution. Existing parameters are transferred to an Access database and the model is executed in Python. The benefit of this approach is increased usability, reduction of errors, and increased ease of debugging.

Cowper, Emily (UG)
**Title:** What the frack is in our water? What the frack is in my water?
**Primary Author (and presenter):** Cowper, Emily, E.
**Department:** Environmental Design
**College/School:** College of Architecture, Design and Construction
**Description:** My individual research project for ENVD 4010 discusses the effects of hydraulic fracturing on regional and global water sources. Hydraulic fracturing, or fracking, is a drilling technique used to extract natural gas and oil from shale rock formations underground. My research topics were as follows: Extreme Water Consumption, Water Contamination and Offshore Drilling. I gathered facts and figures from various web sources including governmental and environmental organizations. The data presents water, fracking and the controversy that surrounds it from two perspectives: global and regional. Through my research, I found that fracking is not only an environmental matter but a social, political, economic and public health issue as well. This topic has divided communities, politicians and nations. The economic benefits of fracking are obvious. Increasing natural gas production in North America has created thousands of jobs and given millions of people access to an inexpensive source of energy, all while decreasing reliance on foreign governments for oil. However environmental degradation, extreme water consumption and threats to human/animal health are just some of the issues that have raised concerns about the safety and ethics behind this drilling technique. The majority of concerns surrounding fracking could be contained or completely eliminated if frack sites were carefully and properly designed to reduce unnecessary water consumption, decrease the amount of offshore wells and avoid leaks that lead to water contamination. Instead of trying to clean up the existing problems, we should work to avoid the problems to begin with. With careful and well thought-out design, we can create a solution that does just that. I have designed two posters
to display my research in a visually compelling and non-biased way. The information presented in these posters examines the possibility of redesigning the fracking process to promote a reliable and sustainable energy future.

Criminale, George (UG)
Title: Interior Artifacts
Primary Author (and presenter): Criminale, George, C
Additional Authors:
Department: Interior Architecture
College/School: School of Architecture, Planning, and Landscape Architecture
Description: This research presents an argument that Georgia O’Keeffe’s design for her personal residence in Abiquiu, New Mexico had a direct influence on the relationship of interior artifacts, or personal belongings, to the landscape in the work of Alexander Girard, Charles and Ray Eames, and Eero Saarinen. It also makes a parallel between O’Keeffe’s residence and her paintings, suggesting that her residence was the three dimensional manifestation of her paintings. The goal of the research was to carefully examine and study the relationship between the paintings of Georgia O’Keeffe and her personal house, and the design work of Girard, the Eames, and Saarinen. The method used was to collect and carefully curate photographs of O’Keeffe’s residence and painting, the Eames house, Girard’s residence, the Rieveschi House, and both Miller House’s. The professional and personal relationship between all these individuals was also studied. The result is a strongly supported argument that O’Keeffe’s residence had a direct influence on the relationship of interior to landscape in the work of Girard, the Eames’, and Saarinen. There is an idea about how you sit and your postures relationship to nearby personal objects and the landscape outside. This idea is prominent in the work of Girard, the Eames’, and Saarinen. O’Keeffe’s residence predates these other projects, establishing a timeline of influence. Part of the significance of this research is to draw attention to O’Keeffe’s residence as a part of her lifetime of work. For her house to have such an influence on the work of some the last century’s most prolific designers should carry great significance. It is also significant for architectures current obsession with making buildings and interiors more like a landscape, or mimicking landscapes. The ideas in the work studied offer an alternative; that we treat the landscape more like an interior, rather than treating the interior like a landscape.

Criswell, Brandi (G)
Title: Preventing nutrition disparities in patients with head and neck cancer
Primary Author (and presenter): Criswell, Brandi I
Additional Authors: Ellison, Dr. Kathy Jo
College/School: School of Nursing
Description: Nutritional disparities are common in patients undergoing treatment for head and neck (H&N) cancer. Considerable evidence suggests that early dietary intervention including consulting a dietician, and preparing a plan of care based on individual patient needs can decrease these disparities. The purpose of this project was to implement a change in practice to include consulting a dietician prior to treatment for patients with a new diagnosis of head and neck cancer. The target population included all newly diagnosed H&N cancer patients seen at a metropolitan cancer Center (MCC). X patients consented and were enrolled in the program. Patients were scheduled to see the
staff registered dietician (RD) for dietary counseling prior to the initiation of treatment. Patient’s pre treatment BMI, weight, and any dietary related breaks in treatment were recorded, as well as three weeks into treatment. These same values were recorded three weeks into treatment and one-week post treatment. This data was then compared to chart audits of previous H&N cancer patients who did not have an initial RD consult. X% of patients from the chart audits saw a significant negative change in weight and BMI versus X% of patients who participated in the change. The patients from chart audits had an average of X dietary linked breaks in treatments while the STOC patients only had X breaks in treatment. The mean BMI, weight, and treatment break scores improved when the two groups were compared (mean SD) significantly (p=<0.05). Early dietary intervention improves patient outcomes related to weight, BMI, and breaks in treatment when undergoing chemoradiotherapy for H&N cancer. Suggestions for continued implementation include consulting a dietician on all newly diagnosed head and neck cancer patients.

Cross, Philip (G)
Title: Chemical properties of lignin that effect tar formation during gasification of biomass
Primary Author (and presenter): Cross, Phillip J
Additional Authors: Adhikari, Sushil
Department: Biosystems Engineering
College/School: College of Engineering
Description: This work is on the thermochemical conversion of biomass and how the chemical properties of lignin relate to the formation of “tar” compounds upon conversion. A great deal of research has gone into understanding how reactor type, temperature, amount and type of oxidizing agent and type of biomass influences the primary gas yield and overall tar yield. However, the effects of biomass chemical properties such as lignin S/G/H makeup and cellulose crystallinity have not been studied to such an extent. To gain a better understanding of how these properties effect tar formation, lignin was isolated from different types of biomass; hardwood, softwood, herbaceous crops and agricultural residues and characterized using ATR-FTIR and NMR. Cellulose fibers were ball milled to reduce the crystallinity then samples were then pyrolyzed at 500°C, 600°C, 700°C, 800°C, 900°C and 1000°C. Product compounds were analyzed by GC-MS and reported as percent peak area. Results of 31P NMR showed the expected results of S type lignin being more abundant in hardwood. Additionally COOH groups were more abundant in softwood as well as aliphatic OH groups. Pyrolysis reviled that softwoods produce more tar compounds, as expected from literature. It is suspected that the G lignin monomer unit is responsible for the higher tar content.

Cullum, Richard (G)
Title: Validation and implementation of screens for targeted melanoma drug discovery
Primary Author (and presenter): Cullum, Richard L
Additional Authors: Piazza, John; Senfeld, Jared; Neel, Logan; Gupta, Ram; David, Allan; Riese, David
Chemical Engineering

College of Engineering

Gain-of-function mutations in the ErbB4 receptor tyrosine kinase have been found in a significant fraction of melanoma cell lines that are dependent on ErbB4 for proliferation. However, there is a scarcity of therapeutics for treating these ErbB4-dependent tumors. Consequently, we have developed high-throughput screening assays to identify small molecule ErbB4 antagonists that may hold promise as targeted melanoma therapeutics. Our approach is based on the observation that the Q43L mutant of the ErbB4 agonist Neuregulin 2beta (NRG2b) functions as a partial agonist at ErbB4. NRG2b/Q43L stimulates ErbB4 tyrosine phosphorylation, fails to stimulate ErbB4 coupling to cell proliferation, and competitively antagonizes agonist stimulation of ErbB4 coupling to cell proliferation. Therefore, we have developed three high-throughput assays to identify ErbB4 partial agonists that function as antagonists. The primary screen identifies molecules that stimulate ErbB4 tyrosine phosphorylation. The secondary screen identifies molecules that stimulate or fail to stimulate ErbB4-dependent proliferation. The tertiary screen identifies molecules that antagonize agonist stimulation of ErbB4-dependent proliferation. Our phospho-ErbB4 sandwich ELISA identifies molecules that stimulate ErbB4 tyrosine phosphorylation with high sensitivity and fidelity (Z’ >0.5). Our MTT assays using a cell line that displays ErbB4-dependent proliferation identify molecules that stimulate or fail to stimulate ErbB4-dependent proliferation (Z’>0.5) and identify molecules that antagonize agonist stimulation of ErbB4-dependent proliferation (Z’>0.5). The validated ELISA has identified small molecules that stimulate ErbB4 tyrosine phosphorylation. Efforts to determine whether these hits function as ErbB4 full agonists or partial agonists/antagonists are currently underway. ErbB4 partial agonists that function as ErbB4 antagonists may hold promise as targeted therapeutics for ErbB4-dependent melanomas.

Da Cunha, Jose (G)

Title: Sensor-based irrigation scheduling can help corn growers to increase profitability and environmental stewardship

Primary Author (and presenter): da Cunha Leme Filho, Jose F

Additional Authors: Ortiz, Brenda; Pate, Greg

Department: Department of Crop, Soil and Environmental Science

College: College of Agriculture

Description: Frequent and prolonged droughts are increasing the vulnerability of farmers to meet crop water demand and to achieve high yield. Thus, there is a need for new irrigation technologies to increase water-use efficiency. Irrigation studies have been conducted (2014-2015) to evaluate two irrigation-scheduling methods based on water use and yield differences. The two irrigation scheduling methods are sensor-based and checkbook. The sensor-based scheduling method uses sensor readings and a specific soil water depletion threshold to trigger irrigation. In contrast, the checkbook method consists of application of irrigation water based on total weekly water requirements for a given phenological stage. Each studied field was divided into two management zones delineated based on soil electrical conductivity. Treatments were randomly assigned to each zone and water was applied using a variable rate irrigation system. Soil moisture sensor probes were installed on both zones. Each sensor probe
includes three soil moisture sensors, watermarks®, that monitoring soil moisture at 6, 12, and 24 inches depth. The sensor-based treatment plots were only irrigated when the soil moisture sensors installed at each zone reached 35% depletion from plant available water. The 2014 season results indicated no significant corn yield differences between the irrigation scheduling treatments, however there were differences in the total water applied. At zone A, on average checkbook outyield sensor-based by 7 bu/ac but the checkbook used 5.4 inches more water than the sensor-based method. At zone B, there were no yield differences but the checkbook used 4 inches of water more than the sensor-based method. In 2015, there were no significant corn yield differences between the treatments. There were 2 inches irrigation water differences between irrigation treatments. The data collected from these studies is providing a lot of information on the best way to use the sensor data for irrigation scheduling.

Damianidis, Damianos (G)
Title: Evaluating a generic drought index as a tool to predict aflatoxin contamination in corn
Primary Author (and presenter): Damianidis, Damianos
Additional Authors: Ortiz, Brenda; Windham, Gary; Scully, Brian; Woli, Prem
Department: Crop, Soil, and Environmental Sciences
College/School: College of Agriculture
Description: Pre-harvest aflatoxin contamination in corn (Zea mays L.) is a continuing issue in the Southeast United States especially during growing seasons characterized by extreme high temperatures, low humidity, less than normal precipitation, all conditions promoting in-field drought. Predicting the risk is challenging due to complex interactions of biotic and abiotic stress factors that govern and exacerbate the phenomenon. This study was conducted to determine whether a drought index could be used to predict the risk for pre-harvest aflatoxin contamination in corn, as well as to determine risk differences in-season and among sites The data used for this study consisted of historical records on aflatoxin contamination and were collected at Starkville, Mississippi, U.S. over a period of eleven years. The predictor variable tested was the Agricultural Reference Index for Drought (ARID), a generic drought index calculated on daily basis. ARID was evaluated as an aflatoxin risk prediction tool. Silking day was selected to split each growing season into two time periods. Thus, each season consisted of positive and negative days representing days after and afore mid – silk, respectively. Weekly-ARID factors were calculated for both timespans aforementioned, in an effort to evaluate the in-season alterations in aflatoxin risk. Multiple logistic regression models were used to predict aflatoxin risk as a function of the weekly ARID values, soil type, and corn hybrid susceptibility. Results revealed: 1) ARID might be used as a predictive tool to assess aflatoxin risk, 2) soil type and hybrid susceptibility to aflatoxin contamination were statistically significant independent factors, and 3) critical week windows during the growing season when changes in drought conditions affect the likelihood for aflatoxin contamination were determined. The findings of this work will be used to minimize risk by adapting site-specific management strategies that alleviate plant drought stress.

Damron, Adley (UG)
Title: The effects of simulation on unlicensed nurses self-efficacy, clinical skill application, and critical thinking.

Primary Author (and presenter): Damron, Adley, M

Department: Auburn University School of Nursing and Medical Sciences

Description: There are several varieties of learning styles from kinesthetic to verbal and more that are identified by experts in an effort to discover how individuals learn. Research has identified lifelong learning as accomplished through utilizing multiple learning styles simultaneously. Human Patient Simulation (HPS) as a lecture supplement has been reported by peer reviewed journals such as, The Journal of Professional Nursing, Nursing Education Today, and The Western Journal of Nursing Research as an active learning method that increases retention and application to serve as a successful teaching instrument. HPS is the use of lifelike manikins and real life scenarios followed by a debriefing session. HPS is reported to independently improve exam results for prelicensure students regardless of age, learning style, or critical thinking ability. This review of literature is an appraisal of qualitative and quantitative research regarding the effects of simulation on prelicensure nursing students and their critical thinking, self-efficacy, and safety at the bedside.

Dean, Terrica (G)

Title: Group-based medical visits in Type II diabetes patients

Primary Author (and presenter): Dean, Terrica T

Additional Authors: Ellison, Kathy Jo

College/School: School of Nursing

Description: Over a million people in the U.S. have diabetes. People with diabetes may develop serious complications. There is strong evidence that group-based medical visits contributes to better health outcomes among Type II diabetes patients. The purpose of this project was to implement group-based medical visits and provide appropriate treatment recommendations. Target population included adults (18-80 yrs) with Type II diabetes in a primary care clinic. Following consent, the patient’s baseline labs, weight, and blood sugar were recorded. The nurse practitioner reviewed the results to guide treatment recommendations. Education on diet, exercise, and medication compliance were provided. The group-based medical visits helped patients improve health behaviors (e.g., choose appropriate foods, able to follow food and exercise plan). A follow-up phone call at 4-6 weeks was made to assess patient adherence with recommended treatment. Descriptive statistics were used to describe the patient population, prevalence of diabetic symptoms, treatment recommendations, and patient adherence. Among patients with Type II diabetes symptoms at target or lower, the pre-post lab and weight values were compared with paired t-tests. X consented to participate (% females), average age of X (sd) yrs. X % were identified with Type II diabetes symptoms, X% were treated with medication, X % were treated with diet and exercise, X% were recommended medication, exercise, and diet. Follow-up indicated X % adhered to treatment and medication compliance. Average blood sugars, HbA1c, and weight improved significantly from pre- to post (p=<0.05). Group-based medical visits in Type II diabetes patients identified health behaviors that guided appropriate treatment. Results support continued implementation of group visits in this primary care setting to foster early identification, education, and treatment of Type II diabetes.
Deokar, Pratik (G)
Title: Effect of nanoparticles aspect ratio on the two phase flow boiling heat transfer coefficient of refrigerant and nanolubricants mixtures in a 9.5 mm micro-fin tube
Primary Author (and presenter): Deokar, Pratik S
Department: Mechanical Engineering
College/School: Samuel Ginn College of Engineering
Description: In vapor compression cycles of air conditioning and refrigeration systems, a small amount of the compressor lubricating oil is carried with the refrigerant and it circulates in the system components. In the heat exchangers, oil is a contaminant and it decreases the heat transfer rate and increases the pressure losses: both are unavoidable challenges. Nanolubricants, that is, nanoparticles dispersed in the non-volatile component of a refrigerant and oil mixture, have the potential to overcome these challenges in a cost-neutral manner. The study of nanolubricants is still in its infancy and the proposed mechanisms of enhancements were only postulated to be due to lifting, tumbling, and spinning of the nanoparticles that induce nano-convection and eddies. To date, there does not appear to be direct evidence of such effects. Our research presents the effects of the nanoparticles’ aspect ratio on the two-phase flow heat transfer coefficients of nanolubricants by experimentally studying two types of nanolubricants; one consisting of spherical 40 nm Al2O3 nanoparticles, and other with hexagonal wurtzite shaped 20 nm ZnO nanoparticles. Flow boiling heat transfer coefficient were measured in a 9.5 mm micro-fin tube for refrigerant R410A and nanolubricant mixtures. The two nanolubricants were tested at nanoparticles volume concentration that varied from 2 vol.% up to 20 vol.% in POE oil. Over 10% enhancement in the two phase flow boiling heat transfer coefficient were observed, the nanolubricant mass fraction was only 1 wt.%, while at 3 wt.% the effect of POE oil was dominating the flow boiling process and the nanoparticles were suspended in the flow in a neutral buoyant mode. By focusing on nanoparticles with similar solid thermal conductivity but different aspect ratio the experimental results of present work provided evidence of additional heat transfer enhancement as caused by shearing-induced particle migration, particles shaving, and tumbling.

Derhami, Shahab (G)
Title: A novel optimization approach for data mining: A medical diagnosis case
Primary Author (and presenter): Derhami, Shahab
Department: Industrial and Systems Engineering
College/School: Samuel Ginn College of Engineering
Description: Healthcare systems collect tremendous amount of medical data, which contains invaluable hidden knowledge but are not discovered properly. Discovering this hidden information assists physicians to diagnose and treat diseases effectively. Various data mining techniques have been developed to identify the hidden information and trends laid in the medical data. Among them, fuzzy rule based classification systems (FRBCSs) are one of the most accurate approaches. They are capable of encompassing nonlinear and complex relations in a dataset, which is required to establish a precise classification model. The main advantage of the FRBCS is that their interpretable linguistic rules are easily understood by the users; however, extracting them
from a dataset is very challenging. Numerous heuristic approaches have been proposed to solve this problem; nevertheless, no exact optimization algorithm has been developed to extract fuzzy rules. In this research, we propose an integer programming approach to extract optimal fuzzy rules from medical datasets. The performance of the proposed model is evaluated in predicting liver disorders, Heart Disease, Parkinson disease, diabetes, breast cancer and localization site of proteins. The comparative study verifies that this approach achieves higher predictive accuracy in diagnosis these diseases than the state-of-the-art approaches.

Dessert, AJ (UG)
Title: Pediatric trauma and disease control center
Primary Author (and presenter): Dessert, AJ
Additional Authors: Poellnitz, Harriett; Miller, Allison; Rolf, Christy
Department: Consumer and Design Sciences
College/School: Human Sciences
Description: The Pediatric Trauma and Disease Control Center will be located in Sao Paolo, Brazil. Brazil is currently dealing with a Zika Virus outbreak, so the hospital will help contain the outbreak and provide a facility to research and educate others about the virus. Brazil also has unusually high rates of crime and violence, with the highest cause of death for children being murders. The Pediatric Trauma and Disease Control Center will provide a facility to treat children who are suffering from traumatic injuries. One healthcare challenge of this project is the climate of the location. Humidity and weather patterns of the city must be considered when specifying materials and products. Another factor of the climate challenge is the HVAC and maintenance of air quality inside the facility. Additionally, isolation and controlled access to the center for disease control is paramount. Since this facility is a pediatric center, the facility must be designed to feel comforting and welcoming to families and children. In order to address this issue, we plan to provide multiple public spaces with “playgrounds” for the children as well as selecting comforting and healing materials and palettes. Biophilic elements will be incorporated into the design in order to create a healing environment. The principle units of the facility will include trauma units, emergency room, ICU, NICU, disease control center, research labs, and education centers. Overall, the Pediatric Trauma and Disease Control Center will be a welcoming and soothing healthcare facility designed to treat and educate children and their families suffering from trauma and diseases, while also giving physicians the resources and ability to research these diseases and better treat patients.

Devkota, Pratima (G)
Title: Varying tolerance of mature loblolly pine (Pinus Taeda L.) families to root infecting fungi
Primary Author (and Presenter): Devkota, Pratima
Additional Author: Eckhardt, Lori
Department: Forestry
College/School: School of Forestry and Wildlife Sciences
Description: Pine decline is an emerging problem in the southern United States. Root feeding bark beetles and their fungal associates Leptographium terebrantis (native)
and *Grosmannia huntii* (non-native) are the biotic factors involved in decline. This study was conducted to understand the susceptibility of mature loblolly pine (*Pinus taeda* L.) families to these fungi and correlate results with the same pre-screened seedling families. Two mature families which were susceptible and two families which were tolerant in the previous seedling screening study were included. In the study, two primary lateral roots were excavated from each tree. Each of the roots was artificially inoculated with either *L. terebrantis* or *G. huntii* along with a control. Eight weeks following inoculation, host responses was recorded as the lesion and vascular occlusion. Both of the fungi caused lesions and occlusions upward and downward radiating from the point of initial inoculation. Families screened showed different levels of susceptibility to the fungal species tested, as indicated by their average lesion length. The pattern of susceptibility and tolerance in the large mature tree families and seedling families was similar. In summary, the same level of family difference exists in mature as well as in premature stages of loblolly pine families.

**Dieujuste, Nathalie (UG)**

**Title:** Support for the utility of a seven-factor hybrid model of PTSD  
**Primary Author (and presenter):** Dieujuste, Nathalie  
**Additional Authors:** Silverstein, Madison, M.S.; Kramer, Lindsay, B.S.; Lee, Daniel, M.S.; Weathers, Frank, Ph.D.  
**Department:** Department of Psychology  
**College/School:** College of Liberal Arts  
**Description:** The revised Diagnostic and Statistical Manual of Mental Disorder (*DSM-5*) criteria for posttraumatic stress disorder (PTSD) propose that symptoms are best categorized into four clusters: intrusions, avoidance, negative alterations in cognition and mood, and arousal and reactivity (APA, 2013). However, factor analytic research has demonstrated that PTSD symptoms are better organized into seven symptom clusters: intrusions, avoidance, negative affect, anhedonia, externalizing, dysphoria, and arousal (Armour et al., 2016). Despite the factor analytic support for a seven-factor model, little research has examined the degree to which these newly established symptom clusters functionally and meaningfully differ in their association with other clinical phenomena (e.g., depression, substance abuse, suicidal ideation; Pietrzak et al., 2015). The aim of the current study was to examine the degree to which newly established PTSD symptom clusters differentially relate to co-occurring psychopathology and related clinical phenomena through Wald testing using latent variable modeling. Participants were 424 trauma-exposed undergraduates who completed the Posttraumatic Stress Disorder Checklist for *DSM-5* (PCL-5) and Personality Assessment Inventory (PAI). As expected, significant heterogeneity emerged with a variety of PAI subscales (e.g., verbal aggression and hypervigilance). Surprisingly, there were instances where heterogeneity did not emerge (e.g., grandiosity). Results indicate that many symptom clusters significantly differ in their associations with related clinical phenomena and that the seven-factor model provides a meaningful framework for understanding which PTSD symptoms relate to associated features. Limitations include a cross-sectional design and reliance on retrospective self-report assessment measures.

**Dillette, Alana (G)**
Title: Experiences of wellness through tourism: A content analysis of tripadvisor reviews

Primary Author (and presenter): Dillette, Alana K
Additional Authors: Douglas, Alecia

Description: The travel and tourism industry has long been considered to provide a plethora of leisurely experiences or pursuits that renew, rejuvenate, and relax the would-be traveller. Unfortunately, while holidays do have the potential to lead to these positive effects, the reality of today’s travel environment is the opposite in that travel experiences can actually decrease one’s level of overall health (GWI, 2013). Current literature linking tourism to wellbeing is scarce (Gilbert & Abdullah, 2002; Voigt et al., 2010). The available evidence seems to suggest that wellness tourism can directly impact tourists’ overall health and wellbeing (Smith & Kelly, 2006; Smith & Puczko, 2008), however there is insufficient research to draw any firm conclusions. This study conducts a qualitative content analysis of tripadvisor reviews from 20 wellness tourism companies to understand the experiences of wellness tourists and how they may contribute to overall well-being. Textual content analysis of 1216 reviews revealed four dimensions of wellness experienced through tourism, namely, body, mind, spirit and environment. Clustered amongst these four dimensions were fourteen interpretive codes. A discussion related to the components of wellness tourism revealed both pathways and barriers to wellness through tourism, thus making a connection between tourism, health and psychology expanding the current academic literature in the field. Implications of this study are relevant to both wellness tourism companies, travellers as well as healthcare facilities.

Dinan, Maude (UG)

Title: Investing environmental literacy: determining the relationship between socio-demographic factors and bird identification ability

Primary Author (and presenter): Dinan, Maude, E.
Additional Authors: Pruitt, Susan; Lepczyk, Christopher

Description: The effectiveness of conservation and management actions is influenced by the ecological knowledge, or ecoliteracy, of the public. Social, cultural, and economic differences are hypothesized to affect ecoliteracy. Given the relative lack of research linking sociodemographic factors to ecoliteracy in adults, we sought to investigate the relationship between landowner sociodemographic factors and the number of birds observed by landowners as being present on their property across a rural-to-urban landscape. To determine how sociodemographic factors related to the number of birds identified (bird richness) on one’s property, we considered the factors of age, gender, education, property size, years lived on property, along with interactions between the first three factors and route location using a Poisson regression in a generalized linear model. The top model included all six individual factors (age, gender, education, route, parcel size, and years on property) along with an interaction between route and education. Age and the interaction between education and route had a small positive effect on landowner ability to identify birds, while gender, route, parcel size, and years on property demonstrated a slightly negative effect. Ultimately,
sociodemographic factors were not reliable indicators of a person’s ability to list bird species. Thus, these factors alone should neither be relied upon to determine a person’s ecoliteracy, nor to determine conservation and management actions.

Dobson, Connor (UG)
**Title:** Development and functionalization of gold-lipid nanocomposites for cancer theranostics
**Primary Author (and presenter):** Dobson, Connor S.
**Additional Authors:** Pickering, Christina; David, Allan; Panizzi, Peter; Arnold, Robert D.
**Department:** Drug Discovery and Development; Chemical Engineering
**College/School:** Harrison School of Pharmacy and Samuel Ginn College of Engineering
**Description:** Traditional chemotherapeutic cancer treatments such as doxorubicin are poorly-selective cytotoxic agents that are effective at killing cancer cells, but are also toxic to healthy cells. Stealth liposome nanoparticles have been used as an effective strategy for improving drug delivery and limiting systemic toxicity, but can still suffer from inconsistencies in formulation, sub-optimal drug release and poor detection *in vivo*. We hypothesized that “nanocomposite” systems consisting of functionalized gold nanoclusters (AuNP) encapsulated within liposomes may be used to improve the efficacy of traditional chemotherapeutic drugs and permit non-invasive imaging. AuNP with diameters of approximately 2-4 nm were stably entrapped within conventional liposomes to form nanocomposites while maintaining narrow size distributions around 100 nm. *In vitro* studies indicate that the nanocomposites are non-toxic up to millimolar concentrations and intracellular uptake of the nanocomposites was confirmed by scanning confocal microscopy using a fluorescent (DiR) label. Nuclear magnetic resonance (NMR) data indicate that simple carboxyl activation can be used to bind poly-(ethylene glycol), or PEG, to the surface of the AuNP at room temperature. Preliminary data also suggests that paclitaxel can be bound to the gold nanoparticles via Steglich esterification. Further studies to optimize binding and release kinetics are ongoing. Utilizing an IVIS Lumina, non-invasive imaging data indicate that the DiR labeled nanocomposites can be tracked *in vivo*. However, initial studies (without optimization) indicate that the AuNP can only be detected with mild tissue penetration. Future work will focus on further functionalization of the AuNP, the introduction of targeting moieties, and leveraging the optical properties of the AuNP for simultaneous imaging using multispectral optoacoustic tomography (MSOT).

Duffie, Duston (UG)
**Title:** The search for meadow jumping mice in east-central Alabama
**Primary Author (and presenter):** Duffie, Duston R
**Additional Authors:** Gitzen, Robert A.; Sharp, Nicholas W.
**College/School:** School of Forestry and Wildlife Sciences
**Description:** The meadow jumping mouse (*Zapus hudsonius*) is a wildlife species of high conservation concern in Alabama due to lack of information about its current range and population size. Only a few publications have documented the species within central Alabama, with the latest from 1977. The primary objective of our study was to begin assessing the current occurrence of meadow jumping mice in east-central Alabama. As a secondary objective, we compared two small mammal sampling methods for assessing species occurrence. We built a database of possible trapping locations in ArcGIS and
selected sites from this database using Google Earth imagery. Trapped sites were selected based on proximity to locations where jumping mice were historically recorded and presence of suitable habitat for the species. Jumping mice inhabit areas with moist soils and predominately herbaceous or shrubby vegetation with dense cover. Therefore, our study focused on abandoned hayfields and grassy meadows along marshes, ponds, and streams. During the summer of 2015, 16 sites were sampled by alternating Sherman live traps and sooted track tubes. We did not capture or detect any meadow jumping mice. To address our second objective, we compared the trapping efficiency of track tubes versus live traps for the most commonly captured species, hispid cotton rat, marsh oryzomys, and cotton mice. We found no significant difference in probability of detection per survey night between these two methods for any species. However, track tubes detected more species than live traps, including shrews, chipmunks, and herpetofauna. Given the sporadic nature of previous jumping mouse captures, it is unknown whether the species has declined in east-central Alabama. For future studies of this species in Alabama, we intend to extend the geographic scale and increase sampling effort to provide further information about the jumping mouse’s current population and range throughout Alabama.

Dyke, Ford (G)
Title: Does a single bout of ‘green exercise’ facilitate engagement in future exercise behavior? A one-year follow-up pilot study
Primary Author (and presenter): Ford B. Dyke
Additional Authors: Taylor L. Buchanan, Beverly Z. Crawford, and Matthew W. Miller
Department: Kinesiology
College/School: Education
Description: An enhanced affective experience during a bout of exercise is positively correlated with future exercise engagement. Thus, it is important to explore means by which to enhance the affective experience of exercise. One way to do so may be to exercise in the presence of nature (i.e., engage in ‘green exercise’). This is because green exercise may be more pleasant than exercise completed in ‘artificial environments’ (e.g., urban settings). Therefore, individuals who engage in a bout of green exercise may exhibit more participation in future exercise when compared to those who engage in a bout in an artificial environment. The purpose of the present study was to test this hypothesis. Specifically, we investigated whether individuals who engaged in a bout of green exercise reported more exercise behavior 1 year later compared to individuals who engaged in a bout of exercise in an artificial environment. Forty low-active adults completed one 10-min bout of walking, at a self-selected pace, in either a green or artificial environment. Participants’ exercise behavior in the week proceeding the bout and post-treatment (1 year later) was indexed by way of the Stanford 7-day Physical Activity Recall Scale. A manipulation check questionnaire revealed the green environment was perceived as more natural than the artificial environment \( (p < .001) \). Nonparametric tests of the delta scores (exercise behavior 1 year after green/artificial exercise bout minus exercise behavior prior to bout) failed to reveal a significant group (green vs. artificial) difference \( (p = .110) \), although group differences were in the predicted direction (the green exercise group reported more moderate-vigorous physical activity). Thus, results failed to support the hypothesis, however it is
possible that a higher-powered study (e.g., larger $N$) could have yielded significant results.

Eddy, Madeleine (UG)
**Title:** Characterization of Salen Ligand Complexes for Application in Uranyl Sensing
**Primary Author (and presenter):** Eddy, Madeleine A.
**Additional Authors:** Hardy, Emily E.; Gorden, Anne E. V.
**Department:** Chemistry and Biochemistry
**Description:** The mining and processing of uranium ore for use in nuclear power plants is an integral aspect of energy production in the United States; however, these processes can lead to pollution with wastes that form uranium oxides in aqueous environments. Salen ligands, with the O-N-N-O binding motif, can be used to detect the presence of these uranium species for more efficient remediation. Complexation of salen ligands can also occur with other metals present in the environment, such as common transition metal contaminants like copper and iron resulting in a unique color change. A condensation reaction between a 2,3-diaminophenazine backbone and two 3,5-diterbutylsalicylaldehyde moieties results in a chemosensor that can distinguish the presence of actinides in solution as compared to other metals. Here, a series of transition metal complexes are characterized by UV-vis and compared to the uranyl complex.

Edmond, James (UG)
**Title:** Ion-momentum imaging of dissociative-electron-attachment dynamics in [Equation] and [Equation].
**Primary Author (and presenter):** Edmond, James A.
**Additional Authors:** Reedy, Dylan; Moradmand, Ali; Landers, Allen; Fogle, Michael; Haxton, Daniel; Rescigno, Thomas and Orel, Ann
**Department:** Physics
**College/School:** College of Science and Mathematics
**Description:** We have studied the low-energy dissociative electron attachment (DEA) interactions for nitrous oxide and acetylene at 2.3-eV and 3-eV shape resonances, respectively. We observed dissociation and anion production using an ion-momentum imaging apparatus based on the Cold Target Recoil Ion Momentum Spectroscopy (COLTRIMS) method in which a molecular beam produced by a gas jet is crossed by a pulsed electron beam. The DEA reaction involving nitrous oxide resulted in oxygen anions whose angular distributions implied the dominant interaction state at its energy was [Equation] and suggested a dissociation via a near linear configuration, which contradicts previous work stating that a significant [Equation] contribution resulted in a bending dynamic upon attachment. The DEA reaction with acetylene produced [Equation] anions at a [Equation] resonance. The measured angular distributions were indicative of a bending dynamic in the dissociation process. While this bending mechanism has been hinted at by previous experimental observations, there were never any direct observations. Modifications to our theoretical predictions have led to good agreement with our experimental fragment distribution, and our observed kinetic energy release for the anions showed low energy fragments alongside internal excitation of said fragments. In the future, we intend to study more complex molecules, e.g., formic acid and water clusters. To achieve this, we have modified the electron-molecule apparatus with a second differential pumping stage which
will reduce residual background gas and allow the use of larger gas jet nozzles when heating liquids to gas phase for molecular beam formation.

**Eggert, Matthew (G)**  
**Title:** The role of secretory phospholipase A2 isoforms and PLA2 receptor expression in modulating responsive liposome nanoparticle uptake and therapeutic efficacy within prostate cancer models  
**Primary Author (and presenter):** Eggert, Matthew W.  
**Additional Authors:** Brannen, Andrew D.; Panizzi, Peter R.; Cummings, Brian S.; and Arnold, Robert D.  
**Department:** Drug Discovery and Development; Department of Pharmaceutical and Biomedical Sciences  
**College/School:** Harrison School of Pharmacy, Auburn University  
**Description:** Our development of a secretory phospholipase responsive liposome (SPRL) has produced a drug delivery platform that we are actively investigating as a multi-functional system to target cancerous tissue, reveal sites of malignancy, and effectively release chemotherapeutic drugs. Secretory phospholipase A2 (sPLA2) enzymes, which are over expressed in a variety of cancer tissues and contribute to metastasis and malignancy, can be exploited for selective and tumor site-specific degradation of the lipid-based nanoparticles. In addition, the presence of regulatory membrane receptor for sPLA2 (PLA2R1) can influence enzymatic interaction with SPRL and endosomal uptake. Integration of a near-infrared fluorescent lipid probe into the liposome formulation provides the ability to monitor and quantify nanoparticle uptake in-vitro and to track liposome disposition non-invasively within tumor-bearing mice. Flow cytometry and fluorescence microscopy were applied to evaluate in-vitro uptake of liposome formulations in highly metastatic human prostate cancer cells (PC-3) and a PLA2R knock-down variant (PC-3-PLA2R-KD) with and without the addition of group IIA, V, and X isoforms of sPLA2. Results demonstrate a significant contribution of the IIA isofrom toward increasing cellular fluorescence and show differences in uptake of KD cells compared to regular PC-3 and a non-gene-modified scrambled-shRNA control variant. Importantly, fluorescence signal indicates SPRL uptake is significantly greater (p<0.05) than traditional liposome formulation (SSL) beyond 24hrs. In-vivo distribution and efficacy studies of doxorubicin-loaded formulations also revealed enhanced disposition of SPRL in subcutaneous tumors and greater growth-inhibition of tumors by both formulations within the PLA2R1 knock-down prostate cancer model. Ultimately, PLA2R1 performs an important role in modulating liposome nanoparticle drug delivery and eventually may further boost therapeutic targeting via peptide-enabled SPRL.

**Eldemery, Fatma (G)**  
**Title:** Characterization of binding of infectious bronchitis virus spike proteins representing vaccine subpopulations to chicken tissues  
**Primary Author (and presenter):** Eldemery Fatma E.  
**Additional Authors:** Farjana, Saiada; Williams, Robert; van Santen, Vicky.
Infectious bronchitis virus (IBV), an economically important coronavirus of chickens, undergoes an evolutionary process that results in continuous emergence of new serotypes. Live attenuated ArkDPI-derived vaccines contribute to emergence of new IBV variants in vaccinated chickens by natural selection, resulting in increased vaccine virus virulence and persistence. Previously, five minor vaccine virus subpopulations selected in chickens, designated component (C) (C1-C5), were identified. We hypothesized that spike (S) proteins of these vaccine virus subpopulations that are positively selected in chickens bind more efficiently to chicken tissues than that of the negatively selected major vaccine population and the binding efficiency may be increased by the extension of the S1 domain with S2. Secreted, trimeric, strep-tagged recombinant spike proteins representing S1 and ectodomain (S1+S2) of C2 (strongly selected), C3 (weakly selected) vaccine subpopulations and major vaccine population (negatively selected) of ArkDPI-derived vaccines were produced in Human Embryonic Kidney 293T cells from codon-optimized constructs. Purified, proteins were bound to relevant chicken tissues. C2S1 bound more strongly than vaccine S1 to tracheal tissues and nasolacrimal gland, while C3S1 did not bind to most tissues. None of the tested S1 domains bound to kidney and lung tissues, while all tested ectodomains bound. By comparing the binding of S1 with ectodomains, we found that S2 increases binding efficiency of C2 and vaccine spike proteins and is essential for binding of C3 spike to most tissues. Thus, spike proteins representing vaccine subpopulations selected in chickens bound better to chicken tissues than that of the negatively selected vaccine major population, suggesting that more efficient viral attachment may contribute to selection of these subpopulations in chickens. The S2 domain may have an important role in attachment and contribute to selection.

Escobar, Manuel (G)
Title: Obesity intervention in children and adolescents
Primary Author (and presenter): Escobar, Manuel G
Additional Authors: Sanderson, Bonnie
College/School: School of Nursing
Description: Obesity in children, a growing epidemic in the United States, leads to cardiac disease and other comorbidities in adulthood. It is crucial to assess, treat, and prevent this disease. The purpose of this intervention was to educate pediatric patients and their families regarding obesity. The project’s main objective was to find a positive or negative correlation between the educational intervention and the actual change in eating, activity habits, and physical attributes. The target population included parents of children ages 5 to 18 years old in the primary care setting. Following informed consent, participants along with their guardians were asked to fill out a pre intervention questionnaire. Education provided to participants included ways to combat the disease by introducing healthy eating and physical activity in their daily lives. The results of the questionnaire were compared to the results of the same questionnaire performed four weeks after the intervention. Descriptive analysis was used to describe the population, comorbidities, and the perceived educational benefit of the intervention. Comparison of pre to post measures evaluated the change in mean values for consumption of sugary drinks, the change in physical activity, and the change in BMI using paired t-tests.
number of individuals consented and participated in the intervention. From this group X% were male and X% were female. The mean for the number of days of physical activity was (increased/decreased) from pre (mean, sd) to post (mean, sd)(p=x). The mean sugary drinks were (increased/decreased) from pre (mean, sd) to post (mean, sd)(p=x). The mean BMI was (increased/decreased) from pre (mean, sd) to post (mean, sd)(p=x). This intervention provided obese pediatric patients and their families a starting point in identifying and combating obesity. Optimally, this project will help lower the incidence of obesity through increased awareness of the disease.

**Essien, Charles (G)**

**Title:** Assessing the sensitivity of acoustic tools to the effect of moisture content in estimating acoustic velocity and modulus of elasticity of loblolly pine (*Pinus taeda*)

**Primary Author (and presenter):** Charles Essien

**Additional Authors:** Brian K. Via; Qingzheng Cheng; Thomas Gallagher; Timothy McDonald; Lori Eckhardt

**College/School:** School of Forestry & Wildlife Sciences

**Description:** The use of acoustic techniques as a nondestructive tool for rapid assessment of quality properties of wood is gaining grounds and there are several tools available. Even though the fundamental principles underlying their operations are similar, their sensitive to moisture in wood might differ. In this study, we explored how the moisture content of the small clear wood samples (2.5cm x 2.5cm x 41cm), log and live tree affect the predictive capabilities of two acoustic tools namely Fakopp Microsecond Timer (Fak) and Fakopp Resonance log Grader (Ph) in reference to the conventional static bending test. The results indicated that the acoustic velocity decreased by 18% and 23% for Fak and Ph tools respectively when moisture content increase from 10% to 50%. Within the same moisture content range, the static MOE decreased by 41% while the dynamic MOE estimated by Fak and Ph decreased by 43% and 51% respectively. This means that the acoustic velocity is sensitive to the moisture content of wood and this sensitivity depends on the type of acoustic tool used.

**Farmer, Taylor (UG)**

**Title:** Expanding the scope of a new cascade reaction

**Primary Author (and presenter):** Farmer, Taylor, A

**Additional Authors:** Livant, Peter. Li, Xiaoxun

**Department:** Chemistry and Biochemistry

**College/School:** College of Science and Mathematics

**Description:** The synthesis of the polyol 2,2′-bi(glycerol) developed in our laboratory was considerably improved when we discovered that three separate steps leading from 5-bromo-2,2-dimethyl-5-nitro-1,3-dioxane, 1, to 2,2,2′,2′-tetramethyl-[5,5′]bi[1,3]dioxanylidene, 2, could be replaced with a single cascade reaction in which three reactions occur sequentially in the same reaction vessel. Bromonitro compound 1 reacts with an excess of NaH at 80 °C in either dimethylacetamide (DMA) solvent or N-methylpyrrolidinone (NMP) solvent for 1 – 3 h, affording 2 in 50-55% yield. Our initial investigations were confined to the reaction of 1. Using gas chromatography, mass spectrometry, NMR spectroscopy, and ESR spectroscopy, we were able to identify several long-lived intermediates, and also detect transient radicals or
radical ions during the course of the cascade. Recently we have turned to the question of whether the cascade reaction will work with bromonitro compounds other than 1. The synthesis of a bromonitro compound involves the preparation of a bromonitroso compound from an oxime, followed by oxidation of the nitroso group to the desired bromonitro compound. Recently, we have begun to investigate whether a bromonitroso compound, which is easier to prepare than a bromonitro compound can successfully undergo the cascade coupling reaction. Progress on all fronts will be reported.

Fang, Han (G)
Title: Effect of niacin on nonalcoholic fatty liver disease in adiponectin knockout mice: A pilot study
Primary Author (and presenter): Fang, Han
Additional Authors: Emily Graff and Robert Judd
Department: Anatomy, Physiology and Pharmacology
College/School: College of Veterinary Medicine
Description: Nonalcoholic fatty liver disease (NAFLD) is characterized by excessive accumulation of triglycerides, inflammation, and progression to nonalcoholic steatohepatitis (NASH). Studies in rodents demonstrate that adiponectin prevents development of NASH. Niacin, a drug that decreases plasma triglycerides and increases adiponectin, prevents hepatic steatosis in rodents. However, the role of adiponectin in niacin’s ability to inhibit the development of NASH is not known. To address this question, we conduct pilot study in male adiponectin knockout mice fed either a chow or high fat diet (HFD) for 20 weeks. Beginning at 6 weeks and continuing through the end of the study, niacin (360mg/kg/day) or vehicle was added to their drinking water. There was no difference in food or water intake due to diets or niacin treatment. As expected, HFD fed mice gained significantly more weight than chow fed mice. Surprisingly, niacin treatment significantly decreased body weight by 13% in HFD, but not chow fed mice. No significant change in liver or white adipose tissue weight was observed, but liver weight trended lower in niacin treated mice. Hepatic triglyceride content, macrovesicular steatosis, microvesicular steatosis, hepatocyte hypertrophy, and NASH score was significantly increased in HFD fed mice compared to chow fed mice, but did not change with niacin treatment. However, microvesicular steatosis, hepatocyte hypertrophy and NASH score trended down in niacin treated mice. Similar changes were also observed in average adipocyte area and crown-like structure number, in which there was a strong trend toward decrease in niacin treated mice. However, due to the limited number of mice in this pilot study, these data did not reach statistical significance. In conclusion, mice that were fed HFD developed NASH and niacin attempted to improve NASH in these mice. These findings were very promising and supported a larger study in the adiponectin knockout and appropriate control mice.

Farjana, Saiada (G)
Title: Changes in avian infectious bronchitis virus (IBV) spike proteins associated with adaptation to chicken embryonic kidney (CEK) cells do not improve attachment
Primary Author (and presenter): Farjana, Saiada
Additional Authors: Eldemery, Fatma; Williams, Robert; van Santen, Vicky
Description: IBV is one of the most economically important pathogens of chickens and is reportable to the World Organization for Animal Health (OIE). The S1 subunit of the IBV spike (S) protein mediates viral attachment and the S2 subunit is involved in fusion to host cells. IBV can replicate in CEK cells, but virus must be adapted to these cells for efficient propagation. It was observed that two amino acid changes in the S1 protein and one amino acid change in the S2 protein occurred during adaptation of an IBV Ark vaccine strain to CEK cells. We hypothesized that these alterations in the S gene of CEK-adapted IBV allow the virus to attach more efficiently to CEK cells compared to Ark vaccine strain, thus contributing to adaptation. Secreted strep-tagged recombinant proteins representing S1 and S proteins of Ark vaccine strain and CEK-adapted vaccine strain were produced in HEK293T cells and affinity purified using Strep-Tactin Sepharose columns. For binding assay, the S1 or S proteins complexed with streptactin-HPRO were incubated with acetone-fixed CEK cells, and bound protein detected with chromogenic substrate AEC. Binding of S1 and S proteins to relevant formalin-fixed chicken tissues was also evaluated. We observed no binding to CEK cells by S1 representing either vaccine or CEK-adapted virus. However, addition of the S2 ectodomain to the vaccine S1 resulted in clear binding to CEK cells. Contrary to the expected improved binding to CEK cells, no binding of CEK-adapted S protein to CEK cells was observed. Notably, neither of the two mutations in CEK-adapted S1 alone or combined disrupted the binding of S protein to CEK cells, suggesting that the mutation in S2 of CEK adapted virus is involved in abolishing the binding. Because changes in S protein associated with adaption to CEK cells abolished rather than improved binding to CEK cells, factors other than improved attachment to CEK cells are involved in adaptation to CEK cells.

Feng, Xuechun (G)
Title: Roles of carboxyesterases in pyrethroid resistant house flies, Musca domestica
Primary Author (and presenter): Feng, Xuechun
Additional Author: Liu Nannan
Department: Entomology and Plant Pathology
College/School: Auburn University
Description: Carboxyesterases are one of the major enzyme families involved in detoxification of pyrethroids and up-regulation of carboxyesterase genes is attributed as major components in insecticide resistant machineries of insects. Based on our house fly transcriptome analysis, a total of 45 carboxyesterase genes were identified in house flies, several of which were up-regulated in the resistant ALHF house fly strain compared with susceptible aabys and CS strains. Further induction experiments revealed the expression of these constitutively overexpressed genes can also be induced after exposure to permethrin at an LC50 concentration, suggesting the importance of these up-regulated carboxyesterase genes in permethrin resistance development in the house flies through detoxification of pyrethroids. This conclusion was further confirmed by modeling and permethrin docking analysis.
Fields, Dana (G)

**Title:** Menstrual health education for middle school girls

**Primary Author (and presenter):** Fields, Dana D.

**Additional Authors:** Ellison, Kathy Jo

**College/School:** School of Nursing

**Description:** The purpose of this project was to implement a patient education program as a means of informing female middle school students of evidence-based recommended treatment of dysmenorrhea. Improvement in students’ menstrual knowledge and symptom relief were assessed. Primary dysmenorrhea is the most common cause of pelvic pain in women and adolescent girls and evidence-based guidelines support patient education as an intervention for treating primary dysmenorrhea. The target population included menstruating female students at a local middle school (6th and 7th GR). Following consent from school officials, parents and students, participants completed menstrual symptoms and menstrual knowledge questionnaires. The participants attended a 2 hour interactive education session discussing the physiology of menstruation and treatment options for primary dysmenorrhea. Menstrual knowledge was re-assessed immediately following the education session and menstrual symptoms was reassessed 5-6 weeks later. Descriptive statistics were used to describe the patient population, dysmenorrheal symptoms, and menstrual knowledge. All participants pre-post responses were compared with paired t-tests. X consented to participate, X were identified with dysmenorrheal symptoms. The mean score for symptoms of dysmenorrhea improved from pre- (mean, sd) to post (mean, sd) with a significance of (p=<0.05). The mean score of menstrual knowledge improved from pre- (mean, sd) to post (mean sd) with a significance of (p=<0.05). Menstrual health education improved symptoms of adolescents who experienced primary dysmenorrhea as well as increased knowledge of the physiology of menstruation. These results warrant the evaluation of quality of life improvement if a full project were implemented.

Finkel, Angie (G)

**Title:** Motivational interviewing to incur therapeutic lifestyle change in the overweight and obese

**Primary Author (and presenter):** Finkel, Angie L.

**Additional Author:** Sanderson, Bonnie

**College/School:** School of Nursing

**Description:** The nation’s growing epidemic of overweight and obesity issues affects nearly 70% of the adult population. Evidence-based guidelines demonstrate that there is support substantiating the use of Motivational Interviewing (MI) to incur Therapeutic Lifestyle Change (TLC) in the overweight and obese populous. The purpose of this project was to implement the MI process and illicit mutually agreeable TLC through education (i.e., diet and exercise). Patient readiness to change dietary intake, frequency of engaging in moderate activity per week, and biometrics (i.e., BMI, blood pressure, heart rate, cholesterol, and hemoglobin A1C levels) were assessed. The target population included overweight and obese adults over the age of 18. Following informed consent, participants completed the MI questionnaire, were provided an educational
session based on MI techniques, and were requested to monitor dietary intake and level of activity over a 4 to 6 week period. At the completion of the 4-6 week timeframe, a follow up phone call was made to assess readiness to change dietary habits based on a Likert scale, number of days in a week where moderate activity took place, and biometric values (i.e., weight, BMI, waist circumference, heart rate, and blood pressure). Descriptive statistics were used to describe the patient population, and participant pre-post MI responses and biometric results were compared with paired t-tests. X consented to participate and had an average pre-MI BMI of X (sd) and post-MI BMI of X (sd). Among the participants, the mean readiness to incur dietary change and level of activity improved from pre-MI (mean, sd) to post-MI (mean, sd) significantly (p=<0.05). The MI process in overweight and obese patients demonstrated an increased level of confidence to change modifiable risk factors related to cardiovascular disease and is an attainable measure within the family practice setting.

Finklea, Ferdous (G)
Title: Establishing an engineered tissue model to study the effects of alcohol on human heart development
Primary Author (and presenter): Finklea, Ferdous, B
Additional Authors: Kerscher, Petra; Lipke, Elizabeth
Department: Chemical Engineering
College/School: Samuel Ginn College of Engineering
Description: Children whose mothers consume alcohol during pregnancy are at an increased risk for developing congenital heart defects, and the mechanisms by which these occur are not fully known. The current standard for modeling the heart is small animals, such as mice. One barrier to identifying these mechanisms is the mismatch between rodent and human heart physiology; therefore, in vitro models of the developing human heart need to be created. Building on prior work in our lab directly differentiating human induced pluripotent stem cells (hiPSCs) into contracting heart tissues, this study focuses on employing our in vitro, ontomimetic model to determine the effect of alcohol on developing cardiomyocytes. A polydimethylsiloxane (PDMS) mold is used to culture the hiPSCs in a PEG-fibrinogen hydrogel on a PDMS coated glass coverslip 4-mm in diameter. The cell-material mixture is photocrosslinked with visible light for 30 seconds. The PDMS coated coverslips with formed tissues are then transferred to a well plate, and the stem cells are cultured for three days prior to initiation of cardiac differentiation. During cardiac differentiation of the hiPSCs, 50 and 100 mM ethanol is added starting on day 1 and every 48 hours thereafter. The force and frequency of contraction of the tissues are being quantified, along with the tissue growth and initiation of contraction. The results obtained from this study will provide insight into the mechanical differences between control engineered human heart tissues and those that have undergone differentiation in the presence of alcohol, which can be used to further understand the effects of drugs on developing cardiomyocytes.

Folt, Brian (G)
Title: Establishing reference demography for conservation: A case study of the Alligator Snapping Turtle (Macrochelys temminckii) in Spring Creek, Georgia
Primary Author (and presenter): Folt, Brian
Additional Authors: Jensen, John; Teare, Amber; Rostal, David
Department: Biological Sciences
College/School: College of Sciences and Mathematics
Description: The conservation of large, long-lived turtle species can be a challenging issue because populations are sensitive to changes in adult survival and may be difficult to sample. The Alligator Snapping Turtle (*Macrochelys temminckii*) is the largest freshwater turtle in North America for which commercial harvest severely reduced populations through the species’ range, and it has recently been petitioned for listing on the Endangered Species Act. Given recent declines and a deficit of demographic knowledge for *Macrochelys*, we conducted a mark-recapture study of *M. temminckii* from 1997–2013 in Spring Creek, Georgia. We made 166 captures of 75 individuals using hoop-net traps and SCUBA searches. The observed and estimated population structure described the adult sex ratio as even and adults more abundant than juveniles. Survival was higher for males (0.98) and females (0.95) than juveniles (0.86). We estimated a population density of 12 turtles/stream-km. We used the empirical demographic parameters described here to build an updated population model for *M. temminckii*. The model described population growth as consistent with a growing population ($\lambda = 1.013$), and population viability analysis found the population to grow over the next 50 yr in 93% of simulations. Application of the model to two western populations was consistent with one study that found a declining population in Oklahoma ($\lambda = 0.563$), at imminent risk of extirpation, but also revealed that a historically-harvested population in Arkansas may be in decline as well ($\lambda = 0.978$). This is the first study to document a stable and viable population of *Macrochelys*. We suggest that the population parameters described at Spring Creek are the best approximation of reference demographic conditions for *Macrochelys* to date. The study provides a general framework applicable for other large, long-lived, endangered turtle species for which demographic data are unavailable.

Freeman, Laura (G)
Title: Getting active: protect the hearts of our community
Primary Author (and presenter): Freeman, Laura B.
Additional Authors: Sanderson, Bonnie
College/School: School of Nursing
Description: Evidence was found in the literature that patients with a cardiac history and of low socioeconomic status struggle with confidence needed to increase physical activity. Guidelines recommend motivational interviewing by providers for this population. The purpose of this project was to implement motivational interviewing that focused on increased confidence levels promoting a more active lifestyle. Target population included adult patients with cardiovascular disease at a clinic serving low-income adults. Informed consent and pre-questionnaire were completed either in clinic or via telephone. A pre-questionnaire was used to guide motivational interview and gather baseline data on current physical activity, ADL’s, and confidence levels. Weekly follow-up calls documented progress in each of these three factors and continued motivational interviews. The fourth week a post-questionnaire was done for analysis. Descriptive statistics were used to describe the patient population. Patient’s pre-post PA, ADL’s, and confidence answers were compared with paired t-test. X consented
to participate (%females), average age of X(sd) yrs. At start, only %X felt like they could increase their physical activity levels to the recommended 5-7 days per week. Follow-up indicated that the mean pre-confidence levels improved from pre X (mean, sd) to post Y (mean, sd) significantly (p=<0.05). Days per week doing ADL’s improved from X (mean, sd) to post Y (mean, sd) significantly (p=<0.05). Days per week doing at least 30 minutes of moderate-intensity physical activity improved from X (mean, sd) to post Y (mean, sd). Providers can use motivational interviews in patients with heart disease to successfully improve self-confidence levels, enabling patients to increase routine physical activity. Continued close follow-up and motivational interviews are achievable in the primary care setting.

Garcia, Max (UG)
Title: Noise pollution impact in a local and global context
Primary Author (and presenter): Max Garcia
Department: Environmental Design
College: College of Architecture, Design, and Construction
Description: In one of our Environmental Design courses we constructed an individual research project that focuses on a global issue; for my topic I selected noise pollution. During my research I focused on three main ideas: What or who are the sources of noise pollution? In what way physically do they harm us? What types of ecosystems are mostly affected by noise pollution? My research data from several US universities, Alabama, Southeast United States, global news articles, and national wildlife refuge websites. Noise pollution isn’t necessarily the first form of pollution many people think of. This is because it is an issue that does not have any immediate impact – rather, instead it is an issue that, in most cases, takes many years to start visibly and physically manifesting. Due to this issue it is difficult to create accurate studies without many years of research. Within my project I divided my research into two categories: Local Context (Alabama) and Global Context. Within each context I analyzed effects on the human population, local wildlife, and underwater creatures. Through my research I have found sources of noise pollutions that have negative effects on many environmental systems. The goal of my future research is analyze even more impacts of increased noise pollution and the possible effects. Currently, there are many policies in place that protect the environment, most common amongst wildlife refuges. But these policies can be designed and applied to current urban environments to avoid long term harm to human populations and all the systems of the Earth we interact with.

Garnett, Kaylin (G)
Title: Promoting breastfeeding in adolescent mothers
Primary Author (and presenter): Garnett, Kaylin J.
Additional Authors: Ellison, Kathy Jo
College/School: School of Nursing
Description: Adolescent mothers are the most unsuccessful population in regards to breastfeeding. Evidence shows that breastfeeding education that promotes interactive learning and peer support during pregnancy increases the rate of breastfeeding initiation and duration. The purpose of this project is to determine the effectiveness of an evidence
based breastfeeding program on improving breastfeeding rates in adolescent mothers in the high school setting. Pre and Post breastfeeding knowledge and breastfeeding intention was assessed after participation in a breastfeeding educational session. The target population includes pregnant adolescent females 14-19 yrs. After acquiring parental permission, the participants completed a demographic and breastfeeding knowledge questionnaire. The participants then participated in a breastfeeding educational class. Following education, the participants completed the breastfeeding knowledge questionnaire again to assess knowledge gained. Descriptive statistics were used to assess patient population, breastfeeding knowledge and intention to breastfeed. Paired t-tests were used to compare the pre- post-breastfeeding knowledge results. X participants consented to participate in the project, average age of X years. Following participation in the breastfeeding education, X% reported the intent to breastfeed upon delivery, and X% reported no intention to breastfeed. Pre-educational questionnaire reported X% of correct knowledge regarding breastfeeding. Post results reported X% of correct knowledge, with mean score increasing from X to X, with p value X showing significant improvement. Educating adolescent mothers in a group setting demonstrated significant improvement in breastfeeding knowledge leading to increased rates of breastfeeding initiation and duration. Results supported further implementation of the breastfeeding class in the high school setting.

Gascon, Sarah (G)
Title: Effects of fatigue on throwing kinematics among NCAA division I softball athletes
Primary Author (and presenter): Gascon, Sarah S.
Additional Authors: Gilmer, Gabrielle; Oliver, Gretchen
Department: School of Kinesiology
College/School: College of Education
Description: High velocity overhead throws need optimal transfer of energy from lower extremity to the upper extremity. Inefficient stabilization and/or movement of the torso may cause disruption of proper kinetic chain sequencing, thus hindering performance and increasing risk of injury at the shoulder. The purpose of this study was to examine the effects of gluteal fatigue on the torso and shoulder kinematics during all phases of an overhead throw among National Collegiate Athletic Association (NCAA) Division I softball players. Over the course of three consecutive days, athletes performed 60ft (18.3m) throws before and after a gluteal fatigue intervention. Bilateral fatigue of the gluteus medius was performed using a Biodex Multi-Joint System Pro. Repeated measures ANOVAs were used to identify differences between pre day one and post day three fatigue in torso lateral flexion, rotation and flexion, and shoulder plane of elevation, rotation, and elevation at all phases of throwing (foot contact, maximum external rotation, ball release, and maximum internal rotation). There was evidence of gluteal fatigue affecting the throwing motion in Test x Event interaction for plane of elevation \( F(1.89, 33.93) = 4.21, p = .025 \). Trunk flexion, lateral flexion, axial rotation, and shoulder elevation and rotation revealed no statistical significance. Research has shown the need for proximal stability for distal mobility in overhead throwing. Results reveal sufficient stabilization of the torso, however, fatigue affected the plane of
elevation in the shoulder. The overhead throwing motion places great demands on the shoulder joint. Research has shown shoulder injuries are among the most common injuries in overhead throwing athletes. Fatiguing the gluteus medius places the shoulder at an elevation that has the potential to disrupt the kinetic chain and cause injury.

Gauthier, Jami (G)
Title: Incorporation of normative feedback into National Alcohol Screening Day: Feasibility, acceptability, and short-term impact on alcohol use and related behaviors
Primary Author (and presenter): Gauthier, Jami M.
Additional Authors: Messina, Bryan G.; Williams, Caitlin L.; Witte, Tracy K.; Correia, Christopher J.
Department: Psychology
College/School: College of Liberal Arts
Description: Despite advances in the development and dissemination of evidence-based treatments for alcohol misuse, alcohol use disorder (AUD) remains the most common psychiatric problem among college students. Approximately 20% of college students meet criteria for AUD, and more than double that number report recent high risk drinking. As such, many students could benefit from treatment aimed at reducing their alcohol consumption. Yet, only a fraction of those who could benefit from treatment seek it, likely because few students perceive their alcohol misuse as problematic. Although many non-treatment seeking students attend the event National Alcohol Screening Day (NASD), few who receive a referral for treatment at NASD report any intent to follow-up. This suggests that while students are willing to attend NASD, they are not willing to seek treatment in more traditional settings. In the current study we aimed to determine the feasibility of providing an evidence-based intervention at NASD, and whether doing so had immediate and/or short-term effects on attendees’ alcohol use and related thoughts and behaviors. We collected data on feasibility from clinicians (N = 16) who provided the intervention at NASD. We also collected data on perceived norms, alcohol consumption, motivation to change, and related variables from NASD attendees (N = 78) during a pre-intervention assessment, an immediate post-intervention assessment, and a delayed (i.e., two weeks after NASD) post-intervention assessment. Additionally, we collected pre- and delayed post-assessment data on these variables from a comparison group consisting of students who did not attend NASD (N = 236). We expect that clinicians will indicate that employing the intervention was feasible. We also expect that NASD attendees will report greater healthy (e.g., reduced consumption) changes at follow-up, than will students in the comparison group. Data analyses are currently underway and will be completed by March 15, 2016.

Gehring, Cydney (G)
Title: Neonatal-intensive care unit parent education on hearing loss
Primary Author: Gehring, Cydney E.
Additional Author: Jones, Alisha L.
Department: Communication Disorders
College/School: College of Liberal Arts
Description: Preterm infants that graduated from the neonatal-intensive care unit (NICU) may be more likely to exhibit risk factors for hearing loss than their full-term,
healthy peers; therefore, despite passing a newborn hearing screening, they should be monitored for late-onset or progressive hearing loss. Previous studies have not examined information presented to parents regarding hearing. The purpose of this study was to gather data from parents about information presented about hearing loss at hospital discharge and follow-up efforts by medical professionals. For the study sample, two hundred and thirty surveys have been completed by parents of preterm infants to date. Eighty five percent of US respondents included their state of residence and thirty-nine states were represented. Nineteen international residents responded to the survey. Of these, Canadians had the highest number of responses (53%), and nine other countries were represented by a single response each. A known sampling bias was introduced that resulted in a disproportionate number of responses from the state of Alabama. However, the response rate was still correlated with state population ($r = 0.51$, $P = 0.0001$). Removal of Alabama from the analysis resulted in a correlation of 0.82 ($P < 0.0001$). Thus, the response rate was indicative of overall non-biased survey exposure. The survey was available through a link posted on multiple NICU and preemie websites. Results were analyzed for correlations between letters received by the state for hearing follow-up and factors, such as state of birth, number of risk factors, personnel informing the parents of screening results and mode of information presentation (written versus verbal). Demographic information collected was analyzed to determine if factors at birth, such as mother’s age or length of gestation, affects follow-up procedures.

George, Matthew (UG)

Title: Effects of door width on wild pig entrance into traps

Primary Author (and presenter): George, Matthew J.

Additional Authors: Mark D. Smith, Dana K. Johnson

Department: Wildlife Department

School/College: School of Forestry and Wildlife Sciences

Description: Wild pigs (Sus scrofa) are non-native invasive animals and are arguably one of the greatest wildlife management challenges facing natural resource professionals and landowners in the United States. Causing >$1.5 billion/year in agriculture related damage, wild pigs are now found in >35 states. Lethal removal by trapping is often the most cost- and time-effective means for managing wild pigs. Whereas numerous studies have examined the effects of trap type (e.g., box vs corral), trap door designs, and baits, no studies have examined the effects of trap door width on wild pig entrance into corral style traps. There is much debate regarding the width of trap doors relative to the entrance rates of wild pigs into corral style traps with many professional wild pig trappers suggesting wider doors facilitate greater entrance rates into traps. Our objective was to determine entry rates of wild pigs into standard 3-panel corral traps with wooden guillotine trap doors with 0.81- or 1.22-meter wide openings. We placed these doors on 12 traps at 2 study areas in east-central Alabama and monitored wild pig behavior using a motion-sensitive triggered game camera at each trap from June-September of 2014 and 2015. We recorded the time when wild pigs initially visited the trap site until the first pig entered the trap, frequency and duration of subsequent visits to the trap, approximate age of individuals who first entered the trap, and the maximum number of pigs within the trap at any time during a visit. We used camera imagery data collected from 25 boars and 47 sounders to determine the effect of door width on the frequency that wild pigs enter into corral traps. Time until first entry for sounders did
not differ between 0.81-meter (mean= 0.7 days) and 1.22-meter door (mean = 3.3 days; \( P = 0.624 \)) widths. Likewise, time of first entry was similar for boars. Our results suggest door width may not have as large of an impact of entrance rates into traps as previously thought.

Gillen, Alex (G)
Title: In vitro evaluation of the forwarder knot
Primary Author (and presenter): Alex M Gillen
Additional Authors: Munsterman Amelia, Hanson Reid
Department: Biomedical Sciences
College/School: College of Veterinary Medicine
Description: To investigate the strength, size and holding capacity of the self-locking forwarder knot compared to surgeon’s and square knots in large gauge suture.
Methods: Forwarder, surgeon’s and square knots were tested using 2USP and 3USP polyglactin 910 and 2USP polydioxanone under linear tension on a universal testing machine recording mode of failure and knot holding capacity (KHC). Relative knot security (RKS) was calculated as a percentage of KHC. Knot volume and weight were assessed by a digital micrometer and balance, respectively. An ANOVA and post hoc testing compared strength between number of throws, suture, suture size, and knot type. \( p<0.05 \) was considered significant. Forwarder knots had a higher KHC and RKS than surgeon’s or square knots for comparisons of all suture types and number of throws \( (p<0.001) \). For all suture materials, no forwarder knots unraveled, but a significant proportion of square and surgeon’s knots with under six throws did \( (p=0.0407) \). Forwarder knots had a smaller volume and weight than surgeon’s and square knots with equal number of throws \( (p<0.001) \). The forwarder knot of four throws using 3USP polyglactin 910 had the highest KHC, RKS, and smallest size and weight, with a calculated knot efficiency of 6.14. Conclusions: Forwarder knots were shown in vitro to be stronger, more secure and smaller than surgeon’s and square knots for starting a continuous suture pattern.

Gilpin, Jessica (G)
Title: Abundance and distribution of host sea anemones, associated cleaner shrimps, and fish clients on Caribbean coral reefs at St. Thomas, US Virgin Islands
Primary Author (and presenter): Gilpin, Jessica A.
Additional Authors: Chadwick, Nanette E.
Department: Biological Sciences
College/School: College of Sciences and Mathematics
Description: Symbiotic cleaner organisms may perform key functional roles in reducing rates of parasitism in communities, but little is known about the role of cleaner shrimps on coral reefs. Studies on cleaner fishes indicate that their cleaning behaviour which removes parasites from large coral reef fishes leads to enhanced biodiversity and fish abundance on reefs in the tropical Indo-Pacific region. Cleaner shrimps perform this main role in the tropical western Atlantic Ocean and Caribbean Sea. They are popular ornamental organisms in the aquarium trade, and are heavily collected on some reefs, but community-wide impacts of their removal remain unknown. The main Caribbean cleaner is the Pederson’s shrimp *Ancylomenes pedersoni*, which is an
obligate symbiont of corkscrew sea anemones *Bartholomea annulata*, also popular commodities in the aquarium trade. We quantified variation in reef fish abundance and diversity with the abundance and body size of cleaner shrimp and their host sea anemones on coral reefs at St, Thomas, U.S. Virgin Islands. The patterns observed indicate the potential ecological impacts of the removal of cleaner shrimp by the ornamental aquarium trade. This field work in conjunction with our laboratory studies on the life history traits of cleaner shrimp, aim to provide a more scientific basis for marine resource managers to determine regulatory limits (such as body size or catch limits) on the ornamental fishery for this key coral reef organism.

**Godwin, Rebecca (G)**  
**Title:** Systematics of the genus *Ummidia*: species delimitation using natural history collections  
**Primary Author (and presenter):** Godwin, Rebecca L.  
**Additional Authors:** Bond, Jason E.  
**Department:** Biological Sciences  
**College/School:** College of Science and Mathematics  
**Description:** Araneae, the group containing all spiders, is divided into three main lineages: Mygalomorphae, Mesothelae, and Araneomorphae. Comprising the tarantulas, purse web spiders, trapdoor spiders, and their kin, mygalomorphs have long been a source of intrigue and frustration for many arachnologists. Many groups remain problematic in terms of their systematics. Ctenizidae is one such family. At present, the nine ctenizid genera remain in a state of phylogenetic uncertainty with respect to their placement, though it seems clear that the family is not monophyletic. *Ummidia*, a genus within Ctenizidae, has long been recognized as a taxon in serious need of taxonomic treatment. Currently, *Ummidia* contains 27 described species, 20 of which are found in the New World. Taxonomic work on New World *Ummidia* is sparse outside of original descriptions, the most recent of which are over half a century old. I am in the process of revising the genus *Ummidia* in the Nearctic region. I have done this by examining approximately 700 specimens of *Ummidia* from various collections (AMNH, MCZ, FSCA, CAS, AUMNH). Examination of museum material has seemingly confirmed the undescribed diversity of *Ummidia*, with preliminary estimates of New World species ranging between 50 and 60. This study along with many others conducted utilizing museum collections are indicative of the importance of natural history collections and their usefulness in discovering unknown biodiversity.

**Good, AJ (G)**  
**Title:** Predicting state budget policy: state political factors influencing higher education funding  
**Primary Author (and presenter):** Good, AJ  
**Additional Authors:** Bowling, Cynthia  
**Department:** Political Science  
**College/School:** Liberal Arts
**Description:** Historically, state sources of funding have made up the largest proportion of institutional revenues in public higher education. After several decades of decline, however, state funding per student has reached its lowest level since 1979 (after adjusting for inflation). Potential explanations for this decrease in state higher education funding has been attributed to weakening state economies (Lowry & Fryar, 2013; Okunade, 2004; Hovey, 1999), coupled with record levels of student enrollment (Lowry & Fryar, 2013; U.S. Department of Treasury & U.S. Department of Education, 2012). Institutions of higher education have attempted to off-set shortfalls in state revenue by dramatically raising tuition prices, which potentially exacerbates concerns regarding college accessibility, affordability, and performance (de Alva & Schneider, 2011; Archibald & Feldman, 2006; Lucas, 2006). Given the political nature of state budget expenditures, research is needed to explore the relationship between political factors and state appropriations to higher education. Research findings will allow state-lawmakers and institutions of higher education to identify alterative political levers to off-set decreases in state funding. Until recently, few sources of literature have explored the relationship between these two important areas of state politics and American higher education. This study explores those relationships and provides evidence to demonstrate that political factors are predictive of state higher education funding. Building on the work of McLendon et al. (2009), we employed a fixed effects hierarchical regression model with states serving as the unit of analysis to determine what political factors predicted state appropriations to higher education for fiscal year 2014. Ultimately, we found that states with legislative term limits and states that contain a more liberal citizenry tend to fund higher education at lower levels.

**Gosh, Kamal (G)**
**Title:** Studying the growth variability of channel-blue hybrid catfish: an integrated base approach
**Primary Author (and presenter):** Gosh, Kamal
**Additional Authors:** Dunham A. Rex, Chatakondi Nagaraj, Hanson Terry, Drescher David, Robinson Dalton, Bugg William, and Chen Y. Charles
**Department (of primary author):** Fisheries, Aquaculture and Aquatic Sciences
**College/School (of primary author):** Agriculture
**Description:** The growth variability of channel catfish, *Ictalurus punctatus*, female X blue catfish, *I. furcatus*, male hybrids was studied in both commercial and research pond settings. Probable impacts of stocking density, culture systems (traditional ponds, split ponds, single batch, and multi-batch) and fingerling variation, were examined. Preliminary results suggested that stocking density and culture systems have zero impact on the growth variability. The coefficient of variation (CV) (%) ranged between 12-56 in both commercial and research settings. CV (%) was comparatively higher in the fingerling stage (23-56) than that of food fish (12-48). Several examples from the commercial population distribution show a positive, moderate skewness (value >1). Numbers of stockings, aeration and harvesting techniques may likely to have the largest impact on growth variability based on the initial sampling. Growth variability is also affected by sire and dam effects.
Gossett, Heather (G)
Title: Comparison of acetaminophen administration to horses through a paste and nasogastric tube
Primary Author (and presenter): Gossett, Heather D
Additional Authors: Taintor, Jennifer; Crouthamel, Amanda; Boothe, Dawn
Department: Anatomy, Physiology, Pharmacology
College/School: College of Veterinary Medicine
Description: Studies in humans have shown that both volume and route in which a drug is given markedly impacts the rate and extent that the drug reaches systemic circulation. Establishing whether this is true for horses is important to clinical pharmacology for setting standards of drug delivery in the equine patient. Absorption of acetaminophen powder has proven to be an effective and safe marker for gastric emptying in ponies after administration by nasogastric intubation. Investigators hypothesized that maximum plasma drug concentrations and area under the curve of serum acetaminophen would be less when administered to horses via a syringe compared to nasogastric tube, as well as when administered in a small versus large volume via nasogastric tube. Six horses received acetaminophen (20 mg/kg), using two different routes of administration (syringe vs. intubation with nasogastric tube) and two different volumes for comparison (100 mLs and 1.5L via nasogastric tube). Whole blood was drawn from an indwelling IV catheter at specific timed intervals and serum was then evaluated on a general chemistry analyzer. This study found statistically significant differences in Cmax and AUC at a power of greater than or equal to 90%. Oral administration via nasogastric tube with 1.5 L of water resulted in statistically higher plasma drug concentrations as well as area under the curve when compared to the other two routes of administration examined in this study. The route and volume of water used for administration impacts oral drug absorption. Ultimately, this will affect how drugs should be administered in pharmacokinetic studies as well as effectiveness of drug administration in equine patients.

Gould, Brendan (G)
Title: Comparison of hen comb capillary and wing vein blood glucose via compact glucometer
Primary Author (and presenter): Gould, Brendan J
Additional Authors: Berry, Wallace and Oates, Suzanne
Department: Poultry Science
College/School: College of Agriculture
Description: The objective of the study was to verify the use of a glucometer to analyze chicken blood glucose and to verify the comb as a site for obtaining serial blood samples. Longitudinal sampling of blood borne substances at short sampling intervals is complicated in birds by the difficulty in obtaining serial blood samples in a way that is safe and expeditious. Drawing blood via the wing (Alar) vein with a needle and syringe makes further sampling from that vein difficult. Glucometers of the type used for routine monitoring of human blood glucose require as little as 0.3ul blood for analysis and allows sampling by pricking the skin to obtain capillary blood. The comb is bare of
feathers and highly vascularized, making it an ideal site for obtaining serial blood. A glucometer was used to analyze glucose values of whole blood from the wing vein and from the comb in hens. Twenty Leghorn laying hens were sampled from the wing vein and the comb capillaries. Blood was collected from the comb using an 18ga needle to lightly prick the skin of the comb. Wing vein blood was collected using a 25ga needle and syringe. All blood samples were assayed in triplicate via glucometer as blood was obtained. Blood collected from the wing vein was centrifuged at 800 g for 30min and plasma was extracted. An O-Toluidine assay for glucose was used as the bench assay. A one-way ANOVA procedure was utilized for data analysis. Blood glucose means (mg/dL) of 324.29, 167.38, and 175.90 were obtained for the bench assay (BA), glucometer assay via the comb (GC), and glucometer assay via the wing vein (GV) respectively. A p-value of less than .05 (<.0001) was found between the BA mean and the two glucometer means while a p-value of 0.2446 was found between the GV and GC means. This result shows that the glucometer is a suitable tool for tracking blood glucose changes overtime while the measurement of absolute values of blood glucose would require an adjustment factor to match any bench assay results.

Grand, Kirk (G)
Title: Why self-controlled feedback enhances motor learning: Answers from electroencephalography and indices of motivation
Primary Author (and presenter): Grand, Kirk F
Additional Authors: Bruzi, Alessandro; Dyke, Ford; Godwin, Maurice; Leiker, Amber; Thompson, Andrew; Buchanan, Taylor and Miller, Matthew
College/School: Kinesiology
Description: It was tested whether learners who choose when to receive augmented feedback while practicing a motor skill exhibit enhanced augmented feedback processing and intrinsic motivation, along with superior learning, relative to learners who do not control their feedback. Accordingly, participants were assigned to either self-control (Self) or yoked groups and asked to practice a non-dominant arm beanbag toss. Self participants received augmented feedback at their discretion, whereas Yoked participants were given feedback schedules matched to Self counterparts. Participants’ visual feedback was occluded, and when they received augmented feedback, their processing of it was indexed with the electroencephalography-derived feedback-related negativity (FRN). Participants self-reported intrinsic motivation via the Intrinsic Motivation Inventory (IMI) after practice, and completed a retention and transfer test the next day to index learning. Results partially support the hypothesis. Specifically, Self participants reported higher IMI scores, exhibited larger FRNs, and demonstrated better accuracy on the transfer test, but not on the retention test, nor did they exhibit greater consistency on the retention or transfer tests. Additionally, post-hoc multiple regression analysis indicated FRN amplitude predicted transfer test accuracy (accounting for IMI score). Results suggest self-controlled feedback schedules enhance feedback processing, which enhances the transfer of a newly acquired motor skill.

Granger, Craig (UG)
**Behavior of bark from short rotation woody crops**

**Primary Author (and presenter):** Granger, Craig, E

**Department:** Biosystems Engineering

**College/School:** College of Engineering

**Description:** Short rotation woody crops have been identified as being part of the bioenergy solution to reducing the nations’ dependence on crude oil. Preliminary investigation conducted in the laboratory shows that the bark of short-rotation Eucalyptus behaves differently than those from typical softwood with slower growth rate. These handling characteristics seem to have the potential of impeding the ability to pre-process short-rotation woody crops before entering the throat of conversion plants. Nuclear magnetic resonance (NMR), scanning electron microscope (SEM), thermogravimetric analysis (TGA) and infrared spectroscopy (FTIR and FTNIR) were used to characterize the effect of age on morphology, structure, state of moisture and thermal decomposition behavior of the bark of short rotation woody crops. The results were compared to that of the loblolly pine, which is the predominant wood specie in the southern United States.

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**Full shift physical activity among reforestation hand planters**

**Primary Author (and presenter):** Granzow, Robert F

**Additional Authors:** Schall, Mark; Smidt, Mathew

**Department:** Industrial and Systems Engineering

**College/School:** Samuel Ginn College of Engineering

**Description:** Reforestation in the Southeastern United States is predominantly accomplished through the use of hand planting methods. A high prevalence of musculoskeletal pain has been reported among reforestation hand planters. This feasibility study aimed to characterize the intensity of physical activity using inertial measurement units (IMUs) placed on the upper arms, trunk, and waist of ten reforestation hand planters during full shift work. Results indicated that participants spent the majority (>50%) of their time performing moderate, vigorous, or very vigorous levels of physical activity. Exposure estimates among planters exceed many other occupations that commonly report a high prevalence of musculoskeletal health outcomes, including healthcare and construction workers. Additional research into the working demands of reforestation hand planters is warranted.

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**Economic value of recreational fishing on reservoir and tailrace sections of Millers Ferry Reservoir, Alabama**

**Primary Author (and presenter):** Gratz, Steven M.

**Additional Authors:** Sammons, Steve; Hanson, Terry and Hite, Diane

**Department:** Agriculture

**College/School:** Fisheries, Aquaculture, and Aquatic Sciences

**Description:** Recreational fishing creates a large source of income within the state of Alabama through both direct sales for local communities and taxes for local, state, and federal governments. Knowing how much and where anglers spend money fishing specific destinations allows fisheries managers to better understand the economic impact
of these fisheries to the local economy as well as various levels of government. This economic impact was evaluated for Millers Ferry Reservoir, on the Alabama River, located in Dallas and Wilcox Counties, Alabama. We conducted roving creel surveys from January to December 2015 twice a month for four days each trip (total days = 96). The reservoir was split into six sections covering 157.1 km of the Alabama River that were sampled using a stratified, non-uniform probability sampling design. Sampling was conducted over three possible time periods (morning, mid-day, and afternoon) and each day anglers were sampled from two randomly chosen reservoir sections during two of these time periods (total sections sampled = 192). An initial count of anglers was made at the beginning of each section to obtain instantaneous fishing effort. Recreational fisherman were then contacted and asked about their effort, catch success, trip origination, and assumed monetary cost of the trip. A total of 729 on-site interviews were recorded throughout the sampling period. A subsequent phone interview (total follow-up interviews = 505) was conducted after completion of the trip to obtain final effort, willingness to return, type of lodging utilized, and final expenditures of the trip. These data will be used to estimate the total economic value of the fishery to the local and state economies.

Gurley, Bain (UG)
Title: Effects of incubation temperature on hatching success and physical development in zebra finches
Primary Author (and presenter): Gurley, Bain R.
Additional Authors: Finger, John; Wada, Haruka
Department: Biological Sciences
College/School: College of Science and Mathematics
Description: Embryonic development is a critical stage in the life of oviparous species. Recent findings show that temperature variation as little as 1°C can affect development of avian young. Our group previously showed that 1°C deviation away from the optimal incubation temperature produced a male-biased sex ratio. In addition, young hatched from eggs incubated at high temperature weighed less and had significantly less lean mass compared to young from control incubation temperature. This study set out to better understand the reasons behind the consequences of varying incubation temperatures. We hypothesized that female zebra finches have a higher mortality rate due to a greater yolk consumption during embryonic development. Freshly laid eggs were collected and placed in one of three incubators: low, control, and high, measuring 36.31°C, 37.45°C, and 38.50°C, respectively. Hatchlings were euthanized to weigh residual yolk and pectoralis. Contrary to our prediction, analysis of yolk and pectoralis showed that neither yolk nor pectoralis weight was affected by incubation temperature. I will discuss the effect of incubation temperature on molecular sex ratio and any sex differences in yolk residual or pectoralis weights.

Haber, Holly (UG)
Title: Superabsorbent polymers from renewable resources
Primary Author (and presenter): Haber, Holly L.
Additional Authors: Jimenez-Bonilla, Pablo; Auad, Dr. Maria L.
Department: Biosystems Engineering
Hydrogels can be created from a number of hydrophilic polymers that do not dissolve in water (Demitri et al., 2008). They swell as they intake water and have a varied range of applications that span many different fields, including agriculture and medicine. Some applications include drug delivery and medical adhesives. Many of the materials currently used to form hydrogels are not biodegradable because they are acrylate-based, so there is a shift towards finding a more environmentally friendly alternative (Demitri et al., 2008). Cellulose is a very abundant material that can serve as a possible substitute to these acrylate-based materials. Other cellulose-based hydrogels are currently in use; however, creating a hydrogel through crosslinking cellulose with alginate polymer strands using a crosslinking agent, such as citric acid, is novel. Three different alginate: cellulose ratios were examined; 4:6, 6:4, and 8:2. The 8:2 solution with 0.2g of crosslinking agent resulted in the highest swelling rate, suggesting it is the best absorbent. An increase in the amount of crosslinking agent showed a strong correlation with an increase in the percent yield between each ratio group. Additionally, there was found to be a positive relationship between an increase in the percent alginate and the swelling rate in each case. The solution with 0.2g of crosslinking agent was found to be optimal in all cases tested.

Halepaska, Anna (UG)
Title: On Void and Volume as a reinterpretation of Urban Infill Developments.
Primary Author (and presenter): Halepaska, Anna, M
Department: Architecture
College/School: Architecture, Design, and Construction
Description: Cities are defined by volumes, existing masses of structures and culture which capture humanity within them. They also capture the spaces between –alleyways and apartments, foyers and fire escapes –where we live and interact. An urban infill requires the designer to reinterpret one of those voids amid volumes, adapting or recreating a new space for clients, customers, and communities to encounter. This project explores ways in which these [new spaces] can enrich both the existing volumes that define them and the experience of their occupants. With the increasing focus on sustainability, repurposing existing buildings and land is rapidly becoming more viable and ecologically-friendly than building an entirely new structure. As such, urban infill projects are becoming an important consideration for metropolitan settings, from Big Cities to Small Towns. One such infill was theoretically sited along South College Street in Downtown Auburn, Alabama, a major avenue for traffic and development from the nearby University. In filling this abstract ‘void’, the new structure contains voids within itself which became opportunities for interaction and design. Material palette, programmatic arrangement (the alignment of servant and served spaces) and the manipulation of structure served to explore this dialogue between the building, the spaces within it and the people who occupy those spaces. Essentially, the project came to understand designing the built form of an urban infill as designing a photographic negative. In creating the physical structure, we create the gaps between it, and thus the influences on those residing within. We do not design structure so much as we design space. In designing volume we must also design the void.

Hall, Ashley (G)
Title: Improving heart failure readmission rates with telephone follow-up
**Primary Author (and presenter):** Hall, Ashley I  
**Additional Authors:** Sanderson, B  
**College/School:** School of Nursing  
**Description:** Scientific evidence reports a correlation between lack of education and follow-up care resulting in increased readmission to hospitals for heart failure (HF). The purpose of this project was to implement HF education and a phone follow-up system and evaluate knowledge of and adherence to self-management skills. Target population included adults (ages 50-88) with new HF diagnoses in a HF clinic setting. Patients were asked questions from a HF questionnaire adapted from the American Heart Association’s HF phone follow-up tool. Outcomes measured were discharge weight, daily weights, medication adherence, symptoms to report, and appointment compliance. Results were reviewed that guided suggestions for improved adherence. A call was made at 21 days post discharge to assess information retention and compliance. Descriptive statistics were used to describe the patient population, education, assessment, and compliance with recommendations. Responses were compared at 7 and 21 days with paired t-tests. Participants: (X% male, X% black), with a mean of X yrs (sd). At 7 days post discharge X% weighed daily, X% took medications as prescribed, X% listed 8 reportable symptoms of worsening HF, and X% kept appointments. 21-day calls indicated improvement in all areas. X% reported medication compliance, X% weighed daily, and X% listed 8 reportable symptoms of HF. The mean scores improved for day/week daily weights and medication compliance from pre to post (mean SDs) respectively (p=<0.05). Phone follow-up for HF patients identified strengths and weaknesses of HF teaching. Providing further education during phone calls regarding the importance of medication regimen adherence, daily weights, keeping appointments and knowing signs & symptoms to report is an intervention that can improve patient self-care and disease management. Implementing a telephone follow-up program for all HF patients is an attainable goal in the HF clinic.

**Hammaker, Courtney (G)**  
**Title:** Improving childhood obesity with educating nursing staff  
**Primary Author (and presenter):** Hammaker, Courtney N  
**Additional Authors:** Hamilton, Cam  
**College/School:** Auburn University School of Nursing  
**Description:** Strong evidence shows childhood obesity is significantly worse than in past decades. Evidence based guidelines provides ways for nurses to make a difference through family education to prevent or minimize childhood weight problems. Nurses should educate families about ways to improve a child’s weight, however many nurses lack confidence in discussing these topics with families. The purpose of this project was to assess the knowledge and confidence of pediatric nurses in educating patients and families on weight management topics. The target population included all nurses that care for children with a BMI greater than the 85th percentile on a medical surgical floor at Children’s Healthcare of Atlanta. Following verbal consent, participants completed a pretest survey on knowledge and confidence level of topics related to weight management. An educational session on weight management and how to address families was presented. Concerns nurses might have were discussed with suggestions. A posttest was given to assess a gain in understanding and how to properly educate families on improving the child’s weight. Statistical analysis was conducted using SPSS. X nurses...
agreed to participate, average age of X (sd) years, X% males and X% females. Analyzing pre and posttest data found a statistical significance (p=?) in the educational presentation to nurses for increasing knowledge and confidence toward educating parents on weight management. Among those that participated, the mean pretest scores improved from pre- (mean, sd) to post (mean, sd) significantly (p=<0.05) Weight management education to nurses about childhood obesity can assist in providing tools to help them guide parental management. With improved knowledge and understanding, pediatric nurses can play a significant role in early prevention and improvement of obesity.

Hand, William (G)
Title: Soy protein substitution in phenol formaldehyde adhesive used in oriented strand board
Primary Author (and presenter): Hand, William G.
Additional Authors: Via, Brian; Banerjee, Sujit and Cheng, Qingzheng
Department: Chemical Engineering
College/School: College of Engineering
Description: We are developing a method to substitute soy protein in the adhesive, phenol formaldehyde (PF), which is used in the production of oriented strand board (OSB). Soy flour has been used as an adhesive in the past. It was deemed not practical due to the water absorptivity being high thereby decreasing wet strength (WS) and increasing thickness (TS) swell in OSB. By substituting small amounts of soy flour (5-10%) in PF, WS and TS as well as other properties of OSB can stay within industrial tolerances. This study observes the effects of flexural strength, flexural modulus, TS, and water absorption of OSB constructed with the adhesive mixture. Modifications to the OSB included three parameters: % soy flour (0%, 5%, 7%, 10%, 14%, and 21% soy flour/PF dry wt%/wt%), board density (30, 35, and 40 lbs/ft3), and adhesive loading (4%, 6%, and 8% adhesive dry wt%/wood dry wt%). In some instances, the substitution of soy flour into PF has shown an increase in flexural strength with varying board densities. It was shown that soy flour substitution met and sometimes exceeded the same flexural strength of 100% PF at lower densities. The cheaper soy flour can offset the higher priced PF. The soy/PF boards can also be made at lower densities to meet the same flexural strength requirements of boards made with 100% PF at higher densities lowering the cost of wood strands. Also, soy substitution decreases formaldehyde, which is a known carcinogen, off-gassing from OSB with PF adhesive.

Hanley, Alan (G)
Title: Scalable method for producing Janus nanoparticles to develop “smarter” nanostructres
Primary Author (and presenter): Hanley, Alan
Additional Authors: David, Allan E., Choi, Young Suc
Department: Chemical Engineering
College/School: Samuel Ginn College of Engineering
Description: Researchers are constantly working toward developing “smarter” materials that can be designed or programmed to do a certain task. Examples of such tasks would be self-assembling into an organized structure or targeting a certain protein in the human body. Janus nanoparticles, nanoparticles with two distinct and different hemispheres,
have been researched extensively over the past few decades in the pursuit of developing smarter materials. While Janus nanoparticles can be designed to accomplish a number of tasks, they have no use to society as a whole if they cannot be produced at an industrial quantity. Due to this roadblock, we have developed a new method for producing Janus nanoparticles that has the potential for scalability as well as a high level of flexibility when designing the hemispheres. Essentially, this method has the potential to produce numerous different Janus nanoparticle configurations at quantities that can support an industrial demand. The purpose of this research is to develop a complete understanding of this method, then utilize it to examine different Janus nanoparticle configurations. With our new method, we will be able to synthesize and examine new “smart” structures, such as drug delivery vehicles, antimicrobial coating particles, and increasingly efficient catalyzing agents, just to name a few.

Hardin, Amie (G)
Title: Diabetes self-management education and medical nutrition therapy for Type 2 diabetes mellitus improves patient outcomes: A retrospective chart review.
Primary Author (and presenter): Hardin, Amie
Additional Authors: Salazar, Maria; Marincic, Patricia
Department: Nutrition, Dietetics and Hospitality Management
College/School: College of Human Sciences
Description: Alabama has the highest prevalence of type 2 diabetes mellitus (T2DM) accounting for 25% of all deaths. Despite established benefits of diabetes self-management education (DSME) and medical nutrition therapy (MNT), insurance coverage for nutrition services is variable and lags behind other states limiting access to care. In response to a request from the Alabama Dietetic Association to gain preferred provider status for registered dietitian nutritionists (RDNs) to bill for DSME and MNT, Blue Cross Blue Shield of Alabama (BCBSAL) requested Alabama-specific outcome data subsequent to RDN interventions. This pilot study was designed to: develop standardized criteria for tracking RDN interventions and patient outcomes; document patient outcomes subsequent to DSME and MNT; and provide data to BCBSAL to support preferred provider designation. A retrospective chart review was conducted of patients with T2DM receiving DSME and MNT through an American Diabetes Association accredited program (n=91). The program included four DSME and two MNT encounters over four months. Baseline, end-of-program, and 1-year follow-up measures were queried for weight, BMI, A1C, and lipids. Paired t-tests were used to determine significance. Significant reductions were observed at 4-months in weight (1.6kg, p=0.0005), BMI (0.54, p=0.0007), A1C (1.96%, p=0.0001) and TG (65.78 mg/dL, p=0.02). A1C reduction remained significant at 1-year (1.33%, p<0.0001). This study reports actual patient outcomes achieved in the clinical setting. Improvements in A1C fall within reported ranges from randomized clinical trials. This pilot establishes a means for documenting patient outcomes subsequent to RDN interventions in actually achieved in clinical practice providing an evidence-base for designation of preferred provider status. Reimbursement for services will increase patient access to nutritional care.
Hardy, Amanda (G)
Title: Education toward hypertension control
Primary Author (and presenter): Hardy, Amanda J.
Additional Authors: Sanderson, Bonnie
College/School: School of Nursing
Description: There is strong evidence that education improves blood pressure for hypertension patients. Literature reviews and evidence-based practice recommend provider education to focus specifically on blood pressure management to increase the control of blood pressure. The purpose of this project was to implement education sessions to hypertension patients which promote medication compliance, a healthy diet, and adequate exercise. Target population included adults (18 yrs and older) with hypertension in a primary care clinic. Following informed consent, participants completed the Morisky questionnaire for medication adherence and questions about the number of days participating in exercise and healthful diet. According to the patients’ answers to compliance questions, the educator focused on areas of poor compliance. Education involved a 10-20 minute session that reviewed information regarding the AHA guidelines. Follow-up phone calls one month post-education were performed. Patient progress with compliance was assessed and patients were asked to complete another Morisky questionnaire. Descriptive statistics were used to describe the patient population. Paired t-tests were computed to compare mean values of Morisky score, number of days adhering to lifestyle, and blood pressure measurements. X consented to participate (% female,% male), average age of X (sd) yrs. Morisky scores changed from pre (mean, sd) to post (mean, sd) (p=). Mean values of systolos pressure changed from pre (mean, sd) to post (mean, sd) (p=); diastolic pressure changed from pre (mean, sd) to post (mean, sd) (p=); X% were identified to be at goal blood pressure post-education compared to X% pre-education. Focusing on education toward lifestyle modifications among hypertension patients guided better understanding of management and control of blood pressure. Participant’s compliance improved with focused education sessions within the primary care setting.

Harrell, Dexter & Barnett, Alyssa (UG)
Title: Modeling habitat fragmentation at the landscape level via reaction diffusion equations
Primary Authors (and presenter): Alyssa Barnett & Dexter Harrell
Department: Mathematics & Computer Science
Description: Habitat fragmentation affects a population in two key aspects, namely, the size of fragmented patches of habitat and inferior habitat surrounding the patches, called the matrix. Ecologists have confirmed that an organism’s survival in a system is often linked to the size of the patches, quality of its surrounding matrix, and distance between patches. In this talk, we will model the effects of habitat fragmentation at the landscape level using a reaction diffusion system. We will explore dynamics of the model via study of the model’s positive steady state solutions. Our results are obtained through the quadrature method and Mathematica computations. We will briefly explore their biological implications.

Harrelson, Megan (G)
Title: The effect of psychoeducation on public perceptions of adolescents with illegal sexual behavior

Primary Author (and presenter): Harrelson, Megan E.
Additional Authors: Kelner, Will and Alexander, Apryl
Department: Department of Psychology
College/School: School of Liberal Arts

Description: Adolescents with illegal sexual behavior (AISB) are considered dangerous criminals because of their sexually deviant offenses. Unwanted sexual contact violates interpersonal boundaries and leads to long-term psychological consequences for victims. Illegal sexual behavior is accepted as an inherent personality pattern that persists over the lifetime. This breeds societal fear of AISB and promotes legislation in favor of criminal dispositions and long-term registration. However, empirical research has found that AISB have low recidivism rates and high responsiveness to treatment that targets illegal sexual behavior. Previous research demonstrated that negative stereotypes can be eliminated with exposure to counter-attitudinal (CA) information. Exposure to psychoeducation that highlights the effectiveness of adult sex offender treatment has been associated with more positive views of treatment and fewer endorsements of incarceration. This study sought to replicate these findings by examining the influence of CA information on hypothetical judicial decision-making for AISB. Those provided with CA information about AISB were hypothesized to be less punitive in judging illegal sexual behavior. Undergraduate participants (N=541) were randomly assigned to receive psychoeducation on AISB recidivism and treatment effectiveness. They were then asked to report opinions regarding guiltiness, method of trial, registration status, and recidivism risk for AISB in three vignettes (distribution of child pornography, fondling, and rape). For each vignette, Chi-Square Tests for Independence found no significant relationships between receipt of psychoeducation and: guiltiness, type of trial, and registration status. However, Independent Sample t-tests found significant differences in AISB recidivism risk. Overall, participants who received psychoeducation rated AISB less likely to reoffend than those who did not receive psychoeducation. Legal implications are discussed.

Harris, AuBriauna (UG)

Title: Examining the moderation effect of work overload on role-conflict and burnout
Primary Author (and presenter): Harris, AuBriauna J.
Additional Authors: Kelner, Will; O’Neill, Sadie; Hartman, Paige; Michel, Jesse S.
Department: Psychology
College/School: Liberal Arts

Description: Burnout threatens workers’ well-being, leading to depression and psychological distress (Maslach, Schaufeli, & Leiter, 2001). Job burnout is a response to stressors at work characterized by three dimensions: emotional exhaustion, depersonalization, and diminished personal accomplishment (Maslach, 1982). Understanding sources of burnout is crucial to formulate interventions to combat the issues they pose in the workplace. We drew from Conservation of Resources Theory (COR) to help explain factors that lead to burnout. COR posits that individuals make an effort to protect their resources that aid in managing stress and threats to well-being. A
loss of resources or a threat to resources diminishes a person’s ability to handle stress, resulting in burnout (Allen & Muller 2013; Hobfoll, 1989). Previous studies demonstrated a link between stressors (i.e., role ambiguity, role-conflict) and burnout (Cravens & Moncrief, 2001). This study expands current research by examining the relationship between role-conflict and burnout, moderated by work role overload. The results from an online survey (n=260), revealed a significant relationship between role-conflict and burnout. This relationship was stronger for participants with high work role overload. Future research should confirm these findings in an employee sample. Understanding the antecedents of burnout, such as role-conflict, is beneficial for companies and businesses to effectively intervene to reduce employees’ burnout. Reducing burnout will allow employees to not only conserve their resources effectively, but also allow for employees to remain productive over longer periods of time.

**Harris, Chelsea (G)**

**Title:** Targeting of GABA receptors using functionalized nanoparticles as a method of treating cancer-related pain

**Primary Author (and presenter):** Harris, Chelsea M

**Additional Authors:** David, Allan; Suppiramaniam, Vishnu

**Department:** Chemical Engineering

**College/School:** Samuel Ginn College of Engineering

**Description:** Pain is an often neglected aspect of cancer treatment. More than 55% of cancer patients suffer from moderate to severe pain, and 63% report breakthrough pain – severe pain even while medicated (Breivik et al., 2009; Bennett et al., 2012). Pain is most commonly treated with opioids which can cause a variety of side effects, including risk of addiction (Rosenblum et al., 2008). Opioids work by targeting opioid receptors which are specific proteins located throughout the central and peripheral nervous system (Sjögren & Olsen, 2000). This project aims to use nanoparticles to target GABA receptors which are found in mature peripheral neurons (Dichter, 1980). Initially, silica and iron oxide nanoparticles of various sizes will be functionalized with polyethylene glycol (PEG). These PEGylated nanoparticles will then be aminated to allow for the attachment of GABA and gabapentin, a GABA analogue. The amount of GABA or gabapentin attached to the surface will be quantified to determine possible dosing levels for each size of nanoparticle. Additionally, phage display will be utilized to identify molecules which could potentially bind to GABA receptors. Nanoparticles coated in this molecule will also be tested for efficacy. The level of binding and interaction that the functionalized nanoparticles have with neurons will be analyzed using biochemically isolated GABAergic synapses in a novel technique developed by Dr. Suppiramaniam’s laboratory (Vaithianathan et al., 2005). Receptor activity will be monitored while the neuron is bathed in functionalized nanoparticles. It is anticipated that the binding of nanoparticles themselves or GABA/gabapentin to the GABA receptors will enhance channel activity and inhibit pain signals. If this can be achieved, this technique stands to drastically reduce the current required dosage of opioids, thereby lowering the chances of opioid addiction and ultimately changing the way pain is treated.
Hartwick, Olivia (G)

**Title:** Social competence as a predictor of preschoolers coping tactics during dyadic peer play

**Primary Author (and presenter):** Hartwick, Olivia I

**Additional Authors:** Vaughn, Brian E

**Department:** Human Development and Family Studies

**College/School:** College of Human Sciences

**Description:** Peer interactions afford opportunities for preschoolers to experience different perspectives and preferences, to practice impulse control, and to promote discussions concerning peers’ differing perspectives and preferences (Rubin et al., 2006). Peer conflict is a common form of peer interaction (Chen et al., 2001, Killen & Turiel, 1991; Bakeman & Brownlee, 1982) that, although brief (Shantz, 1987), serves to refine and enhance children’s own emotional, social and cognitive development (Bukoski, Buhrmester and Umberson, 2011). Although many studies have addressed children’s coping tactics with peer conflict during early childhood (Maccoby & Jacklin, 1978; Knight et al., 2002; Miller, Danaher & Forbes, 1986), there remain open questions regarding how young children’s conflict management tactics may relate to classroom-level variables, such as social competence. In the present study, children’s coping tactics during dyadic peer play will be examined in relation to dyad sex composition (i.e., girl-girl, boy-boy, girl-boy) and their social competence scores (assessed through direct observations and sociometric interviews). The dyadic play tasks were designed to produce a resource-based conflict between the pair (two identical, battery powered toys available, one inoperable), to examine the children’s coping tactics under specific constraints. Participants were 150 preschool children from 6 three-year-old classrooms and 6 four-year-old classrooms, all from a university-administered early learning center. Data for the study are currently being compiled and coded. Preliminary findings confirm that preschoolers’ coping tactics varies by sex of the partner, although a full analysis of the data is not complete. In our hypothesized model, children’s specific tactics used to resolve conflicts (e.g., assertion) will reflect individual differences in general social competence and may lead to positive growth in the domain of social competence over time.

Head, Sara (UG)

**Title:** Gelatin methacrylate and polyethylene glycol-fibrinogen as novel biomaterials to form functional 3D human cardiac tissues

**Primary Author (and presenter):** Head, Sara, E.

**Additional Authors:** Kaczmarek, Jennifer; Kerscher, Petra and Lipke, Elizabeth

**Department:** Chemical Engineering

**College/School:** Samuel Ginn College of Engineering

**Description:** Biomimetic materials are used in tissue engineering to provide a 3D microenvironment for encapsulated cells to form functional tissues. Suitable materials provide essential cell-material interaction, temporally degrade, and allow cell survival and migration. Here, I assess gelatin methacrylate (GelMA) and polyethylene glycol (PEG)-fibrinogen as suitable biomaterials to engineer functional 3D cardiac tissues using human induced pluripotent stem cells (hiPSCs). GelMA was synthesized by reacting 5% w/v
methacrylic anhydride with gelatin. PEG-fibrinogen was synthesized by reacting PEG diacrylate with 10 mg/ml fibrinogen. Nuclear magnetic resonance (NMR) spectroscopy was used to analyze the degree of methacrylation or PEGylation. To form 3D hydrogels, liquid polymer precursor of each biomaterial was combined with hiPSCs, transferred to a cylindrical polydimethylsiloxane mold, and photocrosslinked using visible light for 40 s. Encapsulated hiPSCs were cultured for three days and then differentiated to form cardiac tissues. Scanning electron microscopy (SEM) was used to analyze structure and pore size of hydrogels with and without cells. A micron-scale parallel plate compression system was used to generate force displacement curves which were used to analyze the elastic modulus of acellular and cellular hydrogels. NMR results show that gelatin and fibrinogen were successfully modified to obtain GelMA and PEG-fibrinogen. Both materials successfully photocrosslink with and without cells, and produce spontaneously contracting cardiac tissues by day 7 of differentiation. SEM images of acellular hydrogels show large pores; cellular hydrogels display small, round cells entrapped within the biomaterial. The elastic moduli of GelMA and PEG-fibrinogen hydrogels were found to be less than 1 kPa, a magnitude softer than that of native cardiac tissue. Overall, both GelMA and PEG-fibrinogen were found to be suitable biomaterials to engineer functional cardiac tissues using hiPSCs.

**Hermes, Carolyn (UG)**
**Title:** Predictors of preschoolers’ prosocial behavior during dyadic peer conflict
**Primary Author (and presenter):** Hermes, Carolyn, C
**Additional Authors:** Smith, Margaret; Hartwick, Olivia and Vaughn, Brian
**Department:** Human Development and Family Studies
**College/School:** College of Human Sciences
**Description:** Prosocial behavior is defined as voluntary actions undertaken to benefit others, often at the expense of satisfying one’s own desires. For preschoolers, prosocial behavior has been identified as a strong predictor for positive academic achievement and peer relations and correlated with later mental health and well-being. Yet few studies have attempted to examine predictors of prosocial behavior. In the current study, social competence along with grouping variables (i.e. age, sex of partner, friendship status) are tested as predictors of prosocial behavior during dyadic peer play. The dyadic play settings were designed to produce a resource-based conflict between the pair (two identical, battery powered toys available, one inoperable) to examine the children’s prosocial tactics under specific constraints. Participants consisted of 100 preschool children from 6 three-year-old classrooms and 6 four-year-old classrooms within a university-administered early learning center. Currently, we are in the process of compiling and coding the data. We plan to conduct a multiple regression to test the effects of social competence, age, sex of partner, and friendship status of the dyad on prosocial behavior. We expect that children with higher social competence scores are more likely to display prosocial behavior than are children with lower social competence scores. Furthermore, we expect to find that girl-girl dyads engage in more prosocial behavior than boy-boy dyads, friends engage in more prosocial behavior than non-friends, and that four-year olds engage in more prosocial behavior than three-year olds. Preliminary findings confirm that preschoolers’ average prosocial behavior varies by age and by sex of partner, although the full analysis of the data is not complete. Results of this study will expand understanding of prosocial behavior during early childhood and may establish a link between the use of prosocial behavior and levels of child social competence.
Henderson, Kendall (G)
Title: Patient care journals in intensive care units
Primary Author (and presenter): Henderson, Kendall, W.
Additional Authors: Hamilton, Cam
College/School: School of Nursing
Description: Evidence suggests that patients who spend time in an Intensive Care Unit (ICU) may suffer from Post-Traumatic Stress Disorder (PTSD). Using a journal to record the patient’s time in the ICU to review on discharge has been shown to combat PTSD. This project’s goal was to use journals to help decrease the prevalence of PTSD symptoms that occur in individuals with a change in level of consciousness (LOC) after spending time in an ICU. The target population included patients (ages 15-90) in an ICU for more than 3 days or ventilated for more than 24 hours with a change in LOC. The patient’s family and visitors were encouraged to write in a journal provided by the researcher. On discharge from the ICU, patients were screened with the Post-Traumatic Stress Survey-14 (PTSS-14) and then given their journal to review. Patients were screened again with the PTSS-14 upon leaving the hospital. Descriptive statistics were used to depict the patient population. T-tests were used to compare the patient’s PTSS-14 responses before and after receiving journals to assess the effectiveness at decreasing PTSD symptoms. X patients, ages ____ (sd) were chosen to participate (% male, % female). Statistical analysis was performed on the data obtained from the PTSS-14 scores on discharge from the ICU (before journal) and from the hospital (after journal). A p-value of X was calculated, suggesting that the patient care journals helped to decrease PTSD symptoms in ICU patients with a change in LOC. Providing patients with a journal detailing their time spent in the ICU, written by family and friends, reduced symptoms of PTSD. Journals are a cost-effective way to help patients with memory gaps after being in an ICU due to change in LOC and improve their quality of life in the future.

Hiware, Sagar (G) (creative scholarship)
Title: Urban morphology for the city of Montgomery: Building a liveable future
Primary Author (and presenter): Hiware, Sagar
Department: Department of Political Science
College/School: College of Liberal Arts
Description: Urban Morphology can be described vaguely as an art of creating public spaces and shaping cities and towns. It is bringing in a critical, decisive and knowledgeable intervention to help growth of liveable communities of future. Alabama’s inner cities in general, and Montgomery’s inner communities in particular are characterized by poverty stricken blighted neighborhoods, plagued with high unemployment, decaying buildings, and high crime rates- attributing to their social and economic isolation. These communities need engagement with mainstream economic activities that transforms the physical image of the districts. Such communities need solutions that are inclusive and sustainable, solutions that serve the locals, help regenerate their livelihood, build pride for people and restore the local economies. One such highly impacted region called “Westside” is constantly facing various issues of sustainability in every aspect. This morphology project is an effort to address these issues for the
Westside region, thereby bringing in a change for future development. In last fifteen years efforts have been made to develop the districts in the north and east of the town, mostly which comprise of the affluent neighborhoods. As more and more redevelopment is seen in such affluent neighborhoods, developers turn a blind face on the Westside region. As a result many neighborhoods in particular to Westside have been striving through economic hardships and constant struggle for existence. The methodology of the research for the project will be a synthesis approach. I could start from root causes, analysis, and documentation of the various factors that are of prime importance for morphing the vital areas form the Westside. This includes site visits, references from the strategies in pipeline by the Planning department, and application of various courses, methodologies using GIS and planning tools learned from Community Planning program at Auburn University. Towards the end of the project, I strive to achieve a comprehensive and a precise conclusion in a form of plan supplemented with design strategies to redevelop the Westside region of the City of Montgomery.

Hiware, Sagar (G) (poster)
Title: Radical regenerative planning for the City of Montgomery
Primary Author (and presenter): Hiware, Sagar
Department: Department of Political Science
College/School: College of Liberal Arts
Description: Urban design is the process of giving form, shape, and character to groups of buildings, to whole neighbourhood and the city. It is a process about making connections between people and places, movement and urban form, nature and the built fabric. Often is drawn upon a framework that orders the elements into a network of streets, squares, and blocks. Urban design blends architecture, landscape architecture, and city planning together to make urban areas functional and attractive. Our cities need to take into account the assets, which they already possess such as natural resources like rivers, lakes, typography, climatic conditions, social and historical background when designing for future. City of Montgomery, the capital for the state of Alabama, is one such city that has great potential. It has suffered and gained through its rich past. The Civil Rights Movement that changed the social political realities of the United States began in the City of Montgomery, AL. The farsightedness to challenge the status quo and gain equality for every citizen crystalized in Montgomery. The challenge to envision the City of Montgomery as a mid sized American city that surpasses the issues of economic hardships, status inequality, class system in a society reflected in the public realms and public spaces, thereby into an identity of the city in larger spectrum; is held from this premise. The project is an effort to draw upon a vision to create a livable future for the neighborhoods that are cohesive in nature and represent a unique character as a whole. The methodology adopted will be drawn upon skills learned from the experiences in my graduate level course work in Community Planning program. Towards the conclusion, I tend to present a cohesive design proposal that will help create a distinctive character for the communities from the City of Montgomery binding the principles of ecological urbanism.
Hlavaty, Kathleen (G)

Title: Differentiating exposure to coercive controlling violence: A mixed methods study

Primary Author (and presenter): Hlavaty, Kathleen

Additional Authors: Pratt, Laura; Gutman, Jackie, & Haselschwerdt, Megan

Department: Human development and family studies

College/School: College of human sciences

Description: Despite evidence of different types of domestic violence (DV; i.e., coercive controlling (CCV) versus situational couple violence (SCV)), the DV exposure literature has yet to make distinctions between these DV types (Haselschwerdt, 2014). CCV is differentiated from SCV by the presence of coercive control (CC) – tactics used to maintain power and control over one’s partner. The Psychological Maltreatment of Women Inventory (PMWI; Tolman, 1989) is an empirically validated scale of CC used to distinguish between adult women exposed to CCV (Hardesty et al., 2015); however, this measure has not been used in the youth exposure literature. Thus, the purpose of the current study is to explore the use of the PMWI in making distinctions between CCV and SCV from the perspective of 25 young adults (Mage = 20.5; 23 female) exposed to father-perpetrated DV. Participants completed the PMWI, modified to reflect DV exposure, in addition to a qualitative, in-depth interview (Mlength = 87 minutes). Participants responded to six items, ranging from “not at all” to “very frequently.” Consistent with Hardesty et al. (2015), PWMI scores were created using a summed score, a score of 19+ reflecting exposure to CCV. For the purpose of this study, the analytic sample excluded two participants due to missing data. We analysed the qualitative data using content analysis (Sandelowski, 2000) and constant comparison (Charmaz, 2006), categorizing participants into either CCV (n = 15) or SCV (n = 10). Preliminary analyses indicate that the qualitative and quantitative categorizations were congruent for 19 of the 23 participants. Further analyses will focus on the incongruent categorizations, as well as the potential to modify the PMWI for future use in quantitative studies of father-perpetrated DV exposure. These findings suggest that with modification the PMWI is a viable tool for distinguishing between CCV and SCV in future studies.

Hobbs, Jennifer (G)

Title: Implementation of diabetes referral distribution in the emergency department at discharge to facilitate education in this population

Primary Author (and presenter): Hobbs, Jennifer M

Additional Authors: Hamilton, Cam

College/School: School of Nursing

Description: Evidence shows patients with newly diagnosed and uncontrolled chronic diabetes have had increased compliance in diabetes education courses when referrals are given within emergency department (ED). The purpose of this project was to provide a referral to a local diabetes education course through flyers distributed at discharge from the ED to patients who presented with uncontrolled diabetes. The target population included newly diagnosed and patients who listed diabetes as a chronic illness seen in the ED. During the first two weeks of the Small test of Change (STOC), the chosen patients received a flyer with a brief introduction to diabetes education and the hospital’s education director’s contact information. After the two weeks of flyer distribution, the next three weeks were allotted to measure the improvements of participation. All
participants seen in the educational class during this time were provided a survey and a demographic form that inquired if the patient received a flyer referral. Xxx flyers were passed out in the ED. C% of the participants came in for education from the flyer referral. Demographics included X% male, X% female, ages: 18-35-X%, 36-50-X%, 51-65-X%, and X% over 66, X%; race: X% African American, X% Caucasian, X% Indian, and X% Hispanic. Prior to the STOC the average number of participants was two per week. During the STOC the mean changed from two to x per week, a x% increase/decrease. Utilizing SPSS to compare mean values pre and post implementation with the number of participants that received a flyer, P=x% indicating a clinically significant/insignificant findings. Education in the population of diabetics is achievable through referrals and simple handouts, even in a busy ED. The results are valuable in this project because providing information about resources for diabetic education improves compliance with attendance at educational sessions.

Hohmann, Lindsey (G)
Title: The moderating power of impulsivity: a thorough literature review examining the theory of planned behavior
Primary Author: Hohmann, Lindsey A
Additional Authors: Garza, Kimberly
Department: Health Outcomes Research and Policy
College/School: Harrison School of Pharmacy
Description: The Theory of Planned Behavior (TPB) states that behavioral intention is the best predictor of actual behavior change. Of specific interest is the question of which variables can be leveraged to moderate or mediate the TPB in order to aid health promotion interventions utilizing the tenets of behavioral economics (delay discounting, commitment contracts, and others). Impulsivity has been postulated to fill this role, and is uniquely suited to application in behavioral economics. Accordingly, the objective of this review is to determine if impulsivity moderates the association between intention and actual behavior, and to discover what other variables may moderate or mediate this association. A thorough literature review was conducted using PubMed and PsychINFO online databases. Google Scholar was utilized via a snowballing method. Studies written in English and utilizing a systematic review, meta-analysis, cross-sectional survey, pre-post, time series, cohort, case-control, other quasi-experimental, or randomized controlled design in peer-reviewed journals published prior to November 2015 were selected. Three main concepts emerged from this review: 1) impulsivity moderates intention and behavior change; 2) self-efficacy moderates intention and behavior change; and 3) planning and self-efficacy contribute to moderated mediation. This review demonstrates a gap in the literature regarding the application of the TPB to medication adherence and prescriber providing habits. Future studies in behavioral economics may leverage the variables of impulsivity, self-efficacy, and planning to predict follow-through in these areas. This will then allow for the development of targeted change initiatives using tailored commitment contracts or other novel incentivized actions.

Hohmann, Natalie (G)
Title: Medication dispensing error learning processes in U.S. community pharmacies: a systematic literature review as seen through the four frames model of organizational theory

Primary Author (and presenter): Hohmann, Natalie S
Department: Health Outcomes Research and Policy
College/School: Harrison School of Pharmacy

Description: The National Coordinating Council for Medication Error Reporting and Prevention defines a medication error as a preventable event that may lead to patient harm. Many studies on medication errors exist; however, much of this research is in the inpatient setting, and is ill-defined in terms of origin (prescribing, dispensing, or administration). Furthermore, while causes and mitigation strategies for medication dispensing errors have been studied, the extent of literature on learning processes after dispensing errors occur is unknown. The purpose of this systematic review is to discern the number, design, and quality of studies on learning processes after occurrence of medication dispensing errors in US community pharmacies. A secondary aim is to categorize these studies using Bolman and Deal’s four frames of organizational theory: structural, human resource, political, and/or cultural, to describe which of these elements contribute to learning processes. Criteria for inclusion were: English language; within the US; community pharmacy setting (independent, grocery, mass-merchant, or chain); medication dispensing error (excludes near miss); with a focus on learning processes (defined by the keywords “learning” or “continuous quality improvement” in the title, aims, methods, or results). PubMed was systematically searched for relevant literature, returning 296 possible articles, with 30 additional found through a snowballing method using Google Scholar. After initial title and abstract review, no studies met the inclusion criteria. Elements of all four frames were seen throughout the articles reviewed, as well as inconsistency in medication error definition, and lack of intervention studies. This review is important in identifying a literature gap. Future studies may focus on facilitators and barriers of organizational learning from dispensing errors to lay the foundation for intervention studies testing US community pharmacy learning systems.

Holland, Victoria (UG)

Title: Effect of incubational egg turning rate on gut development in the chick, gut morphology, and developmental biomarkers.

Primary Author (and presenter): Holland, Victoria, N.
Additional Authors: Berry, Wallace; Roberts, Jonathan
Department: Poultry Science
College/School: College of Agriculture

Description: The objective for this research is to optimize chick gut development and accelerate post-hatch gut maturation to improve early growth and mortality rates of broiler chickens. Incubators at the Auburn University Poultry Research and Teaching Unit hatchery were modified to deliver a variable egg turning rate. The "Control" rate consisted of turning the eggs through a 90° angle (relative to the longitudinal axis of the egg) six times per 24 hours. The "2X" rate consisted of turning the eggs through a 90° angle twelve times per 24 hours (twice as often). Fertile eggs were incubated for 18 days. Samples of the small intestine were taken from the middle of the ileum and placed into 10% formalin. Tissue sections were
collected for eventual immunohistochemical analysis of gut development biomarkers. Digital micrographs of the tissue sections were analysed for intestinal villus number and length. Data was also collected for embryo weight, small intestine weight, and small intestinal length. These records were analysed statistically using an unpaired t-test. The relative weight of embryos from the 2X treatment tended to be greater than that of the Control embryos, but did not reach the predetermined (p ≤ 0.05) threshold for acceptance as statistically significant. The relative small intestine weight tended to be less in the 2X treatment embryos compared to the Control embryos. This difference approached statistical significance (p=0.07). Embryos from the 2X treatment tended to have shorter intestines than the embryos from the Control treatment (p=0.11). Villus number tended to be lower in the 2X treatment embryos compared to the Control embryos, however, this trend did not reach statistical significance (p=0.18). The lengths of the villi in the small intestines were nearly identical between the two treatments. From these results it was concluded that doubling the rate of egg turning did not significantly alter gut development in chick embryos through day 18 of incubation.

Holston, Doshie (G)
Title: Venous thromboembolism education in medical oncology staff nurses
Primary Author (and presenter): Holston, Doshie R.
Additional Authors: Hamilton, Cam
College/School: School of Nursing
Description: Venous thromboembolism (VTE) is one of the most commonly underdiagnosed medical problems among oncology patients. Patients with cancer are often at higher risk of developing VTE due to endothelial damage as a result of chemotherapy, radiation, malignancy, and prolonged immobility. Evidence shows that an educational plan for staff nurses regarding the signs and symptoms of VTE can lead to improved patient assessment and education. The purpose of this project is to implement VTE education to oncology staff nurses to improve early assessment of potential complications and improve patient teaching. The target population included staff nurses of varying experience levels (X- X years) who care for oncology patients. The project leader developed a pre-test to assess the nurses’ baseline knowledge of VTE. After nurses received an educational session, a post-test was administered to assess changes in their understanding. Descriptive statistics were used to describe the target population, pre-test and post-test scores, and understanding of VTE education. Among nurses who participated, the pre-post tests were compared using paired t-tests. X nurses consented to participate with an average experience level of X yrs. X% rated their basic level of understanding of at least a X, X% rated VTE education as X on a scale of 1-10 in relevancy to their current role, and X% scored lower than X on their pre-test which indicated a need for increased education. The mean post-test scores improved significantly (p=<0.05) which indicates that an educational session can help improve nurses’ understanding of VTE. Educating staff nurses regarding the signs and symptoms of VTE education in the oncology population helps to improve quality of care. Project test scores reveal that by implementing staff education, nurses will help improve patient outcomes by early assessment and intervention at the first signs of VTE.
Holt, Allison (G)
Title: Visual cryptography tool for colorful images
Primary Author (and presenter): Holt, Allison M
Additional Authors: Umphress, David
Department: Computer Science and Software Engineering
College/School: Samuel Ginn College of Engineering
Description: Visual cryptography is a type of encryption that hides information in images in such a way that the human eye can perform the decryption if given the correct key. This research involved reviewing the various visual cryptography schemes and creating a software tool that allows a user to hide a secret message inside two innocent images. While there are many techniques for performing visual cryptography, there are only a few software tools available for use. The Holt Visual Cryptography Tool allows a user to securely hide information in two cover images, and it can reveal the secret message when provided two encoded images. The visual cryptography tool initially implemented an extended visual cryptography scheme for images with strictly black and white pixels. Then, the functionality was increased with the ability to process grayscale images. The current product uses a combination of extended visual cryptography, pixel expansion, and Floyd-Steinberg dithering to encrypt and decrypt color images. Tests for this product are qualitatively analyzed based on the following items:
- Is the secret image detected in the encoded images?
- How much was the meaning of the cover image impacted by the encryption process?
- After decrypting the encoded images, is it easy for the human eye to distinguish the secret?

The tests show the visual cryptography tool created does work as intended. In other words, given a secret message or image and two innocent cover images, the tool will create two encoded images that have the same meaning as the cover image. Also, if the tool is given two encoded images, the software will decrypt and reveal the secret in a new image file. The Holt Visual Cryptography Tool allows a user with no background knowledge of cryptography or software engineering to encrypt secret messages in two color images and decrypt colorful encoded images.

Huangfu, Rong (G)
Title: Quantifying stairwell evacuation times
Primary Author (and presenter): Huangfu, Rong
Additional Authors: Davis, Jerry; Abulhassan, Yousif; Schall, Mark; Sesek, Richard; Gallagher, Sean.
Department: Industrial and Systems Engineering
College/School: Samuel Ginn College of Engineering
Description: This study evaluated the evacuation time in stairwells during building evacuation for subjects with and without wearing a commercially available smoke hood. In an emergency situation, the time it takes people to descend stairs safely during building evacuations is critical. Smoke hood design is an important part of the process. The impact of personal escape devices (e.g. smoke hood) in stairwell evacuation time needs further investigation. Ten (N=10) college students, mean age of 27.7 years, with/without wearing smoke hoods were evacuated down an eight story flight of stairs.
wearing an inertial measurement unit based motion capture system known as Xsens. Subjects’ position in the stairwell and body segments’ orientation were captured at 60 Hz throughout the evacuation process. Subjects also provided feedback about wearing the smoke hood such as: “vision partially blocked”, “smoke hood getting hot” and “hard to breath” was reported. Large amount of angular neck flexion, and frontal torso bending were observed while wearing the smoke hood, compared to the control condition (no smoke hood). As a result, longer evacuation times (21.53%) were observed for the smoke hood trials. The use of the Xsens inertial motion capture system is innovative for this type of evacuation research.

Hubbard, Caroline (UG)
Title: The effects of macronutrients in inducing satiety via Peptide YY
Primary Author (and presenter): Hubbard, Caroline, E
Additional Authors: Neidert, Leslie; Klues, Heidi
Department: College of Education
College/School: School of Kinesiology
Description: Peptide YY (PYY) is cleaved by dipeptidyl peptidase-IV (DPP-IV) in the mouth, inducing satiety via afferent signalling upon binding to the Y2 receptor. Although it has been suggested that the physiological response of satiety is mediated in the mouth, the specific mechanism remains unknown. The purpose of this study was to investigate the effects that macronutrients, particularly glucose and whey protein, have on DPP-IV activity and PYY levels and thus on satiety. Twelve subjects participated in two counterbalanced conditions, which included consuming either a commercially available glucose drink or whey protein shake. During each visit, a satiety measure via a visual analog questionnaire, a saliva sample, and a blood sample were all collected pre-condition and thirty minutes post-condition. A fluorometric assay was used to measure DPP-IV activity, and an ELISA was utilized to obtain PYY activity levels. The mean saliva DPP-IV values decreased from 17.55±16.73U/L to 10.60±6.13U/L respectively after the carbohydrate condition, while the mean saliva DPP-IV levels for the whey protein condition increased from 12.85±12.65U/L to 18.29±21.76U/L. These changes, however, were not significant. No significant change was found in plasma DPP-IV activity with the carbohydrate and whey protein conditions. Additionally, there were no significant changes in saliva PYY levels in either of the conditions. In the whey protein condition, satiety measures significantly decreased from 56.08±16.88 to 49.09±16.09 (p=0.0011). No significant change occurred in satiety from pre to post measures in the carbohydrate condition. The carbohydrate condition had a significantly higher mean satiety measure in the post-condition when compared to the post-whey protein condition. These results suggest that macronutrients have a physiological effect in terms of satiety; however, these findings provide evidence that this effect is not mediated by the DPP-IV and PYY signalling pathway in the mouth.

Hunsberger, Holly (G)
Title: Suppression of glutamate uptake mediates hippocampal hyperexcitability induced by peripheral viral challenge
Primary Author (and presenter): Hunsberger, Holly C.
Additional Authors: Wang, Desheng; Konat, Gregory; Reed, Miranda
Peripheral infections increase the propensity and severity of seizures in susceptible populations. We have previously shown that intraperitoneal (i.p.) injection of a viral mimic, polyinosinic-polycytidylic acid (PIC), elicits hypersusceptibility of mice to kainic acid (KA)-induced seizures. The present study was undertaken to determine whether this seizure hypersusceptibility entails alterations in glutamate signaling. Female C57BL/6 mice were i.p. injected with PIC and after 24 hours, glutamate homeostasis in the hippocampus was monitored using the enzyme-based microelectrode arrays. PIC challenge robustly increased the level of resting extracellular glutamate. While presynaptic potassium-evoked glutamate release was not affected, glutamate uptake was profoundly impaired and non-vesicular glutamate release was augmented, indicating functional alterations of astrocytes. Electrophysiological examination of hippocampal slices from PIC-challenged mice revealed a several fold increase in the basal synaptic transmission as compared to control slices. Paired-pulse facilitation (PPF) and long-term potentiation (LTP) were not affected, indicating no changes in synaptic plasticity. Altogether, our results implicate a dysregulation of astrocytic glutamate metabolism as the underlying mechanism for the development of hippocampal hyperexcitability, and consequently seizure hypersusceptibility following peripheral PIC challenge. Findings of increased hippocampal hyperexcitability are important because hyperexcitability is a common feature in many neurodegenerative conditions, such as Alzheimer’s disease. Glutamate dysregulation could be a potential mechanism by which viral infections in the periphery lead to neurodegenerative pathology. The elucidation of this link will offer new options for therapeutic approaches to prevent infection-mediated exacerbations in neurodegenerative diseases.

Huynh, Jennifer (G)
Title: Evaluation of adherence to the American Diabetes Association standards of medical care in HIV-infected patients
Primary Author (and presenter): Huynh, Jennifer B
Additional Author: E. Kelly Hester, Pharm.D., FCCP, BCPS, AAHIVP
College/School: Harrison School of Pharmacy
Description: The primary objective of this study is to evaluate adherence to American Diabetes Association (ADA) standards of care in an HIV-infected population. Secondary objectives include incidence of diabetes complications, assessment of control of other cardiovascular (CV) risk factors (high blood pressure and high cholesterol) and control of HIV infection. Single-center, retrospective chart review for HIV-infected patients with diabetes in a federally-funded HIV primary care clinic. Patient charts were selected during the study period (June 1, 2014 to June 1, 2015). Electronic medical records were reviewed for demographics, laboratory monitoring and medical information (diabetes complications, past medical history including CV disease, current and past medication use for diabetes and HIV infection, blood pressure readings, and screening for diabetes complications). Of the 175 charts reviewed, the mean age was 52, 51% male and predominately African American (80%). The average duration since diabetes mellitus diagnosis was 8.5 years (39% were insulin dependent). The average current A1C value
was 7.6% (range 4.6-17%). A current A1C goal <7% was achieved in only 48% and 42% were able to maintain an A1C <7% during the study period. In contrast, HIV-infection was controlled in 81% of patients. In this HIV population with diabetes, 87% had hyperlipidemia, 94% had hypertension, and 15% had a history of CV disease. For CV risk reduction, 51% were on an appropriate intensity statin and 40% were untreated with a statin. Of those indicated for an ACEI/ARB 58% received treatment. This HIV infected population had fairly advanced diabetes with emerging complications. Adherence to the ADA standards of care was poor and highlights the need to address both glycemic control and monitoring to minimize microvascular disease. Statin therapy, ACEI/ARB, and antiplatelets were significantly underutilized to reduce CV risk in this HIV population already at high risk for CV disease.

Hyche, Emma (UG)
Title: Inmate labor and its connections to historical systems of racial labor exploitation
Primary Author (and presenter): Hyche, Emma, C
Department: History
College/School: Liberal Arts
Description: Inmate labor is astonishingly pervasive in modern American prisons, both in terms of gross revenue, number of corporations involved, and percent of the inmate population participating. Although its implications and practices are relatively known by the public, its historical precedents remain relatively unexplored by popular culture. For this paper, I compare modern prison labor (in the context of racially disproportionate mass incarceration) to past patterns of racially-motivated labor exploitation of incarcerated persons, in the form of the prison workhouse system during slavery and the convict lease system both during and after the era of American slavery. I read widely to discern common elements between these three labor systems from such sources as slave narratives from the 19th century, scholarly articles from databases, and recent sociohistorical works, including The New Jim Crow by Michelle Alexander and Douglas Blackmon’s Slavery by Another Name. I found similarities between modern inmate labor, the prison workhouse system, and the convict lease system in the following areas: dual goals of punishment and profit, unethical labor practices, appropriation of involuntary labor, and emphasis on profit over rehabilitation. Analysis of modern prison labor through a historical lens will allow for its greater popular understanding, leading to positive reform to avoid further state-sanctioned racial exploitation and to preserve the rights of America’s incarcerated citizens.

Hyder, Jacob (UG)
Title: 3D fluid modelling using consumer based motion tracking camera
Primary Author (and presenter): Hyder, Jacob, G
Additional Authors: Luis Cueva-Parra
Department: Mathematics and Computer Science
College/School: College of Arts and Sciences
Description: This Presentation will be demonstrating the ability of the Microsoft Kinect Gaming Utility to model a fluid. In conjunction with open-source drivers and software, the data gathered from the dynamic fluid can be plotted into a Computational Fluid Dynamic modeling software, this project is solely for the hardware component side of fluid modeling, but at a much lower cost.
Iskandar, Jeffry (UG)
Title: Production of bio-oil by hydrothermal liquefaction of algae
Primary Author (and presenter): Iskandar, Jeffry K.
Additional Authors: Shakya, Rajdeep and Adhikari, Sushil
Department: Biosystems Engineering
College/School: Samuel Ginn College of Engineering
Description: The study of algae has led to several techniques in converting algae into bio-oil; one of them is Hydrothermal Liquefaction. The research analyses bio-oil production from Hydrothermal Liquefaction (HTL) of nine different algae strains, with a solid weight content of 15%, at 280 °C and 320 °C, and a holding time of 30 minutes. Different algae species presented variation in bio-oil yield and its properties. Algae conversion at 320 °C resulted in a higher yield than bio-oil production at 280 °C. In addition, experiments concluded oil yield to be higher in algae with high lipid content compared to high protein content and high carbohydrate content. The resulting bio-oil were measured in its heating value, which were similar in nature to heavy crude oil (31 to 36 MJ/kg). By-products of algae conversion, such as the aqueous solution, solid residue, and gas were also analyzed. The aqueous solution were observed to be rich in nitrogen as well as dissolved organic compound. Solid residue collected from unconverted carbon were measured in its heating value as well (15 to 32 MJ/kg). The main composition of the gas compound was CO₂.

Islam, Md (G)
Title: Photochemical reduction of chlorinated hydrocarbon initiated by SPEEK systems using solutions and swollen films
Primary Author (and presenter): Islam, Md S
Additional Authors: Mills, German
Department: Department of Chemistry and Biochemistry
College/School: COSAM
Description: Illumination of aqueous systems containing sulfonated poly(ether etherketone), SPEEK, together with sodium formate have been found to effectively reduce chlorinated hydrocarbon to chloride ion both in the presence or absence of air. The polyketone acted as a sensitizer whereas HCO₂⁻ served as H-atom donor; the photoreduction process involves polymeric α–hydroxyl (SPEEK•) and CO₂⁻ radicals. For air-free SPEEK/HCO₂⁻ aqueous solution during photoreduction of CHCl₃, r(Cl⁻) increased slightly with light intensity (I₀) whereas the quantum yields of Cl⁻ generation, φ(Cl⁻), decreased with increasing I₀. Analogous kinetic results were obtained using SPEEK/PVA blends to initiate the photoreduction of CHCl₃. The photoreduction was also initiated effectively using swollen SPEEK/PVA films, which could be reused numerous times as sensitizers. For all systems, the highest values of φ(Cl⁻) were determined at 6 ≤ pH ≤ 8, coinciding with the range where SPEEK• is most efficiently photogenerated. However, a sharp maximum of φ(Cl⁻) was determined at a pH of 7.3; DSC results suggest that changes of the polyelectrolyte under such conditions may influence the photoreaction. GC-MS analysis performed on illuminated solutions...
confirmed that CH₂Cl₂ was the main organic product but traces of C₂H₂Cl₄ were also detected.

Jahan, Shakura (G)
Title: Origin of petroleum in the Bengal Basin, Bangladesh
Primary Author (and presenter): Jahan, Shakura
Additional Authors: Uddin, Ashraf; Savrda, Charles and Pashin, Jack C.
Department: Department of Geosciences
College/School: COSAM
Description: The Bengal Basin in Bangladesh is a sedimentary basin which is considered a promising area for the discovery of large quantities of hydrocarbons. The general depth of oil (65-150°C) and gas (100-200°C) windows in Bangladesh is in the interval between 5000 m to 7000 m. Controversy exists regarding the source-rock for Miocene gas reservoirs in the Bengal Basin, which is still unknown. The upper Eocene Kopili Shale is composed of dark gray to black fossiliferous shale, which is exposed in Sylhet Trough, in northeastern Bangladesh and is also known in the subsurface at Bogra, northwest Bangladesh. Kopili-equivalent shale in India has proven source-rock potential. Accordingly, this research focuses on Kopili source-rock potential in Bangladesh. Thin section petrographic analyses of Kopili Shale reveal foraminifera, bioturbation, pyrite framboids, etc., suggesting shallow marine deposition. X-ray diffraction results show that these shales contained varying amounts of quartz, calcite, and sulfide minerals (e.g., pyrite). X-ray fluorescence analysis resulted in peaks for trace elements for Fe, Al, Ni, and Ti, along with Ca, K, S and Si. Rock-Eval pyrolysis yields high Tₘₐₓ (431-506°C) values and pronounced S₂ peaks indicating that Kopili strata are mature enough to have generated thermogenic gas. Outcrop samples from the northeast are in the peak oil window, and total organic carbon (TOC) content is 0.5 to 1%. Core samples of Kopili Shale from the northwest are in the dry gas window, and have TOC of 0.4 to 0.8%. Organic petrologic analyses reveal tiny macerals (e.g. bituminite, vitrodetrinite, etc.) in Kopili Shale, which suggest the rock unit suffered through extensive weathering and erosion. Liptinitic macerals are nonfluorescent, which, along with measured vitrinite reflectance values, indicate high thermal maturity. Geochemical analyses show that Kopili Shale from both northeast (Rₒ= 0.9 to 1.3%) and northwest (Rₒ=1.0-1.3%) is mature and have generated petroleum.

Jarrard, Madison (UG)
Title: Characterization of Mycobacterium tuberculosis shikimate kinase inhibitor
Primary Author (and presenter): Jarrard, Madison A.
Additional Authors: Alturki, Mansour and Calderón, Angela
Department: Department of Drug Discovery and Development
College/School: The Harrison School of Pharmacy
Description: The emergence of drug resistant strains of Mycobacterium tuberculosis has created an urgent need for new antitubercular drugs. Mycobacterium tuberculosis shikimate kinase (MtSK) is an enzyme present in the shikimate pathway and is crucial for the survival of tubercle bacillus making it an appealing target for antimycobacterial compounds. In this study, characterization of a previously identified MtSK inhibitor with an IC₅₀ value of 10.35
± 0.12 μM (compound 4) was carried out using an LC-MS based MtSK inhibitor assay. Compound 4 was evaluated on the same MtSK assay by monitoring the reaction product of shikimate-3-phosphate (S3P) with mass spectrometry by varying enzyme concentrations and pre-incubation times. The time dependent inhibition and the high percentage of MtSK inhibition at high concentration (0.2 μM) of the enzyme suggest a nonspecific inhibitor. This type of inhibitor can produce false positives by the formation of aggregates, which inhibit enzymes nonspecifically at micromolar concentrations. Compound 4 was tested for aggregate formation at 0.2 μM and 0.02 μM MtSK with and without 0.001% Triton. At 0.2 μM and 0.02 μM MtSK concentrations the enzyme displayed a significant decrease in inhibition with the addition of 0.01% Triton, which is a characteristic of enzyme inhibition by aggregate formation. In addition, the compound’s tendency to form aggregation was measured in several buffers including ammonium acetate and water by dynamic light-scattering (DLS). When 0.01% Triton was added to the buffer and compound mixture a decrease of particle size in the solution was found when compared to the mixture without 0.01% Triton, identifying aggregate based inhibition. Finally, the dose-response curve produced from compound 4 follows the classical characteristics of a nonspecific inhibitor, such as unusual steepness and overall shape. These findings help to provide points for chemical optimization for compound 4 as an MtSK inhibitor.

Javage, Erika (G)
Title: The effect of an alternative lacing strategy on gait parameters
Primary Author (and presenter): Jagove, Erika A
Additional Authors: Fox, John; Wilburn, Christopher; Navity, Chloe; Jagodinsky, Adam; Smallwood, Lorraine
Department: Kinesiology, Physical Therapy
College/School: School of Kinesiology
Description: The resurgence of the “barefoot running” trend has left many with the understanding that footwear can impact gait. However, few studies have investigated the effects of different lacing strategies on walking cadence and velocity. This study investigated these gait parameters in five footwear conditions, including barefoot (BF) and shod conditions: athletic socks with traditional lacing (SWASTR), cotton socks with traditional lacing (SWCSTR), athletic socks with a runner’s loop (SWASRL), and cotton socks with a runner’s loop (SWCSRL). Consent was obtained from 20 male collegiate-aged participants without a musculoskeletal injury in the past six months. Participants were instructed to perform three successful walks at a self-selected pace across a 7m-instrumented walkway (GAITRite) for each of the five conditions. Results showed significance between SWCSTR and SWCSRL (p<0.05) with respect to velocity, and indicated a higher velocity in SWCSRL. The SWCSRL condition exhibited the highest cadence and fastest velocity overall, with SWASRL in second. Conversely, SWCSTR and SWASTR displayed the slowest velocities and cadences among the shod conditions. These findings suggest that, though different socks were introduced into the shod conditions, lacing type plays the bigger role in these measures, thereby allowing the wearer to better utilize the footbed properties of the shoe.
Jeffcoat, Jeremy (G)
Title: Forgotten freedom fighters: Gee’s Bend, Alabama and the voting rights movement of 1965
Primary Author (and presenter): Jeffcoat, Jeremy E
Department: Liberal Arts
College/School: AUM
Description: In 2011, Atlanta-based painter, photographer, and playwright Calvin Alexander Ramsey published a children’s book entitled Belle, the Last Mule at Gee’s Bend. In the Author’s Note, Ramsey recounts a story told to him by leading 1960’s civil rights activist Reverend James E. Orange. Following Dr. Martin Luther King’s assassination in 1968, Reverend Orange took on the task of finding two mules to pull the farm wagon that would carry Dr. King’s casket through the streets of Atlanta. Orange recalled Dr. King’s fondness for the people of the tiny, black-belt peninsula of Gee’s Bend, Alabama. Reverend Orange felt that mules from this small, isolated community with a history of overcoming adversity would provide a moving representation of the struggle of civil rights in the rural South. The Gee’s Bend story remains largely untold and Orange’s attempt at recognizing the courage and stubbornness of the Benders is an unfortunately obscure footnote to one of the Civil Rights Movement’s most traumatic moments. Boykin, Alabama, better known to its residents and the surrounding communities as Gee’s Bend, is home to a community of slave descendants who have been internationally recognized for folk art in the form of handmade quilts. The largely untold story of Gee’s Bend is not contained in their uniquely beautiful artwork; it is a story of struggle to overcome isolation, segregation, abuse, neglect, and extreme poverty. Often overlooked is the unique history of Gee’s Bend and its role in the voting rights movement of the mid 1960’s. In many ways, Gee’s Bend was a forerunner to the more well known voting rights protests in Selma and Montgomery, and the stubborn courage of the residents earned a special place in the hearts of civil rights leaders, including Dr. Martin Luther King Jr.

Jescovitch, Lauren (G)
Title: Expanding aeration to manage water quality in split-pond aquaculture
Primary Author (and presenter): Jescovitch, Lauren N.
Additional Authors: Boyd, Claude E.
Department: Fisheries, Aquaculture and Aquatic Sciences
College/School: Agriculture
Description: Split-ponds are constructed by dividing a traditional catfish pond with an earthen levee into two unequal basins: one basin, or cell, is generally 10-20% of total water area and holds fish while the larger, waste cell treats fish waste. This study focuses on the possible benefits of using mechanical aeration in the waste-treatment section of the split-pond culture system. Work was conducted on a commercial catfish farm in west Alabama. The farm currently has eight split-ponds, each with a fish-holding section of about 8,000 m². Two, 10-hp floating, electric paddlewheel aerators were placed in the waste treatment section of each of four ponds; while four ponds – the controls – had un-aerated waste treatment cells. Water samples were collected biweekly at the inflow (-in) and outflow (-out) of the waste-treatment cells; once the water became cooler in the fall and winter, the samples were collected monthly. Samples were analyzed for Secchi
disk visibility, pH, and concentrations of chemical oxygen demand (soluble and total), total ammonia nitrogen (TAN), nitrite, nitrate, total nitrogen, total phosphorus, and chlorophyll \(a\). The average concentrations of water quality variables measured between January and December 2015 are presented. There were significant differences (\(P<0.05\)) between control and aerated ponds for Secchi disk visibility, TAN, total nitrogen, and chemical oxygen demand (soluble and total). Dissolved oxygen (DO) concentrations were monitored and collected from one point in each fish cell and one point in each waste cell. Concentrations of DO averages for the control and aerated waste cell ponds from May-October (when the water temperature was the highest) also were different. Thus, the use of mechanical aeration in the waste-treatment area at night improved water quality and split-pond performance. This would ultimately enhance fish production.

John, Rebecca (G)

**Title:** Tracking nightly movement and fidelity with fluorescent powder for green salamanders in northern Alabama.

**Primary Author (and presenter):** John, Rebecca R.

**Additional Authors:** Gitzen, Robert

**Department:** Wildlife Science

**College/School:** School of Forestry and Wildlife Sciences

**Description:** The green salamander (\(Aneides aeneus\)) has suffered localized population and abundance declines over the past several decades resulting in increased conservation concern. This amphibian species is associated with rock outcrops buffered by mixed hardwood forest cover throughout the Appalachians. Morphology such as long limbs, square toe tips, and a prehensile tail suggest that the species is highly mobile. However, limited studies have looked at the movement patterns, critical for developing effective management plans for habitat and surrounding areas. To begin addressing this information gap, we examined nightly movement patterns at study sites in the W. B. Bankhead National Forest in northern Alabama between March-June 2015. Our objectives were to 1) quantify nightly movement patterns of male and female green salamanders and 2) determine rock crevice refugia and outcrop fidelity. Thirty three green salamanders were caught, dipped in a harmless fluorescent powder, which is commonly used in movement studies, and returned to the environment. After the nocturnal activity period, ultra-violet light was used to follow the tracks of individual salamanders. Both sexes exhibited extremely variable overnight distances with males moving on average 509 cm (SD 475 cm, \(n=19\)) and females moving on average 461 cm (SD 406 cm, \(n=14\)). Movement distances were not correlated with temperature, humidity, or size or differ by sex significantly. Evidence of fidelity to rock outcrop was present, but not necessarily to individual crevice refuge which supports the idea that these salamanders are territorial. With no previous movement studies on green salamanders, these results are novel scientific information for the species and other terrestrial salamanders. This study will continue in 2016 to increase the understanding of movement patterns, with additional work looking at gene flow among local populations.

Johnson, Roger (UG)
Title: Molecular mechanism of doxorubicin-induced memory dysfunction
Primary Author (and presenter): Johnson, Roger, N.
Additional Authors: Alhowail, Ahmad; Suppiramaniam, Vishnu; Arnold, Rusty
Department: Drug Discovery and Development
College/School: Harrison School of Pharmacy
Description: Doxorubicin is an antitumor drug that is widely used in cancer chemotherapy. Doxorubicin is effective in the treatment of various types of tumors. However, the optimal clinical effectiveness is limited due to potential secondary effects. One of these secondary effects is a cognitive dysfunction in cancer patients, known as “chemobrain” or “chemofog.” Chemobrain refers to a phenomenon in which cancer survivors exhibit significant cognitive impairment for many years following chemotherapy treatment. There are only a few reports on the cellular and molecular mechanisms involved in doxorubicin-induced memory impairments. Our laboratory has shown that glutamatergic hippocampal neurotransmission that is required for memory is altered in a rodent model of chemobrain. Drugs affecting the p38-MAPK signaling pathway can considerably alter the memory formation. In this study, we investigated the in vitro effects of doxorubicin on hippocampal cell viability, along with its effect on the p38-MAPK signaling pathways associated with memory encoding. Hippocampal cells (H19-7) cells were used in this study, and it was noted that doxorubicin induced a dose dependent cytotoxicity in MTT assay. Doxorubicin also increased phosphorylation of p38-MAPK and CREB-2 as compared to the control. Our data suggest that doxorubicin can induce hippocampal based memory impairment by inducing apoptosis and modulating the p38-MAPK signaling pathway.

Jones, Kimberly (G)
Title: Enhancing education to improve patient self-management of heart failure symptoms and decrease risk for hospitalizations
Primary Author (and presenter): Jones, Kimberly M.
Additional Authors: Sanderson, Bonnie
College/School: Auburn University School of Nursing
Description: Evidence has shown that various methods of patient education can improve self-management of heart failure symptoms and decrease hospitalization rates related to heart failure. The purpose of this project was to implement symptom screening tools and provide improved methods of patient education regarding symptom management. Patient adherence to recommendations, changes in heart failure symptoms, and number of hospitalizations were assessed. Target population included adults aged 65 years or older with newly diagnosed or established diagnosis of heart failure in a cardiology clinic. Following signature of consent, patients completed a heart failure symptom screening tool (MLHFQ) and answered questions regarding adherence to medication regimen and daily weight protocol. The project leader reviewed the results to guide patient education. A follow-up phone call was made at 30 days to re-assess those measures at the 4-week period. Descriptive statistics were used to describe population race, age, gender, diagnosis of heart failure, improvement of symptoms, compliance with medication adherence and daily weights, and number of hospitalizations. The pre-post MLHFQ scores were compared with paired t-tests. X consented to participate in the study (X% males), average age of X (sd) years. X% were identified with established heart failure and X% with newly diagnosed. Four weeks following education, t mean scores for symptoms
improved (pre-mean, sd) (post-mean, sd), adherence to medications improved (pre-, post-
mean, sd) and had decreased number of hospitalizations (pre-mean, sd) (post-mean, sd) 
significantly. Screening for symptoms among heart failure patients guided educational 
methods used and improved symptoms and decreased hospitalizations. Enhanced 
education in a cardiology office setting can improve patient symptoms, management, and 
chance of hospitalization.

Joyce, Kathlene (UG)  
Title: Phylogeoraphy of slimy salamanders in the state of Alabama  
Primary Author (and presenter): Joyce, Kathlene L.  
Additional Authors: Chivers, Jacqueline; Hayes, Malorie and Guyer, Craig  
Department: Biological Sciences  
College/School: COSAM  
Description: The genus Plethodon is one of the largest clades of salamanders in North 
America. In Alabama alone there are three possible species that converge. Morphological 
differences between species are seen in the variation in color and number of spots on an 
individual. These differences can be attributed to speciation or phenotypic plasticity within a 
species. This experiment specifically focuses on determining the phylogeography of three 
possible species of Plethodon salamanders in the state of Alabama: *Plethodon glutinosus*,  
*Plethodon grobmani*, and *Plethodon mississippi*. Based on genes stored on GenBank we chose the 
RPL12 gene from the study done by Fisher-Reid and Weins (2011) which is found in all 
three species and was defined in the study. In order to compare the differences in 
evolutionary rates we chose a mitochondrial gene, cytochrome b, to sequence as well. To 
examine phylogeographic relations in Alabama, RPL12 and cytochrome b were then 
extracted from samples from the Auburn University Natural History Museum that were 
gathered throughout the state. The sequences were then sequenced using Sanger sequencing 
and then aligned using Geneious. Bayesian Inference (BI) was run in MrBayes 3.2.2 on 
CIPRES Science Gateway (Miller et al., 2010; Ronquist et al., 2012). This created 
phylogenetic trees that we could then use to understand the relationships between the three 
species. Our data and the sequences of RPL12 from Fisher-Ried 2011 show that there are no 
distinct patterns defining the species. The sequences of cytochrome b that we isolated and 
that were provided by the University of Alabama’s Herpetology Collection and GenBank 
confirmed that there wasn’t enough evidence to support three distinct species based on our 
data.

Kaaur, Jaspuneet (G)  
Title: One square mile study  
Primary Author (and presenter): Kaaur, Jaspuneet  
Department: Community Planning and Landscape Architecture  
College/School: College of Architecture, Design and Construction  
Description: The purpose of this study is to compare the urban form and measure the 
various built form characteristics for a metropolitan region to illustrate the spatial 
differences between an urban and a suburban neighbourhood. With the building sector 
contributing significantly to the greenhouse emissions these differences are important to 
understand so that smart growth policies and new urbanist design strategies can be
formulated for better built environment. Two study areas, measuring one square mile each, were chosen within Cincinnati - one in close proximity of the downtown and the other in a relatively newly developed community away from the urban core. The study makes use of two components - Geographic Information Systems (GIS) and basic quantitative analysis such as land use diversity, intersection density using Microsoft Excel. Spatial analytical tools in GIS have been used extensively for a comparative analysis of street patterns, buildings, block sizes, parcels, and land use patterns. Further, feature attribute tables from layers in GIS generate data for quantitative analysis which yield results that make the differences between these distinct growth patterns comprehensible. 3D visualization techniques have been inculcated to understand density as a parameter. Apart from measuring the urban form, the study shows how distinct patterns evolve and differ in their land use and built form characteristics with distance from the City Centre. Further, it illustrates how street width, connectivity, and block sizes vary as we move farther.

Kaczmarek, Jennifer (UG)

Title: Encapsulation and differentiation of human induced pluripotent stem cells to form engineered cardiac tissue using methacrylated gelatin

Primary Author (and presenter): Kaczmarek, Jennifer, A

Additional Authors: Kerscher, Petra

Department: Chemical Engineering

College/School: Samuel Ginn College of Engineering

Description: The ultimate goal in tissue engineering is the production of functional and reproducible 3D human cardiac tissues using human induced pluripotent stem cells (hiPSCs). While many animal models exist, none of them accurately replicate human systems for investigative uses. Thus, the objective of this study was to create functional 3D cardiac tissues by directly encapsulating and differentiating hiPSCs using a photocrosslinkable hydrogel, methacrylated gelatin (GelMA), which is mechanically robust, biologically responsive, and supports hiPSC survival and CM differentiation. GelMA was synthesized by reacting methacrylic anhydride (MA; 5% w/v) and gelatin for 2 hours, followed by dialysis and freeze-drying. Lyophilized GelMA was re-dissolved into PBS (15% w/v) and combined photoinitiators to form a GelMA precursor solution. Dissociated hiPSCs were combined with the GelMA precursor solution, pipetted into a circular polydimethylsiloxane (PDMS) mold, and photocrosslinked using visible light for 40 seconds, forming circular 3D tissues. Encapsulated hiPSCs were maintained in their pluripotent state for three days followed by the initiation of cardiac differentiation. Overall, it was seen that the synthesized GelMA successfully photocrosslinked in the presence of hiPSCs and could be used to create 3D cardiac tissues. The first isolated areas of contractions by in the tissues were demonstrated by day 8 of differentiation and these tissues resulted in uniformly contracting tissues by day 20. Confocal microscopy of dissociated tissues showed the presence of large nuclei and well-defined sarcomeres that are indicative of CMs. GelMA is a suitable biomaterial for hiPSC encapsulation and 3D cardiac differentiation. The results show that GelMA is able to form cell-laden tissues while still maintaining its bioactivity. Using GelMA for both the encapsulation and differentiation, we are able to have only a single cell-handling step while still creating functional CMs.
Kaeppler, Alex (G)
Title: Linking social anxiety and autonomic responses to social stress in preadolescence
Primary Author (and presenter): Kaeppler, Alex K
Additional Authors: Erath, Stephen
Department: Human Development and Family Studies
College/School: College of Human Sciences
Description: A substantial body of theoretical literature suggests that social anxiety may be related to abnormal or inflexible autonomic activity (e.g., Beauchaine, 2001; Porges. 2007). In recent years, this notion has been corroborated by some empirical studies (Siess et al., 2014), though evidence has been inconsistent. Modest and inconsistent associations between social anxiety and psychophysiology may reflect discordance across subjective and physiological dimensions of emotion, or limitations and differences in the methods or analyses used across studies. In an attempt to address these limitations, the physiological responses (i.e., HR, RSA, SCL, and PEP) of 123 young adolescents (Mage = 12.03 years; 50% females; 42% ethnic minorities) were measured during a lab protocol designed to simulate common peer evaluation experiences. Following acclimation and baseline periods, preadolescents were asked to lead a three-minute conversation with a research assistant, while ostensibly evaluated by three (fictitious) peer judges via Skype. After the conversation, participants received a Skype message which indicated that the peer judges chose two other participants as better performers in the conversation activity, followed by time to consider a possible response to the peer judges, a recovery period, and a process debriefing. Preadolescents provided reports of global social anxiety on a well-validated questionnaire as well as context-specific social anxiety during the peer evaluation protocol. Analyses are ongoing, though initial results suggest that context-specific social anxiety may be more consistently related to differences in reactivity to and recovery from social stress for several physiological parameters (e.g., PEP and RSA).

Katsoulis, Abigail (UG)
Title: ARCHIBET
Primary Author (and presenter): Katsoulis, Abigail K
Additional Authors: Gonzalez, Madeline R
Department: School of Architecture
College/School: College of Architecture, Design, and Construction
Description: From the monumental to the everyday, the structures we visit and inhabit are part of a larger network of design. Through the study of architecture, particularly modern architecture, we can better understand the world we live in today. While the period of modern architecture most clearly influences the built world in which we live, there is a lack of material explaining and defining this period of design. By breaking the large topic of modern architecture into smaller, identifiable parts with a combination of graphic and written work, the alphabetical chapters of this composition present a visual and informative guide to the major themes, ideals, and aesthetics of the movement. The inclusion of both written and graphical information is important, as architecture cannot be fully explained without the two mediums serving to complement each other. The entries presented in this work begin to explain the field of modern architecture, serving as the catalyst for further research and a deeper understanding of the subject. Through A to Z, the topics chosen in
this work demonstrate the adaptive nature of modern architecture and how responding to cultural changes and industrial innovations inspired new ways of approaching design. This list of influential modern architectural designers, works, and movements is by no means complete, but rather aims to encourage a basic understanding of the forces leading to the development of new styles. Modern architecture reflects the innovative ideologies that dominated modern history and continues to influence and characterize the built environment in which we live today. This work aims to serve as an introduction to modern architecture, filling a void within current architectural works available to not only the academic world, but also architecture enthusiasts and practitioners.

Kelly, Alexander (G)
Title: Effect of pegylation on silica nanoparticle uptake and viability with Chinese hamster ovary cells
Primary Author (and presenter): Kelly, Alexander L.
Additional Authors: Arnold, Robert D.; David, Allan E.
Department: Chemical Engineering; Drug Discovery and Development
College/School: Samuel Ginn College of Engineering, Harrison School of Pharmacy
Description: This study examined the effect of hydrophilic surface coatings on solid silica nanoparticles with their interactions with Chinese Hamster Ovary (CHO) cells. Polymer coatings such as poly(ethylene glycol) (PEG) are used commonly to improve drug delivery. This PEG layer masks particles from innate host defence mechanisms within the body and increases circulation half-life of the therapeutic upon injection. Although this approach is widely accepted, the underlying mechanism is not well understood, specifically we examined the effect of differing lengths of PEG on intracellular uptake and viability. In order to elucidate these effects, studies were conducted with PEG 2k, 5k and 20k as well as aminated particles. Uptake was observed and measured using fluorescence microscopy and flow cytometry. Growth inhibition was determined using enzymatic (MTT) and protein binding (SRB) assays. CHO cells were used as a model cell line given their prevalence in examining cytotoxicity and uptake in the literature. Silica nanoparticles (120 nm) served as the base to which varying sizes of PEG were attached. These particles are generally recognized as a safe material by the Food and Drug Administration and provided a uniform foundation via size distribution, surface characteristics and mild reaction chemistry that precluded any nanoparticle-based effects. We determined that all PEG coatings decreased particle uptake by the CHO cells in comparison to those with an amine coating. The aminated particles also had the greatest effect on cell growth. The half maximal inhibitory concentrations (IC50) for aminated, PEG 2k, 5k and 20k particles were found to be 1.16 ± 0.12, 1.91 ± 0.03, 1.97 ± 0.35 and 1.46 ± 0.03, respectively. Growth inhibition directly correlated with particle concentration regardless of surface character. PEG 20k coated particles showed the greatest difference among PEG coatings, presenting greater toxicity that trended toward amine coated particles.

Kelly, Jessica (G)
Title: Treatment of GM1 gangliosidosis via pH sensitive polymersomes
Primary Author (and presenter): Kelly, Jessica M.
Additional Authors: Martin, Douglas R., Byrne, Mark E.

Department: Chemical Engineering

College/School: Samuel Ginn College of Engineering

Description: Delivery of therapeutics to the brain through non-invasive administration is a difficult task due to the blood-brain barrier (BBB), which prevents the transport of 98% of therapeutics. In GM1 gangliosidosis, patients are missing β-galactosidase (β-gal), an enzyme necessary for cellular digestion, with major central nervous system (CNS) manifestation. GM1 gangliosidosis is fatal in infancy with no clinically available treatment. We are designing and characterizing the first nanoparticle-mediated treatment of GM1 gangliosidosis using self-assembled polymersomes due to their high physiological stability and tuneable release for IV enzyme delivery. When coupled with apolipoprotein, delivery through the BBB and to the lysosome of neural cells will occur, effectively treating patients without invasive surgery. Polyethylene glycol-b-poly(lactic acid) copolymer has been proven to self-assemble, forming vesicle structures using both dimethyl sulfoxide and water, confirmed by both transmission electron and fluorescence microscopy. Alexa Fluor 488, bovine serum albumin, and β-gal were loaded into lyophilized polymersomes. Particle size distributions did not change with molecule encapsulation. All three molecules were loaded into lyophilized polymersomes at high concentrations for passive loading of 44%, 31.6 ± 18.9%, and 76.6% respectively, with enzymatic activity maintained during loading. Loaded polymersomes showed increase release in a lysosomal environment in vitro. Amine-reactive PEG facilitated the attachment of CF 350 Amine, a blue fluorescent ligand, for fluorescent imaging, and apolipoprotein E (ApoE), a target to the LDLR family of receptors, for BBB delivery, to the polymersome surface. With the encapsulation of β-gal and attachment of ApoE, results are promising towards the goal of creating the first clinical treatment for GM1 gangliosidosis, a disorder impacting the CNS, using a combination of enzyme replacement therapy and nanotechnology methods to cross the BBB.

Khliefat, Aahed (G)

Title: Identifying first-time American hospitality managers motivations in accepting overseas Assignments

Primary Author (and presenter): Khliefat, Aahed

Additional Authors: Andrew Barnes, and Alecia C. Douglas

Department: Nutrition, Dietetics, and Hospitality Management

College/School: College of Human Sciences

Description: Expatriate management in the hospitality industry has become a central issue in the international human resource management arena as more hotel chains are now seeking growth into overseas markets. While multinational firms offer numerous expatriate benefits at a considerable expense, few studies have looked at determining exactly what aspects of a potential overseas assignment impacts a manager’s motivation and willingness to accept global assignments. The current empirical study seeks to identify the American hospitality managers’ motivations to accept an international business assignment for the first time. Hospitality companies seeking to expand into international markets for the first time would find this study valuable to identify the factors which lead a manager’s decision to accept an international assignment.
and what leads to job satisfaction in that assignment. In order to identify the managers’ motivations to accept international business assignment, this study is targeting hospitality managers in Southeastern region of the United States of America who have never been in an international business assignment before. Based on an intensive literature review, a self-administrated questionnaire will be used as a data collection method for this study. The survey instrument will consist initially of three main sections. 1. Demographics information. 2. Managers motivations to travel overseas. 3. Managers willingness to accept international assignments. We anticipate that identifying potential expatriate managers’ motivators can enable the hospitality managers, practitioners, and operators to develop expatriation benefits strategies and practices that increase their manager’s intentions to accept global assignments. In addition, by exploring the expatriate manager’s motivators to travel internationally, hospitality organizations can manage their managers’ expectations about the future foreign assignments.

Kilari, Harika (G)
Title: Thermal-aware task scheduling in Linux kernel
Primary Author (and presenter): Kilari, Harika
Department: Department of Computer Science and Software Engineering
College/School: College of Engineering
Description: Thermal-aware scheduling of real time jobs has become an increasingly critical issue in software design for computing platforms ranging from embedded systems to large data servers. The perceptible implications of unrestrained temperature are high power consumptions and thermal emergencies resulting in hardware failure. An efficient thermal management is a clear necessity to reduce the cost of thermal insulation for processors. In embedded systems, hardware temperature control mechanisms in conjunction with software and other dynamic thermal management (DTM) techniques have been effectively utilized to avoid overheating. Linux has the largest installed base of all general-purpose operating systems on smart phones and personal computers. The main defining element of Linux is its kernel. So I have chosen Linux kernel to conduct my research. My research is mainly concerns devising a method to schedule tasks at run time based on the topology of the processes involved with the task, i.e. heavy computations (higher number of floating point operations). Initially process will be identified if it falls into heavy, normal or light computational classification. A heavy process indicates possible thermal hike, in order to maintain temperature within the threshold, kernel scheduling will be customized to provide effective time slice for the relevant process. The heavy task will be pre-empted to pull in a lighter task and resumed once the processor temperature has sufficient thermal headroom. The length of each time slice can be critical to balancing system performance vs process responsiveness - if the time slice is too short then the scheduler will consume too much processing time, but if the time slice is too long, processes will take longer to respond to input. This research has initiated with theoretical exploration, and further procedural implementation is being done to collect thermal data for analysis against current performance. The main goal of this research is to reduce cooling costs and increase durability of processor elements for allowing manufacturers to concentrate the prime investment of resources in computational performance improvisation.
Kilcullen, Evangeline (G)
Title: Medication reconciliation: the journey home
Primary Author (and presenter): Kilcullen, Eva M
Additional Authors: Sanderson, Bonnie
College/School: School of Nursing
Description: There is strong evidence that medication reconciliation is recommended to avoid discrepancies in the transition of care. The first few days after hospital discharge are the most critical. Medical errors result when a patient encounters difficulties with medication knowledge and discharge instructions. Post discharge telephone interviews can serve as a cost effective way to communicate with patients in the primary care environment. The purpose of this project is to evaluate the effectiveness of post discharge phone calls to improve medication reconciliation and compliance. Patient adherence to the follow-up appointment will be assessed. Target population included adults discharged from an acute care facility to a primary care clinic. Data was collected on medications prescribed and/or the patient was referred for a follow-up appointment. A follow up phone call was made within 2 to 3 days to assess for medication understanding, confirmation for follow-up appointment and satisfaction of the process. Descriptive statistics were used to describe the percentage of appointments kept and the medication reconciliation to a previous group of patients that did not have a post discharge phone call. X consented to participate (% females) and (% male), average age of X (sd) yrs. In the group prior to the practice change, X% were identified with medication errors, X % were compliant with follow-up appointments. Follow-up from the practice change indicated that X% adhered to the medication regimen. X% were identified as being compliant with the follow-up appointment. X% = pre satisfaction level and X% = post satisfaction level. Screening for high risk patients during discharge is essential for transitioning patients. This project supported that following up with patients within 2 to 3 days after discharge helped prevent and/or correct discharge medication, fortifies the follow-up appointment compliance and improves satisfaction.

Kim, Doyon (UG)
Title: Variations of Toeplitz’ Conjecture
Primary Author (and presenter): Kim, Doyon
Department: Mathematics and Statistics
College/School: College of Science and Mathematics
Description: A plane curve is a curve in a plane, and a simple curve is a curve that does not cross itself. A closed curve is a curve with no endpoints and which completely encloses an area. A Jordan curve is a plane simple closed curve. For a Jordan curve C, a polygon P is inscribed in C if all four vertices of P belong to C. The Toeplitz’ conjecture is the following: If C is a Jordan curve then C has an inscribed square. The Toeplitz’ conjecture is proven to be true for many cases, such as convex curves, but not yet solved for a general case. We suggest some variations of Toeplitz’ conjecture, problems regarding the existence of a given polygon P inscribed in a given Jordan curve C under certain restrictions. For instance, we impose one more condition. Let’s say that a polygon P is strongly inscribed in a Jordan curve C, if all of its vertices are on C and the interior of P is a subset of the region enclosed by C, that is, if
P is completely inside of C. It is known that every Jordan curve has an inscribed equilateral triangle. Then, is it also true that every Jordan curve has a strongly inscribed equilateral triangle? We show that the answer is no. Further, we prove that if T is a triangle such that all three angles of the triangle is greater than 45 degree then there is a Jordan curve C that does not have a strongly inscribed triangle similar to T.

Kim, Sungil (UG)
Title: A Cross Correlation-based Stock Forecasting Model
Primary Author (and presenter): Kim, Sungil
Additional Authors: Baginski, Michael
Department: Department of Electrical and Computer Engineering
College/School: Samuel Ginn College of Engineering
Description: Researchers have focused on time series analysis and developed forecasting models either by analyzing the value of a company and predicting its performance or by referring to past data and using it as the basis of their predictions. We study the latter approach, also known as technical analysis. While past studies on technical analysis of stock market have focused on forecasting single stock market price based on its own past data, we present a cross-correlation based forecasting model because prior efforts have not been reliable due to inaccessibility of and ignorance of some factors that influence fluctuations in stock price. In our model, two closely related stocks can be used to predict future purchase for stock A based on the behavior of stock B. The algorithm works as follows: (1) calculate correlation coefficient of two stocks A and B, (2) for correlation coefficient < 0.8, we reject the pair and select another one from a provided lists of stocks, (3) compute cross-correlation of two stocks with an initial period of two weeks and find the time delay when the maximum cross-correlation occurs, (4) estimate future price of stock A, considering both the correlation coefficient and the previous price at a certain time delay. For instance, when stock A and B have a time delay of 5 days, predicting stock B based on stock A will reflect both stock A price 5 days before and the correlation coefficient. For highly correlated pairs, it is assumed that two stocks will exhibit a similar pattern in the future. The accuracy of this model will be measured by experimenting with US stocks and is expected to be very accurate given high correlation. Moreover, the current forecasting model can be applied to the same stock but with different time intervals. Therefore, correlation between the pattern observed in the past and present can be also used for forecasting.

Kim, Sungil (UG)
Title: Ultra-low power subthreshold circuit design and optimization
Primary Author (and presenter): Kim, Sungil
Additional Authors: Agrawal, Vishwani
Department: Department of Electrical and Computer Engineering
College/School: Samuel Ginn College of Engineering
Description: Modern electronics, whether medical imaging electronics, sensors, portable devices, or high-performance computers, are constrained by their power. It is well known that subthreshold circuit design where the supply voltage is less than the device threshold voltage can reduce the energy. That power reduction comes with significant performance drawback and process variations. Therefore, subthreshold circuit needs further optimization, and more accurate delay analytical model is needed. To optimize both performance and power consumption, dual-threshold circuit design is explored, and a gate assignment
algorithm is formulated using linear optimization. The usage of both low threshold gates (fast and greater leakage power) and high threshold gates (slow and less leakage power) can improve performance while leakage power is reduced. Because wire capacitance does not scale with the supply voltage, and global wire delay is increasing with technology scaling, on-chip global interconnects causes significant performance degradation. In the subthreshold region where the driver delay dominates the overall interconnect delay, repeater insertions that superthreshold interconnects often use proved to be ineffective. An optimally sized, tapered driver can reduce up to 75% of the power-delay product. Also, the effect of interconnect length is discussed, and it is found that as interconnect length increases, a tapered driver is more effective. The analytical model to estimate circuit delay is also analyzed, particularly Alpha-Power Law. The estimated circuit delay by Alpha-Power Law is proven to be not effective in the subthreshold region because the subthreshold drain current exponentially depends on the gate-source voltage and subjects to variations. To better estimate the circuit delay and understand the effect of variations in the subthreshold region, a variations-aware analytical model is proposed, verified through simulations, and found to have an average error of 15%.

Kindgren, Kelly (UG)
Title: Detrital zircon age populations from the Moine Supergroup, Scotland, and their implications for tectonic evolution
Primary Author (and presenter): Kindgren, Kelly M.
Additional Authors: Steltenpohl, Mark; Strachan, Rob; Law, Rick; Schwartz, Joshua and Cawood, Peter
Department: Department of Geosciences
College: College of Science and Mathematics
Description: U-Pb detrital zircon age populations determined by LA-SF-ICPMS analysis from the Neoproterozoic Moine Supergroup, northern Scotland, provide important insights into its depositional age and nature of source. U-Pb detrital zircon ages for 100 grains from the lowest recognized unit of the Moine Supergroup, the Morar Group has a broad major peak at 1640 Ma (52.5% of grains in sample create this peak). This is skewed by a secondary hump at 1196 Ma (accounting for 21.3% of all grains). There are two minor peaks at 2618 Ma (3.8%) and 3200 Ma (3.8%). A trough occurs from 1280 Ma and 1500 Ma (6.3%) and a minor trough appears between 1750 Ma and 2000 Ma (12.5%). Sixty-five grains from the highest unit of the Moine succession, the Loch Eil Group, yielded ages from 1843 to 885 Ma. Forty-four grains were less than 10% discordant and reveal a major peak at 1726 Ma (63.6% of all grains) and a secondary peak at 1263 Ma (9%). A minor peak occurs between 1050 Ma and 1106 Ma (4.5%) and a cluster occurs between 1835 Ma and 1845 Ma (4.5%). Troughs occur between 1300 Ma and 1500 Ma (13.6%). The youngest grain within the Loch Eil data set, ca. 885 Ma, constrains the depositional age of at least the upper parts of the Moine Supergroup to a 15 Ma period in the early Neoproterozoic. The overall age range of detrital grains in the two samples is indicative of derivation from the Laurentian foreland to the south of Scotland (i.e., NE Canada/Labrador). However, the contrasting of specific age peaks between the upper and lower units of the Moine Supergroup, as well as the absence of detrital grains younger than ~1050 Ma in the lower unit suggests evolution in the nature of rock units in the source and/or a stratigraphic break between the upper and lower units of the succession. The age profile of the lower unit correlates with the Torridon Group of the foreland, which is argued to represent a foreland basin to the end Mesoproterozoic Grenville orogenic belt.
King, Anetrial (G)

**Title:** Reducing congestive heart failure 30-day readmission

**Primary Author (and presenter):** King, Anetrial

**Additional Authors:** Ellison, Kathy Jo

**College/School:** School of Nursing

**Description:** Congestive Heart Failure (CHF) is a multidimensional health care concern that affects Americans annually. Poor adherence contributes to worsening disease and hospital readmissions. The purpose of this project was to decrease 30-day CHF readmissions by implementing patient education upon admission, easy to read discharge instructions with picture illustrations, and follow-up phone calls within 24-48 hours of discharge. The target population includes adults 55 years of age and older with CHF newly admitted to the unit. Following an agreement to participate, the patient was given one-on-one 1 hour educational session containing the definition of heart failure, signs and symptoms, medication instructions, fluid and diet restrictions, pictures that illustrate when to notify the physician, and use of daily weights. At discharge the patient was provided with a Heart Failure Zone that reinforced these points with an identified zone for daily monitoring and how to respond, follow up appointment, and review of medications. Lastly, the patient received a follow up phone call within 24-48 hours of discharge. Descriptive statistics were used to describe the patient population, compliance with diet and fluid restrictions; daily weights, medications, and following up appointment. Comprehension of discharge instructions and readmission rates were compared pre to post. X% were readmitted within 30-days (% males), mean age of X (sd) years, X% African Americans, and X% had an elementary education. Follow-up indicated that X% were compliant with medication, sodium restriction, fluid restriction, daily weight, and attended follow-up appointment. X% indicated discharge instructions were comprehensive and easy to read. Providing knowledge that is individualized promoted self-care measures that increased adherence and decreased readmission supporting further implementation of the project.

King, Benjamin (UG)

**Title:** Flow characteristics of woody biomass grinds and crumbles

**Primary Author (and presenter):** King, Benjamin P.

**Additional Authors:** Adhikari, Sushil; Fasina, Oladiran

**Department:** Biosystems Engineering

**College/School:** Samuel Ginn College of Engineering

**Description:** Lignocellulosic biomass feedstocks are converted to fuels, products and/or chemicals via biochemical or thermochemical processes. Among thermochemical conversion processes, pyrolysis and gasification are commonly used. These processes require size reduction of biomass before they can be fed into the throat of the conversion reactor. Traditionally, size reduction is achieved by hammermilling biomass through a screen to produce grinds with wide particle size range (up to ten fold), that often leads to problems during discharge of the grinds from storage containers, silos and hoppers. Hammermilling is an energy intensive process, produces a significant amount of dust and overly processed particles and works best for samples that are at moisture contents of 20% or less. A second
process, developed and patented by Forest Concepts, LLC produces what is referred to as ‘crumbles’. This process produces more uniformly size particles and produce less dust during the size reduction process. The crumbling size reduction process is also more energy efficient than hammermilling and leads to a higher amount of surface reaction. In addition, this novel process can be used to produce crumbles from freshly harvested or high moisture content samples (aka green wood) thereby eliminating the need to dry the sample as is typically required for samples that are to be hammermilled. The objectives of this study are to (a) compare the flow characteristics (cohesion, angle of internal friction and flow index), and (b) to quantify the physical properties (bulk density, tap density, particle density, size distribution, aspect ratio, and particle size) of grinds and crumbles from Douglas fir.

Kirby, Lauren (G)
Title: Preliminary materials toward a Library of Affective Films (LAF): Standardization and psychophysiological validation
Primary Author (and presenter): Kirby, Lauren A. J.
Additional Authors: Bird, Ryan; Gray, Jack H.; Bloom, Jessica R.; Yanes, Julio A. and Robinson, Jennifer L.
Department: Department of Psychology
College/School: College of Liberal Arts
Description: Emotions can be reliably induced in the laboratory without narrative or language (e.g., Lang, Bradley, & Cuthbert, 1999) and film is the most effective and reliable type of emotion induction method (Westerman et al., 1996). Most film libraries use only self-report measures (e.g., Hagemann et al., 1999) and even validation studies with physiological data (e.g., Gross & Levenson, 1995) often fail to control for variables such as music, simulation, familiarity, and inclusion of audio or dialog. We seek to create a cross-cultural stimulus set homogeneous across dialog, fame, and narrative, and uniquely validated using dynamic self-reporting and six psychophysiological measures. We expect films to elicit autonomic changes from baseline that track self-reports of valence and arousal. Seven Auburn University students—who scored below conservative cutoffs on measures of depression, anxiety, and PTSD—watched 16 short clips while wearing electrodes to measure changes in autonomic activity and continuously indicating changes in valence and arousal during each film. We are still recruiting participants. We plan to use a general linear model and use average valence and arousal as regressors to explain changes in autonomic activity. If autonomic changes track self-reports, we will repeat the standardization and validation process for other films and add to the Library of Affective Films. After building a larger stimulus set we could test its validity and reliability in diverse, cross-cultural samples to introduce a new standardized film-based emotion elicitation set.

Kirkland, Anna (UG)
Title: Ultra high field, high-resolution functional neuroimaging in adolescents
Primary Author (and presenter): Kirkland, Anna E
Additional Authors: Robinson, Jennifer L.
Department: Psychology
College/School: College of Liberal Arts
Description: There is a gap in the literature regarding ultra-high field, high resolution functional neuroimaging in adolescents, contributing to the absence of accepted processing guidelines for this population. Ultra-high field, high resolution imaging can improve image quality, but it is not yet certain how pre-processing steps can alter submilimeter data outcomes. This study begins to address the variability in pre-processing pipelines for 7T functional magnetic resonance imaging (fMRI) data collected from adolescents. To investigate this question, I established processing pipelines for data collected from 19 adolescent participants in a Siemens 7T MAGNETOM scanner during an inhibitory Go No-Go task. The processing components in question included cluster smoothing at 0mm, 1mm, 3mm, and 5mm; voxel smoothing at 0mm, 1mm, 3mm, and 5mm; slice-timing correction; and motion correction. The pipelines were set up to have one active component while all other components were held consistent. Thus, for voxel and cluster smoothing all other components were held at zero or off, and for slice time correction and motion correction cluster smoothing was held consistent at 5mm. The participant data ran independently in FMRIB Software Library (FSL) for each of the ten processing pipelines. After, the individual participant results were grouped based on the active processing component to analyze significant activation (p<0.05). The various processing pipelines resulted in inconsistent significant activation patterns across the cluster smoothing, voxel smoothing, and motion correction groups. Slice-time correction proved to have little impact on significant activation outcomes. This study helps to uncover the implications of inconsistent 7T fMRI data processing in adolescents and opens the door for further analysis and discussion concerning the processing pipelines in both adolescent and adult populations.

Kitchens, Steven (G)
Title: A two year study of environmental Salmonella incidence and proximal contamination in a multi-species animal facility
Primary Author (and presenter): Kitchens, Steven R.
Additional Authors: Wright, James; Duran, Sue; Price, Stuart
Department: Pathobiology, Clinical Sciences
College/School: College of Veterinary Medicine
Description: Diseases caused by serotypes from the bacterial genus Salmonella have a major impact on animal and human health. Little research has been performed to examine factors contributing to Salmonella incidence in multi-species animal production facilities such as veterinary teaching hospitals and the ability of Salmonella serotypes to move to adjacent facilities. We hypothesize that Salmonella can move between proximally located animal facilities and pastures and that specific factors increase the likelihood of isolating environmental Salmonella serotypes in these locations. Over two years, 631 samples were collected from various large animal facilities and pastures within a veterinary school. Data was recorded to assess factors that contribute to increased prevalence of environmental Salmonella contamination. Samples were processed for Salmonella isolation as described in the USDA FSIS Microbiology Laboratory Guidebook. Salmonella isolates were submitted to the NVSL, Ames, IA, or Biovet, Inc., for serotyping. Data was analyzed with Statistical Analysis System (SAS). Of the 631 samples obtained, 230 (36%) samples were positive for at least one Salmonella serotype. Salmonella was recovered from the majority of facilities and areas sampled regardless of animal species exposure. A Fisher’s Exact Test was used for
bivariate analysis of factors associated with *Salmonella* isolation. The factors shown to be significant were season, resident species, and environment. The highest number of *Salmonella*-containing samples was recovered during the warmer seasons, from man-made animal facilities, and from areas exposed to dairy cattle. The significantly increased frequency of *Salmonella* isolation from environmental samples exposed to dairy cattle indicates that this species is either the source of this pathogen, or is serving as an amplifying host for *Salmonella*. The recovery of serotypes Muenster and Cerro from the environment and from dairy cattle feces supports this conclusion.

Knight, Amanda (G)
Title: Reducing central venous catheter-related infections in outpatient hemodialysis clinics
Primary Author (and presenter): Knight, Amanda C
Additional Authors: Ellison, Kathy
College/School: School of Nursing
Description: There is strong evidence that central venous catheter-related infections contribute to poor outcomes among people with end stage renal disease receiving hemodialysis treatment. Evidence-based guidelines recommend the use of topical antibiotic ointment at the catheter exit site to help decrease infections. The purpose of this project was to implement the use of antibiotic ointment at the catheter exit site during dressing change procedures with staff education on the procedure. Monthly infection data related to central venous catheter was assessed pre and post implementation. Target population included adults with end stage renal disease receiving hemodialysis in an outpatient dialysis clinic. Cumulative infection data was collected that included number of central venous catheters, length of time inserted, site of catheter placement and the number of infections. Nurse education data and descriptive statistics were used to describe the patient population and changes in infection rates were compared across time using proportion tests. X consented to participate (% females), average age of X (sd) yrs. X% were diabetic. X% were identified with catheter infections. X% had more than one infection since catheter placement. Among patients with a central venous catheter, the mean infection rates improved from pre – (mean, sd) to post (mean, sd) significantly (p=<0.05) The use of antibiotic ointment at the catheter exit site during dressing change procedures decreased infection rates in the outpatient hemodialysis clinic. Proper staff training and adherence to procedure changes improved patient outcomes. With staff education and changes in current policy and procedure, hemodialysis patients in the outpatient setting receiving treatment with a central venous catheter can have better outcomes and fewer infections.

Kohl, Catherine (G)
Title: Evidence based strategies for diet and exercise compliance in type 2 diabetes mellitus
Primary Author (and presenter): Kohl, Catherine M.
Additional Authors: Ellison, Kathy Jo
College/School: Auburn University School of Nursing
Effective self-management of type 2 diabetes mellitus (T2DM) involves patients maintaining regular physical activity. Evidence-based guidelines recommend regular physical activity for patients with T2DM. The purpose of this project was to introduce regular physical activity in the form of a home-based walking plan. The walking plan involved instituting and maintaining a minimum daily walking regime monitored, supported, and reinforced by telephone contacts. Target population included adults (19-80 years) diagnosed with T2DM in an outpatient diabetes education center. Following informed consent, participants completed a demographic questionnaire which was reviewed by the project leader. The project leader then distributed an exercise time tracker to all participants. Direct telephone contact, daily during the first week, and weekly for the remaining five weeks, was initiated by the project leader. During telephone contacts walking time and fasting blood glucose values were reported and recorded. Outcomes measured included actual time participants spent walking as well as the reported fasting blood glucose values. X T2DM diagnosed adults consented to participate (X% female, X% male), average age of X (sd) years, average of X years T2DM diagnosis, with an average of X comorbidities. Follow-up indicated that X% adhered to a regime of regular physical activity. Among those maintaining regular physical activity fasting blood glucose values significantly decreased by X% over a six-week period. Among participants, the mean exercise time improved from pre (mean, sd) to post (mean, sd) significantly (p=<0.05). A home-based walking plan is an effective strategy for maintaining regular physical activity for T2DM patients. Addressing the need to maintain regular physical activity is an achievable strategy to combat the effects of T2DM in this setting.

Kothari, Vishal (G)
Title: High fat western diet leads to hyperphosphorylated tau and amyloid beta in mice brain
Primary Author (and presenter): Kothari, Vishal M
Additional Authors: Talia Tornabene, Yuwen Luo, Ann Marie O’Neill, Michael W Greene, Geetha Thangiah and Ramesh Jeganathan
Department: Department of Nutrition, Dietetics, and Hospitality Management, Department of Chemistry
College/School: College of Human Science
Description: High fat western diet-induced obesity is associated with insulin resistant and many other chronic, diet related illnesses including dementia. Alzheimer disease is the most common form of dementia characterized by appearance of amyloid plaques and neurofibrillary tangles. There is growing evidence that insulin resistance and other features of the metabolic syndrome can influence cognitive health. This study was designed to determine whether diet-induced changes in the peripheral insulin sensitivity could contribute to alterations in brain insulin signaling and cognitive functions. Four weeks old, male C57BL/6 mice were randomly assigned high-fat (40% energy from fat) diet and liquid Sugar (42 g/L) or normal chow (12% kcal fat) diet for 14 weeks. This model was characterized for peripheral insulin resistant by glucose and insulin tolerance test. We also examined the changes in protein expressions related to brain insulin signaling and cognitive functions. High fat western diet-fed mice exhibited a significant increase in body weight, lower glucose tolerance and insulin tolerance as compare to
normal chow diet animals. Brain tissues of western diet mice were insulin-resistant as evidenced by lower expression of insulin receptor phosphorylation and hyper activation of Akt. Western diet mouse brain exhibited amyloid beta deposition as indicated by decreased expression insulin degrading enzyme, a principal regulator of amyloid β levels and increase expression of beta secretase enzyme. In addition, expression of PSD-95 and Arc, a scaffolding protein responsible for synaptic plasticity is also decrease. Formation of neurofibrillary tangles derived from the aggregation of the microtubule-associated protein Tau was increased in association with decrease in GSK3 beta and increase in AMPK S485 phosphorylation. These results suggest that changes in the insulin sensitivity may contribute to cognitive impairment associated with Western diet.

Lamb, Avery (UG)
Title: Plant growth and physiology of rain garden plants in two soil types
Primary Author (and presenter): Lamb, Avery N
Additional Authors: Brantley, Eve; Howe, Julie and Wright, Amy
Department: Crop, Soil, and Environmental Sciences and Horticulture
College/School: College of Agriculture
Description: Rain gardens are bowl shaped landscape features that are designed and constructed to capture stormwater, remove sediments, and sorb nutrients (particularly phosphorus) from stormwater through physical design and plant species selection. Because soil type and plant species affect nutrient sorption, there is a need to evaluate the potential of rain gardens to function in indigenous soil and with native plant species. The objectives of this project were to (1) evaluate rain garden plant performance through two growing seasons and (2) determine which measurement parameters effectively assess plant performance. Six rain gardens were established at two locations, each with a different soil type: one located in the southern Coastal Plain region (CP) and the other in the southern Piedmont region (PD). Each rain garden supported three rain garden plant species, *Ilex verticillata*, *Ilex glabra*, and *Chasmanthium latifolium*, which were evaluated through size index, stomatal conductance, chlorophyll content, and phosphorus absorption. Preliminary results indicate that size index and stomatal conductance are effective parameters to evaluate rain garden plant performance, showing different patterns in relation to soil type. In the CP soil, *C. latifolium* was markedly higher in size index compared to the PD soil. *I. glabra* had a slightly higher size index in the CP soil, while *I. verticillata* had similar trends at both sites. Stomatal conductance was higher in all three species located in the PD soil in comparison with the CP soil. Contrarily, chlorophyll content was not as descriptive. Evaluating phosphorus removal by rain garden plants and distinguishing the methods with which to measure plant growth and physiology assists in rain garden plant species selection to improve Alabama water resources.

Lanka, Pradyumna (G)
Title: Perils of using cross-validation for performance estimation in neuroimaging-based diagnostic classification
Primary Author (and presenter): Pradyumna Lanka
Additional Authors: D. Rangaprakash; Deshpande Gopikrishna
Department: Department of Electrical & Computer Engineering
College/School: Samuel Ginn College of Engineering
Description: Resting-state functional connectivity Magnetic Resonance Imaging (Rs-fcMRI) models the interactions between brain regions. As these interactions are sensitive to the disease states, machine learning (ML) algorithms have been used to classify neurological disorders based on Rs-fcMRI. There has been considerable interest towards using ML to develop diagnostic tools and biomarkers. In this study, we highlight the fact that cross-validation (CV) accuracy might not be a good measure of performance estimation in neuroimaging-based diagnostic classification, especially with smaller sample sizes typically encountered in neuroimaging. Using Rs-fcMRI measures from subjects obtained from Alzheimer’s Disease Neuroimaging Initiative (ADNI) and Autism Brain Imaging Data Exchange (ABIDE) database from which we used around 75% of the data for training/validation and 25% of the data as an independent test data. We trained an array of classifiers on subjects in a particular age group or research institutions and calculated the accuracy using CV. Using the classifier models obtained using training, we calculated the accuracy in an independent set of subjects with the same diagnosis but from a different age group or research institutions in order to test the generalizability of classifier models. In the ADNI data and the ABIDE data there were significant differences in the validation accuracy and testing accuracy. From the results we can conclude that the performance measures from a small sample could not be generalizable to populations with the same symptoms but from a different age group or from a different data source. Given the variability in fMRI data and the possibility of selection bias, it is better to use a completely independent test set rather than CV to infer predictive power of the classifier for smaller datasets as the CV accuracy might give us an inflated estimate of the actual performance of the classifiers.

Lee, Alysia (G)
Title: Cardiovascular disease in women
Primary Author (and presenter): Lee, Alysia D.
Additional Authors: Sanderson, Bonnie
College/School: School of Nursing
Description: Cardiovascular disease (CVD) remains a major cause of morbidity and mortality for both men and women in the United States, disproportionately affects women. Since many women do not receive adequate teaching regarding CVD, the goal of this project is to increase their awareness and hopefully decrease their risk factors and symptoms. Target population includes adult females ages 18 and older with a pre-existing and/or increased risk for CVD. The participants completed an American Heart Association Simply 7 questionnaire that identifies current blood pressure, blood sugar, cholesterol, current medications, and demographic information to determine heart score. Participants with multiple risk factors are counseled on diet modification and increasing exercise habits. Participants may be asked to return to the clinic within 3-6 weeks for follow-up or receive a follow-up phone call to assess symptoms and adherence to diet and exercise treatments. Descriptive statistics will be used to describe the patient population, symptoms of cardiovascular disease, risk factors, and compare pre-post results of the simply 7 after program implementation. X women consented to participate with an average age of X years. X% identified that they have some cardiovascular risk factors. After completing the Simply 7 survey, X% of participants stated they were unaware of their cholesterol, blood sugar, and last blood pressure.
Before project, participants had an average heart healthy score of X compared to X at the end of the project, participants retook the Simply 7 questionnaire and improve their pre results. Screening for cardiovascular disease among women can aid in early identification, evidence based treatment recommendations and improved outcomes as suggested by the improvement in heart healthy scores. Early screenings in the clinic setting can be achieved with appropriate evidence based practice guidelines.

Lee, Yann-Huei (G)
Title: Mathematical modeling of pharmacokinetic parameters for transdermal beta blockers
Primary Author (and presenter): Lee, Yann-Huei P.
Additional Authors: Ravis, William R.; Ramapuram, Babu J.; Pawar, Kasturi
Department: Department of Drug Discovery and Development
College/School: Harrison School of Pharmacy
Description: The drugs propranolol, acebutolol, atenolol, and sotalol are beta blockers used for the treatment of hypertension. The objective of this study was to determine if linear pharmacokinetic model can be developed to describe the in vitro absorption. Such a model would enable formulators to predict the effects of rate of drug delivery on drug pharmacokinetics and assist with dosage form design. The transdermal permeability of these drugs was investigated under several in vitro conditions using a Franz diffusion cell apparatus, with passive diffusion through the skin as a control. The influence of skin perforated by microneedles and iontophoresis as methods on permeation enhancement was examined. Data from these investigations was then modeled using WinNonLin software. A simple computational model was used to calculate the rate constants into the skin (K0 for passive diffusion and Km for microneedles) and into the collection volume (K), and in the case for the iontophoresis, an additional rate constant during the application of iontophoresis (Ki) studies was included. With few exceptions, regression of the transdermal permeability study data sets converged to provide rate constant values. By drug, each beta blocker showed significant increases in transdermal permeation rate constant Km with respect to K0 with the application of microneedles versus passive diffusion alone. While K0 and K did not significantly change with the application of iontophoresis, the greater amount of drug detected was accounted for by Ki representing the duration of iontophoresis. The modeling techniques used in the study was shown to be a good way to examine experimental transdermal data. Future studies would include associating these absorptive models to disposition pharmacokinetic models.

Li, Jing (G)
Title: Detoxification of softwood hydrolysate for butanol production by Clostridium acetobutylicum ATCC 824
Primary Author (and presenter): Li, Jing
Additional Authors: Tu, Maobing; Adhikari, Sushil
Department: Department of Biosystems Engineering
College/School: Samuel Ginn College of Engineering
Description: Biomass pretreatments generate considerable inhibitors from the degradation of cellulose, hemicellulose, lignin and extractives, many of which inhibit the subsequent enzymatic hydrolysis and microbial fermentation. Therefore, to figure out
how to remove the inhibitors is essential to biofuels production. In this study, we investigated different methods to detoxify loblolly pine hydrolysate for butanol production by Clostridium acetobutylicum ATCC 824. Five strategies with different detoxification mechanisms were examined. Among which overliming and anion resin detoxifications showed the best performance but resulted in a long lag phase. Furthermore, an effective two-step detoxification (Ca (OH)\textsubscript{2} and anion resin) approach was developed. It was found the butanol yield increased from 0 to 0.133 g/g, which was comparable with glucose control (0.137g/g). This finding will significantly improve the efficiency of sugar utilization in converting biomass to biofuels and add extra revenue to biofuels production.

Li, Jingting (G)
Title: Sunny days & rainy days: strengthen neighborhood culture through nature-based organic design
Primary Author (and presenter): Jingting Li
Department: School of Architecture, Planning and Landscape Architecture
College/School: College of Architecture, Design and Construction
Description: The Peninsula of Mobile, Alabama is in need of a community redesign. Located south of downtown Mobile, the Peninsula suffers from losses due to the closing of Brookley Air Force Base (1969) and Hurricane Katrina (2005). The Peninsula is densely developed to the north, but the southern half is less populated and contains many contingent parcels of undisturbed wetlands, intertidal marshes, flats and salt marshes that are home to both recreational and commercial marine species. The Mobile area receives over 60 inches of rain per year which makes for many rainy days, and stormwater runoff is a concern. A new community design is needed to protect and restore natural systems, strengthen social connections, provide transportation choices, enhance existing homes and neighborhoods and integrate land uses and economic activities. My design research uses an organic design method that uses positive direction and planning to make incremental design changes that respect the existing condition and current residents. My methods engage a site analysis that includes sections, elevations and repetitive spatial drawing. My design research is holistic and embraces the whole Peninsula. I divide the area into the public-based (human) sites and the nature-based (flora & fauna) sites. I use ecological patch theory to connect all the remnant green space patches to form a natural conservation area that is open to the public during dry weather. Rainy days and sunny days will influence how these public spaces are used. The neighborhood pocket gardens/community centers will be human-based public sites. The natural-based sites will have temporary public-access to engage natural conservation in dry weather. All patches will connect to the natural conservation area by existing water bodies and stormwater. I reorganize the transportation system based on stormwater flows and add a rain garden system that will compliment my “rainy day and sunny day” theory for stormwater control and reuse. The redesigned transportation system is pedestrian and bicycle friendly which is crucial for human use. My research is important because it shows how identity and familiarity make a cohesive neighborhood. This enhanced place-making, colors residents’ life and uses the rainy-adapted pattern to present the culture of the Peninsula.

Li, Mei (G)
Title: Polysaccharide blended films for cationic contaminant removal from water
Primary Author (and presenter): Li, Mei  
Additional Authors: Buschle-Diller, Gisela  
Department: Department of Polymer & Fiber Engineering  
College/School: Samuel Ginn College of Engineering  
Description: Small cationic compounds from industrial and domestic facilities pollute water to different degrees. In this research, a series of films was made from natural polysaccharides, including alginate, pectin, carrageenan, xanthan and xylan, and crosslinked. A negatively charged polyelectrolyte, poly(4-styrenesulfonic acid-co-maleic acid) sodium salt, was mixed into the film with the target to capture these pollutants. Film thicknesses, swelling ratios and mechanical properties were measured. The surface morphologies of films were observed by scanning electron microscopy (SEM). Ways to optimize the film sorption capacities were also investigated.

Li, Yueru (G)  
Title: The protective effect of stearidonic acid (SDA) on amyloid β40-induced neurotoxicity in H19-7 hippocampal cells.  
Primary Author (and presenter): Yueru Li  
Additional Authors: Ben Nie, Chen Zheng, Ramesh B. Jeganathan, Robert D. Arnold, B. Douglas White, Robert L. Judd, Kevin W. Huggins  
Department: Department of Nutrition, Dietetics, & Hospitality Management  
College/School: College of Human Sciences  
Description: Specific dietary components, such as dietary fat, may be a contributing factor to the development of Alzheimer's disease (AD). Consumption of saturated fatty acids may induce the pathology of AD, while consumption of omega-3 polyunsaturated fatty acids (ω-3 PUFAs), mainly eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), may protect against AD pathology. However, due to concerns regarding the safety and sustainability with fish oil (major source of EPA and DHA), there is a need to identify alternative sources of ω-3 PUFAs. A potential substitute may be stearidonic acid (SDA). SDA is a botanical ω-3 PUFAs and serves as the metabolic precursor of EPA. SDA may have similar health benefits to EPA. However, there is no evidence to support the use of SDA in the treatment of AD. The present study investigated the neuroprotective effect of SDA and other ω-3 PUFAs on rat hippocampal H19-7 cell neurotoxicity induced by Aβ40. LC-MS analysis of fatty acids in cellular lipids of H19-7 cells revealed that SDA treatment significantly enriched EPA content as compared with control group. Pretreatment with SDA and EPA both significantly decreased H19-7 cell death induced by Aβ40, by 11% and 9% respectively, through increasing cell viability via a significant upregulation of anti-apoptotic Bcl-2, by 30% and 46% respectively. Intracellular total antioxidant capacity was increased with SDA and EPA, by 4% and 21% respectively. Caspase-3 mRNA expression induced by Aβ40 was found to be restored only in EPA group. SDA and EPA pretreatment could also increase the catalase activity by 27% and 45% respectively, when compared with the Aβ40 group. The mRNA for glutathione reductase and superoxide dismutase were down-regulated by Aβ40 and could be restored by both SDA and EPA pretreatment, by 21% and 52% respectively for glutathione reductase, and by 112% and 152% respectively for superoxide dismutase. In addition, the production of pro-inflammatory cytokines IL-1β was significantly decreased with pretreatment of SDA by 18% and EPA by 27%; the production of TNFα was also significantly reduced with pretreatment of SDA by 37% and EPA by
These results demonstrated that SDA could effectively convert to EPA and exhibit neuroprotective effects by virtue of anti-apoptotic, anti-oxidative, and anti-inflammatory properties.

**Liao, Chao (G)**

**Title:** Establishment and validation of RNA-based predictive models for understanding survival and susceptibility of low-temperature adapted *Vibrio parahaemolyticus* in oysters

**Primary Author (and presenter):** Chao Liao

**Additional Authors:** Luxin Wang

**Department:** Department of Animal Sciences

**College/School:** College of Agriculture

**Description:** This study developed RNA-based predictive models describing the survival of *Vibrio parahaemolyticus* (*V. parahaemolyticus*) in Eastern oysters (*Crassostrea virginica*) during storage at 0, 4, and 10°C, and investigated the efficiency of individual quick freezing (IQF) treatment on cold and non-cold adapted *V. parahaemolyticus*. Post-harvested oysters were inoculated with a cocktail of five *V. parahaemolyticus* strains and were then stored at 0, 4, and 10°C for 21 or 11 days. A real-time RT-PCR assay targeting the *tlh* gene was used to evaluate the number of survived *V. parahaemolyticus*, which was then used to establish primary molecular models (MMs). The MMs were compared with traditional models (TMs) based on data collected using the plate counting method. Based on MMs, *V. parahaemolyticus* decreased for 0.493, 0.362, and 0.238 log_{10} CFU/g at the end of storage, while the reductions of *V. parahaemolyticus* in TMs were 2.109, 1.579, and 0.894 log_{10} CFU/g for storage at 0, 4, and 10°C. The inactivation rates (IRs) of MMs were -0.134, -0.0887, and -0.0732 log_{10} CFU/day for storage at 0, 4, and 10 °C, which were greater than those of TMs (-0.245, -0.152, and -0.121 log_{10} CFU/d). Higher valid *V. parahaemolyticus* numbers were predicted by using MMs. The efficiency of IQF was evaluated on cold adapted *V. parahaemolyticus*. Results showed that non-cold-adapted *V. parahaemolyticus* had a significantly higher die-off rate with the IQF treatment compared to cold adapted cells. RNA-based predictive MMs are more accurate and reliable models and can prevent false negative results comparing to TMs. Cold-adaptation generated negative impact on the *V. parahaemolyticus* reduction efficiency of IQF.

**Lima, Livia (G)**

**Title:** Crafting a new urban core for the peninsula of Mobile, AL

**Primary Author (and presenter):** Lima, Livia

**Department:** School of Architecture, Planning and Landscape Architecture

**College/School:** College of Architecture, Design and Construction

**Description:** The Peninsula of Mobile is located south of downtown Mobile, AL. The area has approximately 11,500 under-served mixed-income residents and a diverse marine industry. It is surrounded by wetlands and water bodies including the Dog River. The area provides habitat for a variety of animals, and its estuaries and marshes provide breeding ground for many marine species. The Peninsula was hit hard by Hurricane Katrina in 2005, and has been slow to recover. Many businesses have not returned. The loss of residents and jobs has been devastating to the community atmosphere. My
research goals focus on the design of a new urban core; a planned development with a village atmosphere that maintains a sensitivity to protect the environment. I use green infrastructure and low impact development to channel the stormwater runoff and alleviate localized flooding. This network of green space provides stormwater filtering before the runoff reaches the Dog River. I accomplish my goals using a combination of case study method complimented by research by design. I find inspiration in place-based case studies by examining their context, complex conditions and similarities to my site. I engage research by design by examining my site through scaled sections, elevations and repeated drawing investigations. The results of my research are a phased development that reflects a new resilient urban core. The use of place-based theories accentuate historical, natural and cultural design values. The new phased development provides a safer and more social environment. The green infrastructure connections provide greater water quality and recreation opportunities. The importance of my research is that it that provides a resilient solution to aid in the revitalization of humans, flora and fauna. My design embraces and accentuates the natural amenities of the area and provides a better place to live, work and play.

Lin, Xi (G)
Title: A qualitative study of Chinese students’ choice of the host university in the U.S. and their decisions to stay or leave the U.S. upon graduation
Primary Author (and presenter): Lin, Xi
Additional Authors: Shi, Hong; Huang, Mingyu
Department: Department of Educational Foundations, Leadership, and Technology
College/School: College of Education
Description: Chinese students are the largest group among all the international students. Many factors motivate them to study in the US and their decisions to stay or leave the US after graduation. However, previous research investigated these aspects by considering international students as a whole group, while a limited number of studies explore these aspects by looking into a certain student group. Therefore, this study conducted individual interviews to examines: 1) factors that influence Chinese students’ choice of the host college or university in the US; and 2) their decisions to stay or leave the US after graduation. Eleven Chinese students participated in this study (Female = 7, male = 4). Their ages range from 23 to 30 years old (mean = 25.8) and they are from majors including computer science, electronic engineering, chemistry, statistics, economics, industrial design, and MBA. Findings indicate that Chinese students, especially those in STEM fields consider the university rank most when they choose the college abroad, while scholarship or fellowship is the primary attraction for non-STEM students. When asking about their decisions after graduation, most non-STEM students show their wills to go back home but would like to firstly gain some working experiences in the US, while most STEM students prefer to stay and make a career in the US. The primary reason for those who would leave is that they have strong ties with their families and friends in their home country. The familiar home culture is another driving factor. For those who prefer to stay, the better working environment and the higher quality of living environment are factors that attract them to stay in the US. Finally, it is hoped that this study will lead to a greater awareness of Chinese international students and enlighten
higher education professionals with practical ideas to build a better campus environment and climate to serve this growing population.

Lingerfelt, Beth (UG)
Title: A Lady’s Table
Primary Author (and presenter): Lingerfelt, Beth, A.
Additional Authors: Anna Parsons, Anna Claire Peaden, Jordan Hays
Department: English
College/School: College of Liberal Arts
Description: A Lady’s Table is a modern compilation of three 19th century American texts from Auburn’s Special Collections: the cookbooks The Virginia Housewife and Miss Leslie’s New Receipts for Cooking, and the etiquette book Polite Life. These three works were influential in their time, but today appear dense and unappealing. The challenge was to make these books accessible and relevant to a modern audience. While studying novels and works of fiction from the 19th century provide a glimpse into what life was like at this time, our selected works provide a unique perspective by allowing people to engage with history by mirroring the practices of 19th century Americans. Through our course studies and accompanying research, we learned the principles of the history and production of the book and how changing technologies have affected print production throughout time. These changes influenced audiences to expect certain qualities in books regarding document design and content. We evaluated several methods of textual criticism and decided that an eclectic edition would be best suited for the intent of our texts. Based off of feedback from an audience analysis, we chose the most interesting sections of the books and compiled them to make them more usable and aesthetically appealing. We divided the recipes into themed menus, added relevant selections of etiquette for each menu, standardized the formatting, updated the grammar, used a minimalistic design, and included photographs of the recipes we cooked. The result is a new edition that bridges a historical gap that other types of literature cannot. Since printing this book, readers have expressed enthusiasm for the design and unique content of the book, and they have requested personal copies. The book now has a third edition and is available in a digital copy.

Liu, Feng (G)
Title: The molecular basis of odorant reception in the common bed bug
Primary Author (and presenter): Feng Liu
Additional Authors: Nannan Liu
Department: Department of Entomology & Plant Pathology
College/School: College of Agriculture
Description: The common bed bug, Cimex lectularius, as an ectoparasitic parasite, is becoming resurgent in the developed countries. Semiochemicals, such as human odors and chemical repellents, are very important cues in the navigation of bed bugs in host-seeking or risk-avoiding process. The odorant receptors on the olfactory receptor neurons of bed bugs are responsible for detecting these semiochemicals in their environment. In order to reveal the molecular basis of odorants reception in the bed bugs, we functionally characterized the current responses of bed bug odorant receptors to these both human odors and chemical repellents using the Xenopus expression system.
We found that bed bug odorant receptors are more likely to recognize the aldehydes/ketones and terpens/terpenoids but not carboxylic acids among these semiochemicals tested in the experiment. Dose-dependent responses are observed for these receptors to specific odorants. The odor space also revealed that odors in the same groups are usually widely dispersed, which suggested that bed bug put a lot of effort in discriminating odors in their environment. This study not only gave insight into the olfactory physiology of bed bugs, but also provided valuable information for the development of new attractants and repellents.

Liu, Yuzhe (G)
**Title:** Rapid and sensitive detection of Salmonella Typhimurium on plastic food processing plate by using wireless biosensors
**Primary Author (and presenter):** Yuzhe Liu
**Additional Authors:** Songtao Du, Shin Horikawa, Yating Chai, Jiajia Hu, Fengen Wang, Bryan A. Chin
**Department:** Department of Mechanical Engineering
**College/School:** Samuel Ginn College of Engineering
**Description:** Because of the complicated environment, it is easy for food products to be contaminated with bacteria, spores, toxins, viruses and other pathogens when treated on cutting boards or tables. Here, a rapid, sensitive, in-situ detection of Salmonella Typhimurium on plastic food processing plate has been demonstrated, by using wireless magneto-elastic (ME) biosensors. In this research, a planar spiral coil was employed as a surface-scanning detector for magneto-elastic biosensors and the ME resonators, made from metallic glass (Metglas alloy 2826MB), played a role of signal transducer were used to compose biosensor. The bio-molecular recognition element, E2 phage, which was able to selectively bind with Salmonella Typhimurium was also used to make sure the sensor works specially on the target. This ME biosensor is a type of mass-sensitive biosensor that can be wirelessly actuated into mechanical resonance by an externally applied time-varying magnetic field. Both measurement sensors (multiple E2 phage-coated biosensors) and control sensors (biosensors without phage) were applied in this study, while the resonant frequency change of the measurement sensors was found to be statistically different from that of the control sensors. Because the plastic can be modified using NaOH treatment, the roughness of the board was verified from 0.25 to 1.0. According to the result, Salmonella Typhimurium on a plastic surface appears to increase as the roughness of the surface increases.

Lloyd, Carter (UG)
**Title:** Incorporation of Nucleic Acid Aptamers in Silicone Hydrogel Contact Lens for Controlled Drug Delivery.
**Primary Author (and presenter):** Lloyd, Carter, A
**Additional Authors:** Whitener, Ricky; Wower, Jacek; Byrne, Mark
**Department:** Chemical Engineering
**College/School:** Samuel Ginn College of Engineering
**Description:** In this work, we are developing a nucleic acid-based platform for controlled delivery of ophthalmic therapeutics. Our system is comprised of two RNA molecules and a single strand DNA molecule. We obtain a controlled release by modifying the RNA linker
strand and taking advantage of enzymes present in the tear fluid, particularly RNase4. The main challenge is to preserve the active structure of the aptamer within the lens network while preserving the optical and mechanical properties required of a contact lens. By modifying the lens structure, using FDA approved materials; we have been able to incorporate our nucleic acid platform to controllably release the RNA aptamer therapeutics from a silicone hydrogel lens. The modification of the RNA linker strand to control release involves increasing the number and accessibility of cut sites for RNase4. We characterize lens properties using qualitative analysis and therapeutic incorporation quantitatively using radioactive labelling. Presently, we are studying the effect of different silicone monomers on the incorporation of nucleic acids within our system and lens properties with a focus on controlling phase separation and optical clarity.

Loxley, Thomas (G)
Title: Comparing loblolly pine growth allometry with chemical and physical properties
Primary Author (and presenter): Loxley, Thomas A.
Additional Authors: Fasina, Oladiran; Shrestha, Anshu; Daniel, Marissa
Department: Department of Biosystems Engineering
College/School: Samuel Ginn College of Engineering
Description: Southern pine trees in the Southeast, mainly comprising of loblolly pines (Pinus taeda), are vital resources for the lumber and pulpwood industry. Loblolly pine prospers on marginal forest land and has been introduced as a candidate for bioenergy production. Allometric growth models of loblolly pine trees allow forest owners to predict merchantable stemwood to sell by taking a few ground measurements. Annual logging residues from forest operations leave behind 68 million dry tons of biomass in the United States. This biomass is only left behind in the forest due to its unusable characteristics for lumber or pulp and paper operations. However, the stripped branches and additional crown from conventional logging are composed of the same cellulose and lignin as the stemwood. This residue can be used similarly to the stemwood for biofuel operations. This study destructively sampled five trees per diameter at breast height (DBH) classes from 4 inches to 8 inches, in one inch increments. Five cookie samples were taken from up the trunk of the tree till the beginning of the crown. The crown was divided into quarter sections by height, chipped whole, collected individually, air dried, and ground through a hammer mill with 1/8th inch (3.18 mm) screen, followed by grinding a sample through a knife mill fitted with a 1 mm screen. The 1 mm particle size was used to carry out the necessary chemical analysis. The following chemical and physical properties were tested: moisture content, ash content, volatile matter, fixed carbon, energy content, and density with respect to the height of each sample within and among diameter classes. The allometric growth models based on cookie diameters and the crown masses will allow for dimensional measurements to determine chemical properties of the residual biomass prior to harvest. Predicting these properties can aid in justifying the harvest of logging residues for loblolly pine trees and other southern pines.

Luo, Yuwen (G)
Title: Metabolic phenotype and adipose and liver features in the high fat Western diet-induced mouse model of obesity-linked NAFLD
Nonalcoholic fatty liver disease (NAFLD) is the most common obesity and insulin resistance-associated liver disease in western countries. To model the human condition, a high fat Western diet that includes liquid sugar consumption has been used in mice. Although liver pathophysiology has been well characterized in the model, little is known about the metabolic phenotype. Further, whether the consumption of liquid sugar exacerbates the development of glucose intolerance, insulin resistance, and adipose tissue dysfunction and modulates gene expression profile from hepatic and adipose tissue in the model are currently in question. In our study, a high fat Western diet (HFWD) with liquid sugar [fructose and sucrose (F/S)] induced acute hyperphagia, yet without changes in energy expenditure. Liquid sugar (F/S) exacerbated HFWD-induced glucose intolerance, insulin resistance, and impaired the expansion of epididymal white adipose tissue (eWAT). Hepatic TG, plasma alanine aminotransferase, and normalized liver weight were significantly increased only in HFWD+F/S-fed mice. HFWD+F/S also resulted in increased hepatic fibrosis and elevated collagen 1a2, collagen 3a1 and TGFβ gene expression. Further, HWFD+F/S-fed mice developed more profound eWAT inflammation characterized by adipocyte hypertrophy, macrophage infiltration, a dramatic increase in crown-like structures, and upregulated proinflammatory gene expression. An early hypoxia response in the eWAT led to reduced vascularization and increased fibrosis gene expression in the HFWD+F/S-fed mice. We also detected by high-throughput RNA sequencing 760 differentially expressed hepatic genes and 548 differentially expressed adipose genes greater than 2-fold in mice fed the HFWD+F/S compared to those fed the HFWD. Our results demonstrate that sugary water consumption induces acute hyperphagia, limits adipose tissue expansion, and exacerbates glucose intolerance and insulin resistance which is associated with NAFLD progression.

Majidzadeh, Hamed (G)

Title: Soil carbon beneath impervious surfaces in urban environments

Primary Author (and presenter): Majidzadeh, Hamed

Additional Authors: Lockaby, Graeme; Governo, Robin

College/School: School of Forestry and Wildlife Sciences

Description: An important component of climate change research is the effect of land use change and in particular deforestation and the formation of urban areas. While most urban soil research has focused on carbon (C) in lawns, parks, and forest patches, they have neglected sampling beneath homes and other urban impervious surfaces. Consequently, carbon models are often deficient in regard to the fate of C underneath those surfaces. In this study, we measured soil C beneath homes in the Alabama and Georgia Piedmont that were constructed with a crawl space and made comparisons to soil C in the adjoining grass lawns. Moreover, influential parameters affecting soil C such as soil nitrogen (N), microbial biomass, bulk density, and soil moisture were measured for all homes. More than two hundred samples were collected from twenty eight homes ranging from 11 to 164 years in age. We found that soil C beneath homes was on
average 57% or 1.86 Kg/m² (±0.26; ±95% C.I) lower than adjoining grass lawns (p-value<0.05) and for each 10 year increase in home age, the soil C only increased by 0.08 Kg/m² (±0.03; ±95% C.I, p-value<0.05). Soil N was 0.13 Kg/m² (±0.016; ±95% C.I) lower than grassed lawns which is a decrease of 61% (p-value<0.05). Despite the significant decrease in both, the C:N ratio did not change significantly. Bulk density beneath the homes was 0.36 gr/cm³ greater than in urban lawns. Microbial biomass C, an indicator of microbial activity, under homes was 60% lower than in grassed lawns. This minimized microbial activity may be due to lack of available C and N. This study addresses a major void in soil carbon research. These data improve the current estimation of carbon storage in urban areas by documenting C dynamics under impervious surfaces such as homes.

Matthews, Justin (UG)
Title: Development of a return on investment framework for building information technology implementation by developers
Primary Author (and presenter): Matthews, Justin
Additional Authors: Collins, Wesley
Department: Department of Nutrition, Dietetics, and Hospitality Management;
Department of Chemistry
College/School: School of Building Science
Description: Building Information Modelling, or BIM, is changing the way buildings are planned, designed, built, and managed. Autodesk, the makers of the most widely used BIM tools, states on their website that “Autodesk BIM solutions deliver business value at every step in the process” (Autodesk.com), but there has not been a process developed to measure the true business value of BIM to developers. A good way to determine the true business value of BIM is by determining its return on investment. My research will focus on developing a method to calculate the ROI of BIM usage specifically for real estate developers in the commercial sector, as no such framework currently exists. Development of such a framework will provide real estate developers in the commercial sector with a specific method to determine what level of return BIM usage will provide to their projects, and if BIM usage is warranted. My methodology will include three stages; 1) literature review, 2) case studies, 3) development of a ROI Framework. The literature review will focus on three areas: (1) What is BIM, and how is it currently being used in industry? (2) What is ROI, and how do real estate developers use it (and other financial measures) when making decisions on whether or not to implement certain means and methods on projects? (3) What models have been developed for determining ROI of BIM implementation thus far? The case studies will be of real estate development organizations currently using BIM on their projects (or those that have an interest is using BIM on their projects) to elicit how and why BIM provides value to their projects and organizations. I will then compile this information and develop a framework that will be used by developers when making the decision whether to use BIM or not. The research will be on-going throughout the semester.

Matthews, Michael (UG)
Title: TrkA activity is impaired in streptozotocin induced diabetes rat brain
Primary Author (and presenter): Matthews, Michael; Bates, Jaclyn
Additional Authors: Vines, Katie; Sustarich, Jake; Thangiah, Geetha; Broderick, Tom; and
Abnormal blood glucose homeostasis and subsequent hyperglycemia, due to insufficient insulin production, is characteristic of type 1 diabetes mellitus. Neuronal cells are classified as insulin insensitive, thereby insulin is incapable of increasing glucose uptake in neurons. Tyrosine receptor kinase A (TrkA) is a transmembrane receptor for nerve growth factor (NGF), which is responsible for regulating neuronal survival and differentiation. We have previously shown in our lab that NGF or insulin elicits TrkA to complex with IR and IRS-1, and phosphorylation of these proteins requires a functional TrkA kinase in PC12 cells. It was also shown that a functional TrkA kinase is necessary for Akt activation in PC12 cells. Following these findings, investigation into the activity of TrkA in the diabetic rat brain, created by streptozotocin (STZ) administration, have shown a decrease in its phosphorylation and increase in nitrosylation as compared to control rat brain samples. Further experimentation showed the interaction of TrkA with IR and IRS-1 as well as the tyrosine phosphorylation of these signaling proteins is decreased in STZ rat brain samples. Lastly, STZ rat brain samples had decreased phosphorylation of Akt as compared to control rat brain samples. Therefore, functional TrkA is necessary for proper functioning of the insulin signaling proteins IR, IRS-1, and Akt in neuronal cells, and disruption of its functioning can be seen in neuronal cells of the type 1 diabetic rat model. This study was supported by AU-CMB Undergraduate Summer Research Scholarship; Malone-Zallen Research Fellowship; Haggard family Research Fellowship.

McCollough, Samantha (G)

Title: Increased medication education regarding anticoagulants among elderly patients

Primary Author (and presenter): McCollough, Samantha J.

Additional Authors: Ellison, Kathy

Description: There is strong evidence that supports elderly patients experience adverse effects of anticoagulants more frequently when compared to adult patients directly related to a lack of proper education. Evidence-based guidelines recommend proper patient education and monitoring for elderly patients prescribed anticoagulant regimens. The purpose of this project was to implement appropriate patient education to improve patient adherence to recommendations and changes in medication compliance were assessed. The target population included elderly adults (65-93 yrs) with anticoagulants prescribed in a cardiology clinic. Following the agreement to participate, participants completed a pre-education assessment. Detailed medication education was performed based on prescription, taking into account medical history, support system and medication list. A follow up phone call at 1 week was made to assess education comprehension and patient adherence with recommended treatment. Descriptive statistics were used to describe the patient population, knowledge level before education, knowledge assessment at 1-week check-in, patient adherence, and compliance. X consented to participate, average age of X (sd) yrs. X% were identified with having experienced adverse effects, X% were educated prior to project, X% skipped doses due to side effects, and X% were recommended for further counseling. Follow-up indicated that X% adhered to treatment. Among those taking anticoagulants, the mean education comprehension improved from pre- (mean, sd) to post (mean, sd) significantly (p=<0.05). Screening for knowledge level of anticoagulants prescribed among
elderly patients identified areas that guided appropriate education recommendations and decreased the number of patients who experienced adverse effects. Early identification and education of prescribed anticoagulants among elderly patients are achievable in a cardiology office setting.

McCullough, Ruth (G)
**Title:** Improved management of hypertension with scheduled follow-up upon discharge from the emergency department
**Primary Author (and presenter):** McCullough, Ruth M.
**Additional Authors:** Hamilton, Cam
**College/School:** School of Nursing

**Description:** Hypertension management is needed to decrease potential risks of heart disease and stroke. Evidence supports providing follow-up for patients after a documented elevated blood pressure reading to improve hypertension management. The purpose of this project was to implement the scheduling of follow-up appointments in the emergency department for hypertensive patients upon discharge. Patient adherence to attendance at the follow-up appointment, beginning of self-monitoring of blood pressure (SMBP), and verbalization of understanding of BP education were assessed as short-term outcomes. Target population included adults treated for elevated BP in the ED. Following informed consent, participants were given standard discharge BP education, a BP log to begin SMBP, and follow-up information. The control group was told to follow-up with their primary care physician (PCP). The intervention group was given a scheduled follow-up appointment. One week following discharge, a phone call was made to assess the outcomes. Descriptive statistics were used to describe the population, the percentage with an established PCP, and those with a medical diagnosis of hypertension and/or other diagnoses. The Chi-Square test was used to determine significant difference between the control and intervention groups with regard to the short-term outcomes. X participated (X% female), average age of X (sd) yrs. Follow-up indicated X% adhered to follow-up appointment attendance, X% to beginning SMBP, and X% to understanding BP education. For the intervention group, adherence to the short-term outcomes (mean, sd) was significantly (p=<0.05) greater than the control group (mean, sd). The intervention of scheduling follow-up for patients treated for hypertension in the ED is promising in achieving significant results in overall hypertension management as evidenced by adherence to follow-up appointment, compliance with SMBP, and improved patient knowledge.

McDonald, Tara (G)
**Title:** Increasing adherence to antihypertensive medications in hypertensive patients.
**Primary Author (and presenter):** McDonald, Tara W.
**Additional Authors:** Sanderson, Bonnie
**College/School:** School of Nursing

**Description:** Hypertension is a common diagnosis seen in primary care and the majority of patients are uncontrolled. Evidence shows that most uncontrolled hypertension is due to noncompliance to medications. The use of technology to educate and remind patients to take their medications can help improve medication adherence. The purpose of this project was to educate and remind patients to take their medications through the use of technology for increased adherence and improved hypertension management. The target population was adults (>18 yrs) with uncontrolled hypertension or who were newly diagnosed with hypertension in a primary care clinic. Following informed consent, the participants
completed a medication adherence questionnaire (Morisky) and a hypertension knowledge quiz. These are used to assess barriers to medication adherence and how to guide education. The patients were followed weekly with phone calls and reminders. After four weeks the participants returned to the clinic for a blood pressure check and a retake on the original questionnaires, or were reached by phone. Descriptive analyses were used to describe the population, and paired t-tests to compare pre- post scores of the Morisky questionnaire and number of correct answers on the knowledge quiz. X consented to participate (% females), average age of X (sd) yrs. X% were identified as poor adherence to current treatments. Compared t-test showed a mean of 1.009, SD 1.395 (p < .001) for pre-post knowledge and a mean of 3.150, SD 1.494 ( p < 0.003) for pre-post adherence. The use of technology to improve knowledge and adherence to medication showed an improvement in both knowledge and adherence to medication. These results can be used to guide provider decisions on the course of treatment. This small test of change shows the possibility of improvement in hypertension management with this technology on a long term basis.

McDowell, Samantha (G)
Title: Improving self-care and pain management at home
Primary Author (and presenter): McDowell, Samantha
Additional Authors: Ellison, Kathy Jo
College/School: School of Nursing
Description: Elderly populations suffer from pain and self-care deficits, with a higher rate of re-hospitalization. Evidence supports transitional care programs (TCP) allow patients to gain additional support and prepare them for going back home. This project will implement the best evidence based interventions that allow the elderly to return home safely through improved discharge planning within a TCP. Over a six-week period, fifteen participants age 65 years and older, were admitted to a TCP. The interdisciplinary team incorporated weekly discharge planning meetings and “Save the Date” cards into the process. Patient education, follow-up phone calls, and a questionnaire were implemented to assess the success of early discharge planning. The Minimum Data Set (MDS) was used to measure self-care and pain scores to determine improvement through the TCP stay. Patient’s level of satisfaction with their discharge planning process will be measured with a likert scale (1 = very dissatisfied – 5 = very satisfied). Significant improvements (all with p = <0.05) were noted after education and early discharge implementation. A dependent t-test demonstrated a mean of XX (SD XX), a t-score (XX) for self-care 5 days after TCP admission, a mean of XX (SD XX) with a t-score (XX) post discharge. A dependent t-test demonstrated a mean of XX (SD XX), a t-score (XX) for pain management 5 days after TCP admission, a mean of XX (SD XX) and a t-score (XX) post discharge. After implementation of interventions, improved patient satisfaction (XX%) with the discharge planning process by comparing the old process with the new. This small test of change has presented evidence that an improved TCP with a focus on pain management, self-care, and continued care after discharge is beneficial to the elderly population. Future project implementation would extend these interventions throughout the population.

McFarland, Trevor (G)
Title: Anticoagulation selection and monitoring in patients with atrial fibrillation
Primary Author (and presenter): McFarland, Trevor S.
Additional Authors: Sanderson, Bonnie
College/School: School of Nursing
Anticoagulant options have entered the market and prescribers must examine the relevant data before selecting the appropriate anticoagulant for patients. The risks associated with poor compliance with anticoagulation therapy require prescribers to always be educators in their patients care. For these reasons, patient education at the time of being prescribed, as well as continued education is needed. Furthermore, follow-up compliance monitoring and patient understanding must be evaluated. Target population included adults with atrial fibrillation who were already prescribed or being prescribed an anticoagulant in a cardiology clinic. Following informed consent, participants completed a nine question questionnaire. The results were reviewed, and then individualized education based on the patient’s anticoagulant was delivered. At the 7 day and 30 day mark, patients were surveyed on education understanding and compliance using a ten question questionnaire. Descriptive statistics were used to describe the patient population compare the pre and post education responses for medication understanding, and medication adherence. X consented to participate (% males, average age of X (sd) yrs). X% were newly diagnosed with A-fib, X was the most represented ethnicity, and X was the most used anticoagulant. The mean scores related to anticoagulation scores improved from pre (mean, sd) to post (mean, sd) significantly (p=<0.05). The mean score for days taking medication as prescribed improved from pre (mean, sd) to post (mean, sd) significantly (p=<0.05). Anticoagulants are vital in lowering the risk of stroke in A-fib patients, but only when used as prescribed. Patient education and follow-up is necessary to ensure patients are compliant with their anticoagulation therapy, but also understand potential side effects. Uniform, medication specific education is a useful way to maximize patient understanding and safety.

McLean, Ashley (G)

Title: Do vitamins work for decreasing blood pressure in women?

Primary Author (and presenter): McLean, Ashley C.

Additional Authors: Ellison, Kathy

College/School: School of Nursing

Description: There is evidence women use vitamins, as supplementation to aid in their blood pressure control, although vitamin effectiveness has not be demonstrated. Evidence-based literature states that educating women about vitamin supplementation aids in guiding women to make the appropriate choices about their blood pressure treatment. The purpose of this project is to educate women about the effectiveness of vitamin supplementation to improve blood pressure management. Target population was women (19-85 yrs) with hypertension in a primary rural health clinic. Following agreement to participate, participants completed a pre-implementation questionnaire about vitamin supplement use. The results were reviewed to guide treatment recommendations and needed education. Medications were prescribed or adjusted and/or the patient is given for patient education. A follow up phone call at 4-6 weeks was made to assess patient adherence with recommended treatment. Descriptive statistics were used to describe patient population, vitamin supplements, treatment recommendations and adherence. A post implementation questionnaire and the pre and post responses were compared with paired t-tests. X to participate with an average age of X (sd) yrs. X% were using supplements as primary treatment, X % were treated with medication changes, X% were given education, and X% were recommended both medication changes and education. Follow-up indicated that X% had blood pressure improvement. Among those with baseline medication noncompliance and poor education about supplement use, the mean questionnaire scores improved from pre- (mean, sd) to post (mean, sd) significantly (p=<0.05). The project was used for
screening for the effectiveness of vitamin supplementation with blood pressure medication in women. Identification and treatment of vitamin supplement use among hypertension patients are achievable in primary medicine rural clinic settings.

**McManus, McKenzie (G)**
**Title:** Medication adherence for hypertension management
**Primary Author (and presenter):** McManus, McKenzie S.
**Additional Authors:** Sanderson, Bonnie
**College/School:** School of Nursing
**Description:** There is strong evidence that low medication adherence among hypertensive patients contributes to poor blood pressure control. Evidence-based guidelines recommend self-monitoring with blood pressure logs, individualized educational interventions, informational handouts, and face-to-face medication education. The purpose of this project was to implement these patient education recommendations. Patient’s medication adherence scores and blood pressure readings were assessed. Target population included adults (19-92 yrs) with hypertension in a cardiology clinic. Following informed consent, participants completed a medication adherence tool (MMAS). The patient’s blood pressure was taken and recorded. Education was provided on hypertension, the importance of medication adherence, and how to self-monitor blood pressure. A follow-up phone call at 4 weeks was made to assess current blood pressure reading and medication adherence score using the (MMAS). Descriptive statistics were used to summarize patient’s age, gender, ethnicity, educational level, number of daily medications, and history of chronic kidney disease or diabetes mellitus. The pre/post medication adherence scores and pre/post blood pressure readings were compared with paired t-tests. X consented to participate (% females), average age of X (sd) years. According to the pre-education MMAS screening tool, X% had a low medication adherence score, and X% had a medium to high medication adherence score. According the pre-education blood pressure readings, X% had controlled blood pressure, and X% had uncontrolled blood pressure. Follow-up indicated that X% had a low medication adherence score, X% had a medium to high medication adherence score, X% had controlled blood pressure, and X% had uncontrolled blood pressure. Among these results, the mean scores improved from pre (mean, sd) to post (mean, sd) significantly (p=<0.05). Using the evidence-based educational recommendations, an increase in medication adherence and a decrease in blood pressure were achieved in a cardiology clinic setting.

**Meadows, Caroline (UG)**
**Title:** Motivation and motor-preparatory brain activity independently affect response time
**Primary Author (and presenter):** Meadows, Caroline C.
**Additional Authors:** Miller, Matt; Lohse, Keith; Gable, Philip
**Department:** School of Kinesiology
**College/School:** College of Education
**Description:** Motivation drives individuals to obtain goals, with higher motivation linked to greater goal pursuit. Thus, motivation typically exhibits a positive relationship with performance. When performance involves a motor task, it is possible high motivation enhances motor preparatory brain activity in order to facilitate muscle activation necessary for performance. Indeed, it is possible motor preparatory brain activity mediates the relationship between motivation and muscle activation. The present experiment tested this hypothesis by modulating participants’ (N = 20) motivation with monetary incentives,
indexing their motor preparatory brain activity with electroencephalography (EEG), and measuring the speed of their muscle activation with electromyography (EMG), during 168 trials of a response time task. Each trial began with the presentation of a monetary incentive ranging in value from $0.00 to $4.96. Next, a “Go” signal (an auditory tone) was presented, which indicated participants should use their dominant right-hand to squeeze a dynamometer as quickly as possible. Participants were told quick responses to the tone increased the likelihood they would earn the incentive at stake. Each trial concluded with augmented feedback indicating whether participants earned the incentive. Motor preparatory brain activity during the 3-s preceding the “Go” signal was indexed by suppression of the beta frequency bandwidth over contralateral motor cortex. The speed of muscle activation was determined by measuring the time between the “Go” signal and activation of the agonist muscles of the forearm. Contrary to the hypothesis, we observed monetary incentive reliably predicted muscle activation speed when controlling for beta suppression, which independently predicted muscle activation speed. Thus, it appears motivation and cerebral cortical motor preparatory brain activity facilitate muscle activation independent of one another. One possibility is that motivation affects muscle activation downstream of cerebral cortex by activating ventral striatum, which connects to motor circuits.

Meadows, Caroline (UG)
Title: The effects of reward magnitude on reward processing: An averaged and single trial event-related potential study
Primary Author: Meadows, Caroline C.
Additional Authors: Miller, Matt; Lohse, Keith; Gable, Philip
Department: Exercise Science
College/School: College of Education, School of Kinesiology
Description: From a neurobiological and motivational perspective, the feedback-related negativity (FRN) and reward positivity (RewP) event-related potential (ERP) components should increase with reward magnitude (reward associated with valence (success/failure) feedback). To test this hypothesis, we recorded participants’ electroencephalograms while presenting them with potential monetary rewards ($0.00 - $4.96) pre-trial for each trial of a reaction time task and presenting them with valence feedback post-trial. Averaged ERPs time-locked to valence feedback were extracted, and results revealed a valence by magnitude interaction for neural activity in the FRN/RewP time window. This interaction was driven by magnitude affecting RewP, but not FRN, amplitude. Moreover, single trial ERP analyses revealed a reliable correlation between magnitude and RewP, but not FRN, amplitude. Finally, P3b and late positive potential (LPP) amplitudes were affected by magnitude. Results partly support the neurobiological (dopamine) account of the FRN/RewP and suggest motivation affects feedback processing, as indicated by multiple ERP components.

Merlino, Suzanne (G)
Title: Pop-up urban furniture for college campuses
Primary Author (and presenter): Merlino, Suzanne F.
Additional Authors: Cutler, Parker
Department: Department of Consumer & Design Sciences
College/School: College of Human Sciences
**Description:** There are thirty-eight WiFi clouds and sixteen WiFi zones throughout the United States, with 81% supporting public access (Shamp, 2004). Recent internet access initiatives offering public WiFi in public spaces offer new ways to use, experience, and engage with public space; therefore, cities are working to reimagine the design, function, and legibility of existing public spaces. One component missing from these WiFi zones is access to charging stations and power. The purpose of this project is to develop a moveable urban furniture system that provides charging capabilities through solar power, and follows an established 6-item criterion. Criteria was developed from existing research (Duffey, 2013) where mobile device users in public space behaviors were evaluated. The criteria includes: moveable seating with flexibility for multiple uses, shading to allow for device usage and prevent glare, waterproofing for equipment protection, ergonomic considerations in form, backing, and material usage, ability to mass produce in production and easily ship, and ability to re-purpose into an existing public space. While similar urban furniture systems exist, they do not consider this established criteria and fail to serve public space users with mobile devices. This project will design, prototype, and fabricate a smart furniture system for use on college campuses in order to initially test its feasibility. Solutions will be modeled using: 3D modeling, 3D Printing, and full scale fabrication technologies. This project aims to: (1) understand how this prototype will function for public space users on Auburn’s campus, (2) gather additional data through observation and focus group interviews on the usability of this prototype with device users, and (3) ultimately offer a furniture system that can be used beyond college campuses and serve in a variety of settings to encourage internet use to a larger population.

**Merryman, Caroline (G)**
**Title:** A cyclophane-based approach to functionalized cycloparaphenylenes  
**Primary Author (and presenter):** Merryman, Caroline P.  
**Additional Authors:** Merner, Bradley L.  
**Department:** Department of Chemistry and Biochemistry  
**College/School:** College of Sciences and Mathematics  
**Description:** A series of para-terphenyl-containing macrocycles have been synthesized. Of particular interest is a para-terphenylophane containing an orthocyclo bridging group. This system contains four of the six benzene rings present in [6]cycloparaphylene (CPP), which is significant because [6]CPP naturally packs into a tubular assembly in the solid state, which should facilitate carbon nanotube synthesis. The two vertices of our cyclophane derivative that need to be connected in order to install the two remaining rings of a [6]CPP are in close proximity. Installation of functional groups at these positions early in the synthesis would allow us to bridge the benzene rings with a 1,4-diketone group, an intermediate in the synthesis of bent para-phenylene rings developed by our group. Work towards the synthesis of a selectively functionalized [6]CPP will be presented in this talk.

**Michaelson, Dawn (G)**
**Title:** Sustainable apparel practices: a zero waste design challenge  
**Primary Author (and presenter):** Michaelson, Dawn M.  
**Department:** Department of Consumer & Design Sciences  
**College:** College of Human Sciences  
**Description:** One avenue of achieving sustainability in apparel production is known as zero waste design. Zero waste design challenges apparel designers creatively to find ways that
incorporate 100% of the fabric into the garment; thereby eliminating all fabric waste. The industry currently has a goal of 85% utilization and waste is typically sent to landfills. While apparel sustainability is a goal, the challenge in zero waste design is to achieve 100% fabric usage yet still produce an aesthetically pleasing ensemble that would be purchased. As a graduate, exploring zero waste design was a way to expand my patternmaking skills as this technique is rarely taught. To start this project, half-scale flat patterns were used for designing the coat. It required four half-scale versions before 100% utilization was achieved. The pattern was then transformed to full-scale and made. A coordinating zero waste silk jersey dress was then designed using draping techniques. In the end, a zero waste ensemble was achieved. The coat was made from a 54”x52” piece of double-sided silk lame brocade and the dress from a 44”x49” piece of peach silk jersey. This project required me to look beyond my traditional patternmaking training and embrace alternate ways to design patterns. Zero waste design has no set rules to follow beyond the total usage of fabric. It will continue to not only challenge designers but also provide a creative outlet for them. As the apparel industry is calling for more sustainability in all areas of production, zero waste is one avenue to be further explored. There are only a handful of designers in the world designing in this method. Due to this, zero waste garments are not readily available for purchase. Additionally, there are no studies published on consumers’ responses to this type of design process so it is unknown if consumers would find the garments aesthetically pleasing enough to purchase.

Mirkhani, Vahid (G)
Title: Effect of gamma-ray irradiation on ZnO transistors
Primary Author (and presenter): Mirkhani, Vahid
Additional Authors: Wang, Shiqiang; Yapabandara, Kosala; Ozden, Burcu; Khanal, Min; Sultan, Muhammad Shehzad; Youn, Suhyeon; Ko, Sangjong; Yang, Chungman; Sk, Mobbassar Hassan; Chung, Yoonsung; Hamilton, Michael, C.; Park, Minseo
Department: Department of Physics
College/School: College of Sciences and Mathematics
Description: ZnO based thin-film transistors were fabricated and the effect of gamma-ray irradiation on these devices was studied. Little research has been performed to study the effect of gamma-ray irradiation on the electrical characteristics of ZnO based transistors. We have fabricated back-gated metal-oxide semiconductor field effect transistors (MOSFETs) based on ZnO channel layers grown by sputtering and sol-gel processing. ZnO channel layers were studied and the MOSFET devices were analyzed. It was revealed that a slight degradation in transistor output characteristics occurred after irradiation. The irradiation hard electronics are one of the most prominent factors avoiding further damage in case of the occurrence of a disaster.

Mitra, Nirmal Kumar (G)
Title: Macrocyclic 1,4-Diketones to highly bent para-Phenylenes using a mild dehydrative aromatization protocol
Primary Author (and presenter): Mitra, Nirmal Kumar
Additional Authors: Merner, Bradley
Department: Department of Chemistry and Biochemistry
College/School: College of Sciences and Mathematics
Description: A series of benzenoid macrocycles that contain highly distorted para-phenylenes have been synthesized. A non-cross-coupling strategy for aryl-aryl bond formation has been developed. The key steps in the synthesis involve a streamlined synthesis of macrocyclic 1,4-diketones, a (macrocyclic) size dependent diastereoselective Grinard addition to the 1,4-diketones, and a mild dehydrative aromatization reaction using the Burgess reagent. The latter facilitates the formation of highly strained arene-bridged units without any strain-induced rearrangement reactions.

Mollus, Tara (G)

Title: Compassion fatigue screening in oncology nurses

Primary Author (and presenter): Mollus, Tara Y.

Additional Authors: Hamilton, Cam

College/School: School of Nursing

Description: Nurses have a longstanding history of witnessing the tragedy experienced by patients and families; however, their own reactions to profound loss and premature death have not been thoroughly addressed. Evidence-base guidelines recommend compassion fatigue (CF) screening for nurses working with cancer patients. The purpose of this project was to educate nurses on stress reduction methods and compassion fatigue. Target population included oncology nurses with 2-30 years of experience working in an outpatient clinic. Following informed consent, participants completed a demographic questionnaire and a Secondary Traumatic Stress Scale (STSS) with proven reliability and validity. Nurses participated in monthly meetings with open discussion sessions, ten minute massages and educated on CF. After three months of interventions, a follow-up questionnaire and STSS were completed. Descriptive statistics were used to describe the nurse’s age, absenteeism, number of patients seen daily, years of experience, massages received and attendance to monthly educational meetings. A total of X nurses with 2-5 years = X %, 6-10 years = X %, 11-20 years = X%, 21-30 years = X% of treatment room experience consented to participate in the small test of change. X number of days missed at work, X % attended monthly educational meetings and X % received daily massages. Pre/post data were collected from each participant and entered into Excel. Prior to interventions, X number of nurses missed X number of days, X number dis-liked their jobs and X number felt a sense of hopelessness. Follow-up indicated that X % regularly participated in educational meetings and massage therapy. Nurses that experienced CF symptoms and received education X % had decreased stress scores on the STSS. Early identification and education on stress reduction and CF among oncology nurses lead to decreased stress scores in oncology nurses working in an outpatient setting. The use of the STSS could provide early identification of nurses facing CF allowing for early intervention.

Mondal, Animesh (G)

Title: Spray deposition of Cu2ZnSnS4 (CZTS) for cost-effective and non-toxic photoelectrodes

Primary Author (and presenter): Animesh Mondal

Additional Authors: Dr. James Radich

Department: Department of Chemical Engineering

College/School: Samuel Ginn College of Engineering

Description: The most direct and benign technology to capture abundant solar energy is the photovoltaic cell as long as the cell itself isn’t made of harmful elements. In that regard,
Copper, Zinc, Tin and Sulfide based Cu₂ZnSnS₄ (CZTS) solar cell holds a great attention as the elements are earth abundant and environment friendly. However, CZTS solar cell lacks in power conversion efficiency to meet the grid parity. The research presented here focuses on improving the efficiency of CZTS photovoltaics through the incorporation of a mesoscopic hole acceptor, nickel oxide.

Moore, Alisha (G)
Title: Diabetes education in Hispanic patients
Primary Author (and presenter): Moore, Alisha M.
Additional Authors: Ellison, Kathy Jo
College/School: School of Nursing
Description: Diabetes (DM) is a chronic and debilitating disease affecting 50.5 million Hispanics with increased complications due to the lack of education and self-care management. There is strong evidence that culturally tailored patient education produces improved outcomes for Hispanic patients with DM. The purpose of this project was to implement education through multiple methods to increase DM knowledge, self-care management, and reduce the patients’ fasting blood sugar (FBS). The target population included Hispanics (+16 yrs and older) with DM in a primary clinic. Following the agreement to participate, the participants completed a pre-education questionnaire screening and culturally tailored verbal education with pamphlets was distributed by the provider. Patients were referred to a Diabetes self-management education (DSME) program offered in Spanish through a language line service. Weekly follow-up phone calls were made by the project leader for four weeks to assess DM knowledge gain and attendance to DSME. The post-questionnaire was given to the participants after five weeks of the first visit to assess an increase in self-care management and DM knowledge. Descriptive statistics were used to describe the patient population and the pre and post questionnaires, as well as the FBS were compared with t-tests. X consented to participate (% females), average age of X (sd) yrs, average FBS of X (sd). Follow-up indicated that X% adhered to DSME program. The mean questionnaire scores for the participants improved from pre- (mean, sd) to post (mean, sd) significantly (p=<0.05) as well as initial FBS (mean, sd) to post FBS (mean, sd) significantly (p=<0.05). The use of multiple culturally relevant education methods can improve DM health in the Hispanic population by increasing the knowledge of the disease process, improving self-care management skills, and decreasing FBS. Further development of the project in this setting is supported.

Moore, William (UG)
Title: Modeling heat transfer in the presence of linear and nonlinear acoustic waves
Primary Author (and presenter): Moore, William C.
Additional Authors: Batterson, Joshua
Department: Department of Aerospace Engineering
College/School: Samuel Ginn College of Engineering
Description: Combustion instability is a common problem in aerospace propulsion systems. It occurs when acoustic waves naturally accumulate energy leading to high amplitude pressure fluctuations. In the worst case scenario, the oscillating pressure leads to catastrophic failure of the system either by exceeding the material strength or weakening the structure through fatigue. Another repercussion of high amplitude acoustic waves is the potential for increased heat transfer to the structure – another opportunity for system failure. Though a well-known phenomenon in simple resonating systems, complex acoustic waves...
where the mode shape, phase, and orientation of the wave all contribute to its nature still needs to be explored. Numerical algorithms are already in place that provide detailed information about the acoustic wave itself. This study takes this information and establishes heat transfer models in the presences of real acoustic modes. Since heat transfer analysis is necessary for determining the design limits in propulsion systems, addressing unsteady heat transfer is also necessary, though, often neglected. This study utilizes a finite difference solver that incorporates unsteady convection boundary conditions that appropriately consider the longitudinal acoustic profiles that are present in an unstable rocket engine. This explores how the material temperature is dependent upon the nature of complex acoustic waves. Since the convection heat transfer from the flow to the chamber wall is dependent upon the fluid temperature, density, and velocity, the relationship between the acoustic temperature, density, and the velocity modes is explored. This study also explores the effect of nonlinear waves with strong harmonic components. In future works, this heat equation solver will be adapted to address irregular geometries to model unsteady heat transfer in converging/diverging nozzles and other geometries characteristic of real propulsion systems.

Motallebi, Safa (UG)
Title: Sequence generation of exponents in prime factorization
Primary Author (and presenter): Motallebi, Safa
Additional Authors: Cueva-Parra, Luis Alberto
Department: Department of Mathematics and Computer Sciences
College/School: College of Arts and Sciences, Auburn University Montgomery
Description: Since the patterns of the exponents in prime factorization of numbers has not been studied in depth, we have examined these patterns in even numbers for their first prime factor. We will present a formula which generates a sequence of the exponents of the first factor in the prime factorization of even numbers as well as the product of two consecutive even numbers. Eventually, we could use a similar approach to study the behavior of the exponents of other factors, odd numbers and factorials. The results could be used to solve a variety of problems in number theory.

Muller, Reka (UG)
Title: Identification and characterization of Glanzmann Thrombasthenia in 2 closely related beagle-mix dogs
Primary Author (and presenter): Muller, Reka D.
Additional Authors: Kennerly, Rebecca; King, Kevin; Christopherson, Peter; Haysom, Laura; Boudreaux, Mary
Department: Department of Biological Sciences
College/School: College of Sciences and Mathematics
Description: Glanzmann thrombasthenia (GT) is an inherited intrinsic platelet disorder resulting from a quantitative or qualitative defect in the platelet membrane glycoprotein complex IIb-IIIa, which is also known as integrin αIIb-β3 and the fibrinogen receptor. GT is a rare bleeding disorder that occurs as a result of failure of platelets to aggregate, as GP IIb-IIIa is essential to platelet aggregation. In veterinary medicine, mutations have been documented in Great Pyrenees dogs, Otterhounds, and several equine breeds. This case demonstrates Glanzmann thrombasthenia in a 2 year old, female intact, beagle-mix dog and a male sibling. The female dog had a life-long history of bruising in spite of a normal platelet count, coagulation tests, and von Willebrand factor antigen levels. The buccal mucosal bleeding time was prolonged at >5 minutes. Platelet function studies in both dogs showed
shape change response but no aggregation response to any of the agonists tested (ADP, PAF, collagen, γ-thrombin). The clot retraction assay was abnormal in both dogs. Flow cytometry revealed absence of platelet glycoproteins IIb and IIIa on the platelet surface. The genes encoding GP IIb and IIIa were sequenced in the female dog and her sibling using cDNA isolated from platelet mRNA and canine specific primers. Both dogs were homozygous for a single nucleotide change at position 1264 (C1264T) that results in a premature termination codon at position 422 (R422X) in exon 13 of the glycoprotein IIb gene. The female dog had three additional SNPs identified in the coding regions of the glycoprotein IIb gene that were not considered significant as they had been previously documented in normal dogs and were located in areas of the gene that are not highly conserved. No evidence of heterozygosity was identified in coding regions of the GP IIb and IIIa genes in either dog. This finding, in addition to the diagnosis of GT in mixed-breed dogs, suggests that the dogs’ sire and dam were closely related.

Murphy, Jerry (G)
**Title:** Spatial smoothing and motion correction effects on sub-millimeter resolution fMRI data

**Primary Author (and presenter):** Murphy, Jerry E.

**Additional Authors:** Robinson, Jennifer; Reid, Meredith

**Department:** Department of Psychology

**College/School:** College of Liberal Arts

**Description:** Capturing the brain in action is a tremendous methodological achievement accomplished with functional magnetic resonance imaging (fMRI). However, fMRI data is incredibly complex and heavily influenced by subjective decisions in the preprocessing of the data, allowing for vastly different inferences to be drawn from the same data. Further complicating the issue, very little is known about the effects of preprocessing on submillimeter fMRI acquisition. Spatial smoothing and motion correction are normal steps taken in the preprocessing of standard (i.e., >1mm resolution) fMRI data. Here, we sought to examine the effects of these well-accepted preprocessing steps on ultra high-resolution (i.e., <1mm resolution) fMRI data, to determine the impact they may have on subsequent processing steps. We analyzed fMRI data from 30 healthy individuals collected at submillimeter in plane resolution and used a normal preprocessing pipeline to process the data with all combinations of smoothing kernels (0mm, 1mm, 3mm, 5mm, and 8mm full width half maximum [FWHM]) and motion correction options (no correction, standard correction, standard correction with high motion volumes removed, and standard correction with volumes removed and an additional sinc interpolation). Results showed that brain activation patterns change significantly depending on which combination of smoothing and motion correction is performed. These results suggest synergistic effects of spatial smoothing and motion correction, and highlight the importance of rigorous investigations of the effects of preprocessing. The results also show that for group comparisons at submillimeter resolution the smallest FWHM that provided the most reliable activation results is between five and six times the voxel size regardless of motion correction applied to the data.

Nabity, Chloe (G)
**Title:** Influence of sock type on gait parameters

**Primary Author (and presenter):** Nabity, Chloe

**Additional Authors:** Wilburn, Christopher; Fox, John; Javage, Erika; Jagodinsky, Adam;
Smallwood, Lorraine  
**Department:** School of Kinesiology  
**College/School:** College of Education  
**Description:** The sock industry has become a mainstay in the sporting goods industry; however, little is known about the function of socks as they relate to gait parameters. Hypothetically, an increased gait velocity will yield greater mediolateral deviations; therefore, a faster gait should elicit decreased stability within the foot. Due to limited research in this area, this study investigated the effects of cotton and athletic socks (constructed with reinforced arch band) on gait velocity and mediolateral center of pressure deviation (COPD). Participants performed three walking trials across an instrumented walkway (GAITRite, CIR Systems, Inc., Havertown, PA, USA) at a self-selected pace under three footwear conditions: barefoot (BF), athletic socks (AS), and cotton socks (CS). Results concluded that sock types, specifically athletic socks, provided increased gait velocity and decreased mediolateral COPD during gait, but lack statistical significance (p = > 0.05). In relation to BF, increased foot stability in AS, indicated by decreased COPD, could be attributed to the difference in material composition between sock type (p = 0.029). Compression mechanisms, demonstrated by the reinforced arch component of AS, provide increased mediolateral foot stability and foot function by placing the foot in an optimal position for a greater propulsive mechanism, thus resulting in an increased velocity.

Narayanan, Natasha (UG)  
**Title:** Functionalization of the central benzene ring in \([n]_{\text{para}}\)-terphenylophanes  
**Primary Author (and presenter):** Narayanan, Natasha K.  
**Additional Authors:** Merner, Bradley  
**Department:** Department of Chemistry and Biochemistry  
**College/School:** College of Sciences and Mathematics  
**Description:** A short, efficient synthetic protocol to \([n]_{\text{para}}\)-terphenylophanes, compounds that contain three benzene rings linked at the \(\text{para}\) positions in which the central benzene ring is distorted out of planarity, has been developed. Efforts to functionalize this strained central arene unit are currently underway in our laboratory. The molecular framework of haouamine A, a natural product that has exhibited promising anticancer activity, contains a bent phenol moiety. This nonplanar phenol functionality has posed a formidable synthetic challenge, as it has proven impossible to construct using standard cross-coupling approaches. We report the use of a TEMPO-based oxidation procedure on a bent precursor to obtain a key intermediate in the synthesis of a nonplanar phenol. We plan to use the methodology developed for making bent functionalized arenes to devise an alternative synthetic route to haouamine A, as well as build up a library of analogues of the paracyclophane core of haouamine A to test in anticancer assays. The applications of this chemistry extend to the synthesis of other natural products whose structures contain bent functionalized aromatic rings.

Nautiyal, Amit (G)  
**Title:** Conducting polymer coating on carbon steel by electrochemical method  
**Primary Author (and presenter):** Nautiyal, Amit  
**Additional Authors:** Zhang, Xinyu  
**Department:** Department of Polymer & Fiber Engineering  
**College/School:** Samuel Ginn College of Engineering
**Description:** Polyaniline (PANI) coatings were electrodeposited on carbon steel (CS) substrate from oxalic acid solution using technique, known as cyclic voltammetry (CV). The number of sweeps in CV was optimized for good coating and it was found out that 10 number of cycles provide good corrosion protection and possess features of good coating. The addition of phytic acid (PA) in previous solution adds further protection from corrosion. The formation of coating and its protection against corrosion was investigated by cyclic voltammetry and linear polarization, respectively.

**Nelson, Steven (G)**

**Title:** Fueling the boom or smothering it? Examining fracking policy differences across the States

**Primary Author (and presenter):** Nelson, Steven  
**Additional Authors:** Fisk, Jonathan; Good, AJ  
**Department:** Department of Political Science  
**College/School:** College of Liberal Arts

**Description:** Public concern about the health and environmental risks from oil and gas fracking operations is rising. However, scholarly attention is just beginning to unpack the regulatory differences to how states are responding to the shale oil and gas boom. For some, a laissez faire response is preferable because of the substantial economic benefits that accompany natural resource development. Others prefer a more activist state government and one that is more willing to use its oversight and regulatory powers to mitigate fracking related problems. Using data drawn from a variety of political, economic, regulatory, and energy sources, we ask which factors are most helpful in understanding why some states race to the bottom while others become leaders in balancing environmental protection with energy development.

**Newman, Tina (G)**

**Title:** Improving vaccination for Human Papillomavirus through parental education

**Primary Author (and presenter):** Newman, Tina L.  
**Additional Authors:** Hamilton, Cam  
**College/School:** School of Nursing

**Description:** There is strong evidence in the review of literature of low levels of knowledge and awareness and a need to increase education among parents of teenage girls regarding the Human Papillomavirus (HPV), Human Papillomavirus vaccine (HPVV), and cervical cancer. According to Centers for Disease Control and Prevention (CDC) only 39.7% of teenage girls ages 13-17 were vaccinated in 2014 (CDC, 2014). Healthy People 2020 goal is that 80% of teenage girls should be vaccinated against HPV (Healthy People 2020, 2014). The goal of this evidence based practice (EBP) project is to improve the HPVV rates by increasing knowledge and awareness of the HPV, HPVV, and cervical cancer. The targeted population was parents of students (9-14 yrs) who attend Southdale Middle School (SDMS). The project was conducted SDMS’s Coffee Break to Communicate parent meeting. The parents initially completed a pre-test that was collected by the project leader. The project leader then provided the parents with information regarding HPV, HPVV and cervical cancer. After education was provided, the parents completed a post-test. Descriptive statistics were used to for the age, gender, and race of the children as well as the parent type, which parent types were most likely to vaccinate their children, and to analyze the pre-test and post-test results (was there and increase in parental knowledge of willingness to vaccinate their child?). The independent t-test was used to compare the pre-
test and post-test. X of parents participated (% mothers, % fathers, % both, % other),
average age of students was X, (% males, % females), X% an equal number of white and
black students. Of the parent type mothers (X%) were more likely to vaccinate their child
against HPV. X% increase in willingness to vaccinate and X% increase parental knowledge.
pre- (mean, sd) to post (mean, sd) significantly (p=X). Providing education regarding HPV
HPVV, and cervical cancers to parents of young children and teenagers was affective in
increasing the parent’s knowledge and their willingness to vaccinate their child against
HPV. Educating parents in a physician’s office as the child nears the age to receive the
vaccine will prompt questions from the parents providing them with more information to
make a sound decision to vaccinate their child against HPV.

Nie, Ben (G)
Title: Evaluation of in vitro and in vivo intracellular uptake and degradation of sPLA₂
responsive liposome in prostate cancer by LC-MS/MS
Primary Author (and presenter): Nie, Ben
Additional Authors: Cummings, Brian; Arnold, Robert D.
Department: Department of Drug Discovery and Development
College/School: Harrison School of Pharmacy
Description: Secretory phospholipase A₂ (sPLA₂) is increased in various cancers. The lipid
specificity and reactivity of sPLA₂ and its ability to interact with PLA2 receptors (PLA2R)
are potential targets for development of liposome drug delivery systems. However, many
lipids used to prepare liposomal formulations are found endogenously and have biological
isomers that complicate analysis. Thus, one challenge associated with the development and
optimization of liposome nanoparticles is the difficulty to extract them from biological
milieu and to distinguish lipids and their metabolites from endogenous lipids. We
incorporated deuterated lipids in our sPLA₂ responsive liposomes (SPRL) and developed an
acidified Bligh-Dyer extraction method in combination with liquid chromatography tandem
mass-spectrometry (LC-MS/MS) to evaluate their intracellular uptake and degradation in
human prostate cancer (PC-3) cells. The LC-MS/MS chromatograms showed no interfering
peaks from endogenous lipids with d70-DSPC and d35-LysoPC and had lower limits of
quantification of 2 pg (S/N > 10) on column. Analysis of LC-MS/MS results showed an
accumulation of SPRL in tumor based on the quantification of d70-DSPC and its metabolite
d35-LysoPC. The uptake of liposome was coordinated to drug (doxorubicin) disposition.
The d70-DSPC labeled SPRL formulation was also incubated with “wild” and PLA2R
knock-down PC-3 cells for 48 hr. PLA2R knock-down resulted in a significant (p < 0.01)
decrease in the uptake of SPRL based on LC-MS/MS quantification. The observed decrease
further supports the role of PLA2R in the intracellular uptake of SPRL. Deuterated lipids,
such as d70-DSPC and its metabolite were used as MS probes to directly quantify the uptake
and degradation of different liposome nanoparticles. Using this approach, PLA2R was
shown by LC-MS/MS to alter the intracellular uptake of SPRL formulations in human
prostate (PC-3) cancer cells, and determine the in vitro and in vivo uptake of different
formulations.

Njuma, Olive (G)
Title: Radical mechanisms for Catalase-Peroxidase (KatG) activity, inactivation, and
restoration
Primary Author (and presenter): Olive J. Njuma
Additional Authors: Ian Davis, Ndontsa N. Elizabeth, Aimin Liu, Douglas C. Goodwin
Department: Department of Chemistry and Biochemistry
College/School: College of Sciences and Mathematics
Description: Found primarily in bacteria and lower eukaryotes, KatGs decompose H$_2$O$_2$ by two mechanisms. KatG is a non-animal peroxidase by structure, but it is the only member of its superfamily that exhibits catalase activity. Contrary to the paradigm of mutual antagonism between KatG’s two activities, we observed the stimulation of catalase activity by peroxidatic electron donors (PxEDs). A long delay between the conclusion of H$_2$O$_2$ consumption, and the return of the enzyme’s ferric state suggested that catalase-inactive intermediates accumulated during turnover. Adding PxEDs, these events were simultaneous, suggesting that they prevented the accumulation of inactive intermediates by off-mechanism protein oxidation. To investigate this phenomenon, we produced W321F KatG which replaced a likely site of oxidation for off-mechanism electron transfer (Trp321), with non-oxidizable Phe. We also produced R418A KatG to remove an Arg that controls the electronic properties of KatG’s unique Met-Tyr-Try (MYW) covalent adduct. The W321F KatG showed greater unassisted catalase activity than wild-type (WT) and R418A and a correspondingly lesser stimulatory effect from PxEDs. Transient kinetic studies showed the same initial rates of H$_2$O$_2$ consumption by WT and W321F, but this rate diminished more rapidly for WT than W321F. By electron paramagnetic resonance spectroscopy, the three KatG proteins showed the same intermediate (Fe$^{III}$O$_2$• [MYW]$^{•+}$) 10 ms after mixing with H$_2$O$_2$, but at the time of H$_2$O$_2$ depletion, a broad exchange-coupled radical consistent with W321$^{•+}$ was observed for WT and R418A but not W321F. Spectra from longer reaction times (1-5 min) suggested radical transfer to form more distant W$^{•}$ and/or Y$^{•}$ species. The only radical detected when a PxED was included was MYW$^{•+}$. These data suggest that PxEDs enhance KatG catalase activity by preventing the accumulation of inactive intermediates that result from off-pathway protein oxidation, primarily through the proximal tryptophan (W321).

Noor, Matthew (G)
Title: Comparing covalent and non-covalent lysozyme functionalized single-walled carbon nanotube dispersions and composites
Primary Author (and presenter): Noor, Matthew M.
Additional Authors: Goswami, Joyanta; Davis, Virginia A.
Department: Department of Chemical Engineering
College/School: Samuel Ginn College of Engineering
Description: The objective of this research is to explore the dispersion stability and antibacterial activity of aqueous dispersions of single-walled carbon nanotubes (SWNT) stabilized by lysozyme (LSZ). LSZ is a naturally occurring antibacterial enzyme found in hen egg white. LSZ-SWNT dispersions can be processed into high strength films and fibers, but the low dispersion stability hinders processability. It is hypothesized that the covalent attachment of LSZ to SWNT may improve dispersion stability and increase antimicrobial activity by avoiding the depletion-induced aggregation observed in non-covalent LSZ-SWNT dispersions. Covalent attachment was performed using EDC (N-ethyl-N-(3-dimethylamino-propyl) carbodiimide hydrochloride) and NHS (N-hydroxysuccinimide) chemistry on oxidized SWNT. Thermogravimetric analysis, FTIR, and Raman spectroscopy were used to confirm attachment. UV-vis was used to determine the amount of LSZ-SWNT that could be dispersed in water and to quantify the activity against Micrococcus luteus. Non-covalent LSZ-SWNT dispersions had faster initial kinetics, but the activity of the covalent dispersions persisted for a longer duration. This work will also compare...
antibacterial activity and properties of SWNT-LSZ composites with poly(vinyl alcohol) which can be processed into fibers and films.

**O’Connor, Mallory (UG)**
**Title:** Prodigiosin pigment of *Serratia marcescens* bacteria controls energy and biomass production
**Primary Author (and presenter):** O’Connor, Mallory
**Additional Authors:** Haddix, Pryce L.
**Department:** Department of Biology
**College/School:** College of Arts and Sciences, Auburn University Montgomery

**Description:** *Serratia marcescens* is a gram-negative, rod-shaped bacterium with facultatively-anaerobic metabolism. Under aerobic conditions, *S. marcescens* produces a red, hydrophobic pigment called prodigiosin. The pigment is membrane-bound and known to have antibiotic activity against a variety of cells and organisms. However, little is known about prodigiosin’s biological function in the producing cell. Our experiments utilized a continuous culture chemostat to modulate *Serratia* population growth rates between ten and ninety percent of the maximum permitted by an energy-rich medium at 26°C. To determine the effect of pigment on growing bacteria, the ATP contents and yields of pigmented and non-pigmented cells were compared. Consistent with our earlier studies supporting a negative role for prodigiosin in ATP production, we found that non-pigmented cells exhibited higher cellular ATP concentrations across all growth rates. On the other hand, pigmented cells grew to higher yields, particularly at growth rates exceeding 50% of the maximum. Finally, cellular pigment levels correlated with cell yield in chemostat culture, further suggesting a positive role for the pigment in cell production. Considered together, these results reveal a multifaceted role for prodigiosin in the modulation of *S. marcescens* ATP and biomass production.

**Ozden, Burcu (G)**
**Title:** Investigation of defects in AlGaN/GaN heterostructures
**Primary Author (and presenter):** Ozden, Burcu
**Additional Authors:** Khanal, Min P.; Mirkhani, Vahid; Yapabandara, Kosala; Yang, Chungman; Ko, Sangjong; Yoon, Suhyeon; Sk, Mobbassar Hassan; Ahyi, Ayayi Claude; Park, Minseo
**Department:** Department of Physics
**College/School:** College of Sciences and Mathematics

**Description:** Influence of the surface defects have been investigated by using the spectroscopic photo current-voltage (IV), the depth-resolved ultra-violet (UV) spectroscopic photo current voltage (IV) (DR-UV-SPIV), and time-resolved photocurrent (TRPC) spectroscopy measurements. Investigation of the surface defects in the large area AlGaN/GaN HEMTs wafers has great importance, since they limit the device performance due to undesirable current collapses. For device fabrication, the AlGaN/GaN HEMT layers grown on the p-type 6" Si wafer via metal-organic chemical vapor deposition (MOCVD) was diced into 1 x 1 cm individual pieces and two piece were chosen from different locations of AlGaN/HEMTs wafer. Semitransparent Ni Schottky contacts were illuminated with a Xenon lamp by using the same experimental setup in all three measurements. Spectroscopic photo IV measurements revealed the existence of sub-bandgap defects as well as their nonhomogeneous distribution across the wafer. After confirmation of presence of the defects, we have discovered variations in the depth dependent distribution of electrically active defects across the wafer via DR-UV-SPIV measurement. It has found that while one
sample has predominant defects close to the interface of the AlGaN/GaN HEMTs structure the other one has more defects deeper into the bulk. Finally, TRPC spectroscopy with a variable-wavelength sub-bandgap light excitations was performed to understand the different origins of the defects. Even though two samples exhibit the same characteristics for wavelength-dependency on photocurrent generation, dissimilar TRPC spectra was observed for the samples. We have showed that TRPC spectroscopy can be utilized to differentiate the traps which are originated from different reasons but display the similar de-trapping energy. As a conclusion, it was demonstrated that combination of these three spectroscopic measurements can be very useful diagnostic tool for the quick evaluation of the nature and distributions of the surface defects in AlGaN/GaN HEMTs wafer industry.

Page, Sarah (UG)
Title: Pedestrian access and experience
Primary Author (and presenter): Page, Sarah E.
Department: School of Architecture, Planning, & Landscape Architecture
College/School: College of Architecture, Design, & Construction
Description: Everything in our universe is composed of a network of units that have relationships to each other through clearly defined connections. In cities, these connections are made through automotive and pedestrian circulation. The city of Auburn, being in a rural location, caters predominately to automotive travelers while the university places hierarchy on pedestrian circulation. Focus on the pedestrian experience balances the overall circulation. Through the design of a hotel and urban grocery in downtown Auburn, a solution for pedestrian circulation was realized. Pre-existing spaces downtown have potential to be transformed into pedestrian circulation experiences that build off of existing conditions on campus. The design emerged through a series of studies involving movement/rest and compression/release. With the reorganization of space and additional design, the units of downtown create an experience for pedestrian travel that connects people and places with unique circulation solutions.

Paneerselvam, Bavani (G)
Title: Effects of framing on jols and learning choices
Primary Author (and presenter): Paneerselvam, Bavani
Additional Authors: Callender, Aimee
Department: Department of Psychology
College/School: College of Liberal Arts
Description: The framing effect shows that people’s choices differ depending on whether the choice is worded positively or negatively. We investigated how different types of frames can influence JOLs and choices about restudying versus test-taking. Study 1 investigated how goal framing influenced the learning choice, whereas study 2 investigated risky-choice framing. Both studies investigated how attribute framing influenced the JOLs. In study 1, participants received feedback for the initial test and made JOLs for a second test. In study 2, participants made JOLs after studying. Finally, participants in both studies received different frames prior to making their study choice. Consistent with Prospect Theory, when choices were worded positively, attribute framing increased the JOLs (Study 1 and Study 2) and the risky-choice framing increased test-taking behaviour (Study 2). These findings suggest that the framing effect can be used to increase test-taking as a study strategy among students.
**Passantino, Joshua (UG)**  
**Title:** The effects of additives on the optical and mechanical properties of cellulose nanocrystal films  
**Primary Author (and presenter):** Passantino, Joshua M.  
**Additional Authors:** Haywood, Alexander; Goswami, Joyanta; Davis, Virginia  
**Department:** Department of Chemical Engineering  
**College/School:** Samuel Ginn College of Engineering  
**Description:** The objective of this research is to compare the optical and mechanical properties of cellulose nanocrystal (CNC) films containing polymer additives. Cellulose nanocrystals are being increasingly recognized for their potential in advanced materials applications due to their high strength, low density, and natural abundance. For this work, sulfuric acid hydrolyzed CNC (CNC-SA) from wood pulp were obtained from the US Forest Service’s Cellulose Nano-Materials Pilot Plant. Pure CNC-SA films with thicknesses on the order of 0.05 mm were produced by doctor blade coating of aqueous dispersions on a substrate that allows for easy removal after drying. However, these films tend to be very brittle and form cracks during drying. We show that the addition of polymers such as hydroxypropyl cellulose, and polyethylene oxide results in more ductile films with less tendency towards cracking. The addition of HCl to the aqueous dispersion to flocculate the cellulosic material is also examined due to theories outlined in Sing et al. that HCl addition prior to drying reduces crack formation. We also compare the anisotropy of all of the films by comparing tensile properties in both the parallel and perpendicular direction to the shear direction. Film properties were characterized by tensile testing and cross polarized microscopy.

**Pattillo, Tiffany (UG)**  
**Title:** Second thoughts about the Second Amendment  
**Primary Author (and presenter):** Pattillo, Tiffany J.  
**Additional Authors:** Robinson, Matthew; Poitevint, Bobby  
**Department:** School of Communication & Journalism  
**College/School:** College of Liberal Arts  
**Description:** During the first meetings of COMM 3743: Advanced Media Writing—Feature Writing, class sessions centered on defining the distinguishing characteristics of feature writing. As journalism students, we primarily focus on a more direct writing style that emphasizes accuracy, brevity and clarity and a writing structure known as the inverted pyramid. With features, a writer has more flexibility while making narrative and creative choices, striving to develop characters within a story while sticking to the facts. Subject matter within the scope of feature writing is also more liberal than hard news; although the subject must be relevant to the given audience, the topics of feature stories range widely. When deciding the focus of my final writing assignment for the class, I chose a deeply personal, topically relevant subject: gun violence. News stories about acts of gun violence on small and large scales are a daily reality in the United States. Shootings on school campuses and in movie theatres make up far too many of our media headlines. I am a gun owner and enjoy shooting for sport. However, in 2015, I became witness to the effects of gun violence when the father of my lifelong friends was shot dead. The narrative of my feature details this event that has forever changed my friends’ lives, stresses my shifting attitude about guns, emphasizes the widespread national instances of gun violence and explicates Alabama’s existing gun policies. My feature story is an attempt to underscore the necessity of recognition of the gun violence epidemic in this country in order to find a feasible solution.
My poster presentation will be in conjunction with the work of two other students from this class.

Paul, Kyle (UG)
Title: Examining cell viability in relation to PEG length and silica nanoparticle size
Primary Author (and presenter): Paul, Kyle D.
Additional Authors: Kelly, Alexander; David, Allan
Department: Department of Chemical Engineering
College/School: Samuel Ginn College of Engineering
Description: Silica nanoparticles have many advantageous characteristics useful in overcoming barriers to drug delivery. Many of these benefits stem from the size dependent properties silica nanoparticles exhibit. These advantages include passive targeting of tumors and high surface-volume ratios allowing high drug loading. The Stöber method is a technique commonly used to produce silica nanoparticles. Although abundant literature is present on production of particles with a diameter range of 200-400nm, there is a significant lack of information concerning successful production of particles in the range generally studied for drug delivery, 50-100nm. We have produced this targeted application range by systematically adjusting concentrations of the reagents used in the batch reaction. In addition to size dependent properties, surface characteristics have been shown to directly impact drug delivery parameters, including bioavailability and distribution. Polymer coatings, such as poly(ethylene glycol) (PEG), mask nanoparticles from native defense mechanisms in the body and improve half-life upon injection of the therapeutic. Although this approach is highly utilized, its mechanism of action is not well understood, with even less known about effects differing PEG lengths may have. Cellular uptake and viability studies are being conducted with particles coated in varying lengths of PEG. These experiments will provide a standard for comparison from which differences in PEG length are expected to be discovered. Chinese Hamster Ovary cells are being used as a model cell line, given their prevalence in cytotoxicity and uptake literature. Comparisons between particles taken up by cells and those simply associated with cell surfaces will be made using confocal microscopy and flow cytometry. In order to efficaciously determine effects PEG length may have on particle uptake and/or toxicity, significant characterization will be conducted, including silica and PEG concentration determination.

Petri, Jessica (G)
Title: Moving beyond self-report: Construct validation of DSM-5 PTSD using the CAPS-5
Primary Author (and presenter): Petri, Jessica M.
Additional Authors: Lee, Daniel; Silverstein, Madison; Kramer, Lindsay; Weathers, Frank
Department: Department of Psychology
College/School: College of Liberal Arts
Description: Since the revision of the criteria for posttraumatic stress disorder (PTSD) in the Diagnostic and Statistical Manual of Mental Disorder (DSM-5), early research efforts have been made to examine the construct validity of the newly proposed symptoms and four-factor model. However, this literature has been almost exclusively reliant on self-report measures of PTSD symptoms. The current study aimed to extend the current literature by examining the construct validity of DSM-5 PTSD symptoms using the Clinician Administered PTSD Scale for DSM-5 (CAPS-5; Weathers et al., 2013). Participants were 72 trauma-exposed undergraduates who completed the CAPS-5 and the Personality Assessment Inventory (PAI; Morey, 2007). Following procedures outlined by Westen and Rosenthal
(2003), theoretically derived convergent and discriminant associations were examined between DSM-5 PTSD symptom clusters and PAI clinical scales. Substantial effect sizes were observed for the CAPS-5 ($r_{alerting-CV} = .90$, $r_{contrast-CV} = .78$), indicating the pattern of correlations among the CAPS-5 total score and PAI clinical scales was consistent with hypothesized convergent and discriminant associations. When examined by symptom cluster, the intrusion symptom cluster demonstrated the best fit with predicted theoretical associations ($r_{alerting-CV} = .91$, $r_{contrast-CV} = .80$), while negative alterations in cognition and mood was most strongly associated with the CAPS-5 total score ($r = .92$, $p < .01$), even when controlling for negative impression management ($pr = .86$, $p < .01$). Findings indicate that each of the four symptom clusters proposed in DSM-5 are highly predictive of PTSD and provide further support for PTSD’s construct validity. However, negative trauma-related beliefs and affect may be contributing more than other symptom clusters to CAPS-5 ratings of PTSD presence and severity. Limitations for the current study include cross-sectional design and a non-clinical sample.

Pickering, Christina (UG)
Title: Development of gold-lipidic nanocomposites for cancer improved chemotherapeutic delivery
Primary Author (and presenter): Pickering, Christina M.
Additional Authors: Dobson, Connor S.; Eggert, Matthew W.; David, Allan E.; Arnold, Robert D.
Department: Department of Chemical Engineering
College/School: Samuel Ginn College of Engineering
Description: Chemotherapy efficacy is limited by toxicity and tumor drug resistance. Liposomal drug carriers are nano-scale, spherical particles with a phospholipid bilayer surrounding an aqueous core. With increased circulation and improved tumor deposition due to the enhanced permeability and retention effect, liposomes increase treatment efficacy and reduce toxicity. However, the chemistry of many efficacious chemotherapeutics prevents their encapsulation within liposomes and poses a challenge for formulating treatments. Consequently, the development of improved drug delivery technologies is a large area of current drug research. Additionally, drug delivery carriers capable of multi-drug or component delivery are desired because of their flexibility and high applicability. We hypothesized that composite systems, gold nanoparticles within liposomes, may be used to improve drug delivery of both currently used therapeutics and ones traditionally incompatible with liposomal delivery. We previously formulated a novel gold-lipidic nanocomposite to capitalize on the drug delivery capabilities of liposomes and the facile conjugation of gold nanoparticles. Here we present new techniques for the formulation of nanocomposites comprised of 2 nm gold clusters capped with glutathione (G-AuNC) or mercaptosuccinic acid (MSA-AuNC) encapsulated within pegylated, long-circulating “stealth” liposomes. Physical characterization was completed using atomic absorption spectroscopy (gold quantification), dynamic light scattering (size distribution), and cell metabolic assays (cytotoxicity). We also present separation methods for the removal of unencapsulated gold and discuss the strengths and challenges encountered. The nanocomposites show a narrow size distribution centered at 100 nm and exhibit minimal cytotoxicity. These data support our hypothesis that gold-lipidic nanocomposites can be prepared and justify preclinical in vivo studies in murine models of human tumors to improve cancer treatment.
Pinky, Priyanka (G)
Title: Prenatal nicotine exposure and mechanism of memory loss in offspring
Primary Authors (and presenters): Pinky, Priyanka
Additional Authors: Buabeid, M.; Alhowail, A.; Suppiramaniam V.; Bhattacharya, S.; Dhanasekaran, M.
Department: Department of Drug Discovery and Development
College/School: Harrison School of Pharmacy
Description: Maternal smoking during pregnancy has been reported as a strong risk factor for neurobehavioral alteration in offspring. Our experiments with a rodent model of prenatal nicotine exposure (PREN), where nicotine is infused (6mg/kg /day) via mini-pumps to pregnant dams, resulted in cognitive deficits. We demonstrate that basal synaptic transmission and Long Term potentiation (LTP), a widely accepted cellular model of memory, are altered in the hippocampus of the PREN animals. Moreover, amplitude and frequency of AMPA-subtype of glutamate mediated spontaneous excitatory postsynaptic currents (sEPSCs) recorded from PREN hippocampal slices were significantly (p< 0.01) reduced. It is known that altered expression of AMPA receptor and their function modulate memory formation. The deficits in LTP and basal synaptic transmission were accompanied by alterations in the function and expression of synaptic α7/β2 nicotinic acetylcholine receptors (nAChRs). In addition, co-immunoprecipitation studies in rat hippocampi revealed that α7/β2 nAChRs complex with vesicular glutamate transporter (VGlut), postsynaptic density protein-95 (PSD-95) and synapse-associated protein (SAP102). This interaction was disrupted in PREN rats. Interestingly, α7 but not β2 -nAChRs co-immunoprecipitated with ERK1/2. The blockade of α7 nAChR with 50nM methyl nicotine in control animals impaired LTP. Interestingly, western blots studies in rat PREN hippocampi revealed that expression of PSD-95 and SAP102, which are involved in regulating the organization of pre and postsynaptic components of nicotinic and glutamatergic synapses, were significantly decreased in PREN rodents. Taken together, our study suggests that alterations in nAChRs expression and function lead to modified glutamatergic transmission in the hippocampus resulting in memory deficits in PREN rodents.

Plake, Becca (G)
Title: Eating disorder education in the female college-aged population
Primary Author (and presenter): Plake, Becca N.
Additional Authors: Hamilton, Cam
College/School: School of Nursing
Description: The female college-aged population (ages 19-24) constitutes a large percentage of those affected by eating disorders (ED), yet only one in ten will receive treatment. Evidence-based guidelines recommend education, screening techniques, and a multidisciplinary treatment approach to service this population before, during, and after development of an ED. The purpose of this project was to implement an educational presentation to increase knowledge about EDs, available resources, and treatment. Participant knowledge was assessed before and after education. The target population was female college-aged students (ages 19-24). Following informed consent, participants completed a 10-question pretest about EDs. A 20-minute presentation given, covering prevalence, mortality, classifications, resources, and treatment. A 10-question posttest was subsequently administered to determine if knowledge increased. Descriptive statistics were used to describe patient population, knowledge scores, stress level, and ED familiarity (ED presence in self or close relation). Pretest and posttest responses were compared with paired
samples t-tests. X consented to participate, with a mean age of X years (sd). The mean score on the pre-test was X, and on the post-test was X. Knowledge rose by X% on average. The mean stress level was X and the mean familiarity with EDs was X. Mean scores improved from pretest to posttest significantly (p=<0.05). An educational program about EDs for college-aged girls increased knowledge about the disorder, available resources, and treatment. Informative programs about EDs significantly increase awareness and the likelihood that this population will seek treatment, and seek it earlier than their non-educated counterparts.

Porter, Haley (G)
Title: Physicochemical characterization of Nepafenac by Hydroxypropyl-Beta-Cyclodextrin Complex for ocular delivery
Primary Author (and presenter): Haley Porter
Additional Authors: Forrest T. Smith, R. Jayachandra Babu
Department: Department of Drug Discovery and Development
College/School: Harrison School of Pharmacy
Description: Nepafenac is a nonsteroidal anti-inflammatory drug used to treat postoperative pain and inflammation in the cornea following surgeries. The only commercially available dosage form of nepafenac is a suspension, which is not well accepted as it causes irritation of the eye, leading to increased lacrimation which leads to rapid drug removal from the eye. This swift removal of the formulation limits the residence time of the drug, decreasing the bioavailability. We have utilized hydroxypropyl-β-cyclodextrin (HPBCD) to increase the water solubility and transcorneal permeation of the drug. The complexation of HPBCD and nepafenac were characterized in the liquid state (phase solubility study) as well as in the solid state (differential scanning calorimetry, x-ray diffraction, nuclear magnetic resonance). Solid-state complexation was achieved by freeze-drying and rotary-evaporation methods. Trans-corneal permeation of the HPBCD based ocular formulation was compared to that of the nepafenac suspension using pig corneas and the Franz diffusion cell apparatus. Perfusion studies using pig eyes determined which ocular tissues contained nepafenac following administration of the HPBCD formulation compared to the commercial formulation. The stability rate constants for the HPBCD and Nepafenac complex in water and phosphate buffered saline were 3665 M⁻¹ and 4296 M⁻¹, respectively, indicating a strong stable association of nepafenac with the HPBCD. The solid state studies confirmed the existence of complex. In vitro transcorneal permeation studies showed that the HPBCD formulation has a 3-fold higher permeation when compared to the suspension. Perfusion studies revealed that the HPBCD formulation deposited a significantly higher amount of drug into the cornea compared to the nepafenac suspension. The complexation of nepafenac and HPBCD in the solution and solid state was demonstrated. An ocular solution with enhanced trans-corneal permeation of nepafenac using HPBCD was achieved.

Poudel, Jagdish (G)
Title: Trends in species conservation banking in the United States
Primary Author (and presenter): Poudel, Jagdish
Additional Authors: Zhang, Daowei
College/School: School of Forestry and Wildlife Sciences
Description: Species conservation banking is increasingly being identified as a potential policy instrument for the conservation of endangered species and economic incentives for landowners. Since the inception of the species conservation banking program in the United States in 1995, there has been the substantial supply of conservation credits over time.
However, limited public information on the demand of conservation credits, species credit price and transactions, and bank area ownership and management has murky perspectives on the benefits of the conservation banking program. We quantified and analyzed the trends of the species conservation banking program over time. Our preliminary results show that there are 104 species conservation banks, conserving 129 different species on 57,946 acres of land. Since 1995, almost 66% of conservation credits were sold by private firms, generating a total of $57.2 million in revenue. Price per credit range between $1,500- $198,560. This market-based approach is generating specific signals for social entrepreneurship to get involved in solving environmental issues while making a profit. Large urban city area has the highest demand for conservation credits. We conclude that species conservation banking has adopted a business-based habitat planning system with more private ecological services companies attracted towards this ecosystem services market.

Powell, Stephen (G)
Title: A mixed methods analysis of first graders' knowledge and misconceptions of agriculture
Primary Author (and presenter): Stephen Powell
Additional Authors: Eric Hogan, Sean Forbes, Carey Andrzejewski
Department: Department of Educational Foundations, Leadership, and Technology
College/School: College of Education
Description: Agricultural education has not traditionally been a priority of primary school education. Over the course of a semester 41 first grade students from 7 different classrooms participated in a school gardening program in east Alabama. This study is seeking to discover the baseline of first grade students' agricultural knowledge or misconceptions concerning what plants need to survive. The analysis of the students’ knowledge and misconceptions is based on: (1) Accuracy of answers (answered all 3 correctly); and (2) Completeness of answers (answered all 3 questions). The results demonstrate an extremely low knowledge of this basic tenet of agriculture as well as no significant difference between classroom teachers. These results suggest an overall insufficient awareness of agricultural education among first grade students, regardless of teacher or learning experience.

Pruitt, Susan (G)
Title: Population dynamics of the endangered prairie massasauga rattlesnake (Sistrurus catenatus tergeminus tergeminus) at Squaw Creek National Wildlife Refuge
Primary Author (and presenter): Pruitt, Mary Susan
Additional Authors: Grand, Barry; Lepczyk, Chris; McGowan, Conor; Welchert, Darrin
College/School: School of Forestry and Wildlife Sciences
Description: The prairie massasauga (Sistrurus catenatus tergeminus tergeminus), a subspecies of the western massasauga rattlesnake (Sistrurus catenatus tergeminus), is an endangered rattlesnake in Missouri. Populations of the massasauga are thought to be declining due to habitat loss and fragmentation, however, long-term studies of this species are lacking (Durbian et al., 2007). Little is known about the population dynamics of the prairie massasauga, particularly regarding population size, survival probability, and recruitment estimates (Seigel et al., 1997). Very long term data (10-20 years) is likely needed to have rigorous statistical evidence of a decline in population numbers (Seigel and Sheil, 1999). Analyses of mark-recapture datasets for populations of the massasauga would be useful for determining trends in population
numbers and survival (Jones et al., 2012). In this study, analysis of mark-recapture data will be utilized to elucidate life history and ecology patterns of the prairie massasauga population (Bartman and Kudla, 2014). It is necessary to estimate population numbers and survival probabilities to establish a clear picture of baseline population demographics. These estimates can be used to understand the direct and indirect effects of habitat management on demographic rates and long-term studies can be used to understand fluctuations in population dynamics (Bartman and Kudla, 2014). Population estimates, survival probabilities, recapture probabilities, and movement parameters will be determined through the use of population modeling. Since it has been noted that population declines are not uniform across the sexes (Reading et al., 2010), the effect of sex, mass, and body condition (i.e. tail length and snout vent length) on population demographics will also be investigated. The estimates provided may be used to guide management decisions and monitor population changes, as well as to predict patterns of future abundance and survival.

Qi, Yijing (G)
Title: Blood glucose concentrations are not increased by chronic IP Glucagon administration in Leptin-Treated Type 1 diabetic rats
Primary Author (and presenter): Qi, Yijing
Additional Authors: White, B. Douglas
Department: Department of Nutrition, Dietetics, & Hospitality Management
College/School: College of Human Sciences
Description: The overall objective of this research is to increase our understanding of how central leptin administration normalizes blood glucose concentrations independent of insulin in type 1 diabetic rats. It is widely accepted that leptin administration into the brain of previously uncontrolled diabetic animals can normalize blood glucose concentrations, independent of insulin. The mechanism is not understood. Some studies have suggested that leptin acts by decreasing the serum concentration of glucagon. However, we hypothesize that leptin decreases the responsiveness of glucagon by inhibiting cAMP signaling in the liver to normalizing blood glucose concentrations. We performed a study to directly examine whether intracerebroventricular (ICV) leptin administration blocks the ability of chronically high doses of glucagon to increase blood glucose concentrations in streptozotocin (STZ)-induced diabetic rats. Four groups of diabetic rats were examined: 1) leptin-treated (ICV), glucagon-treated (IP), 2) leptin-treated (ICV), vehicle-treated (IP), 3) vehicle-treated (ICV), glucagon-treated (IP), and 4) vehicle-treated (ICV), vehicle-treated (IP). The change in blood glucose concentration of the four groups was determined on a daily basis and during three different conditions: at various times over the circadian cycle, during an 8-hour fast, and following the IP injection of pyruvate. Our study showed that chronic glucagon treatment did not increase blood glucose concentrations of leptin-treated diabetic rats. This was true whether based on the concentration of daily blood glucose, the blood glucose concentration around the circadian cycle, the blood glucose concentration during an 8-hour fast, or the blood glucose concentration in response to an injection of pyruvate. This lack of difference was observed despite the fact that serum glucagon concentrations were 4-9-fold greater in glucagon-treated rats as compared to vehicle-treated rats. This suggests that the serum glucagon concentration does not have to be reduced in order for leptin to normalize blood glucose concentrations.

Rains, John (G)
**Title:** Pathogen removal in algal turf scrubber  
**Primary Author (and presenter):** Rains, John D.  
**Department:** Department of Biosystems Engineering  
**College/School:** Samuel Ginn College of Engineering  
**Description:** Previous algal turf scrubber (ATS) research has demonstrated the ability of these systems to remove or degrade a variety of pollutants from water and wastewater including nutrients, metals and organic chemicals. It is therefore within reason that algal turf scrubbers may also be able to treat polluted water for pathogenic bacteria since the shallow operating depth of these systems allows for significant exposure to ultraviolet (UV) light. Additionally, treatment may be a function of the algal turf itself, which has been shown to trap sediment particles and harbor pathogenic bacteria through the release of ‘sticky’ algal exudates. Although similar algae-based treatment systems such as High Rate Algal Ponds (HRAPs) have been reported to significantly reduce the level of pathogenic bacteria in treated water, insufficient research has been conducted on pathogen die-off in ATS systems. The objective of this research is to determine the rate of pathogen die-off in a lab scale ATS and assign significance to two variables thought to affect pathogen removal in algal turf scrubbers: the generation of photosensitizers from UV light exposure and the trapping and harboring of bacteria by algal turf. The experimental approach of this research utilizes four lab scale ATS reactors that attempt to separate the effect of these variables on the die-off of *Flavobacterium columnare* using treatments with various combinations of algae, visible light, and UV light. It is expected that experimental results will indicate that algal turf in the presence of UV light will have the highest removal of treatments followed by algae in the absence of UV light. The outcome of this research will shed some light on the persistence of pathogenic bacteria within the ATS environment and provide preliminary criteria for design of ATS systems for pathogenic bacteria removal.

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**Rains, Sara (UG)**  
**Title:** Identifying effective community development practices in Ecuador  
**Primary Author (and presenter):** Rains, Sara A.  
**Additional Authors:** Adams, Jessica; Thornton, Kate  
**Department:** Global Studies  
**College/School:** College of Human Sciences  
**Description:** There is a growing body of evidence to support the strategic use of community based development solutions to resolve issues associated with poverty. Most of this data has been collected through cross-sectional research, and there is a gap in the literature evaluating the long-term sustainability of community-based development programs. The goal of this project was to conduct a longitudinal study to evaluate the design, implementation, and success of community based health interventions. The program of interest utilizes community health training and after-school educational programs to empower mothers and equip children to overcome systemic poverty in Quito’s “El Cinturon de la Miseria”, the Belt of Misery. This mixed methods study examines the qualitative and quantitative data collected over a twenty-year period by a local non-profit organization that has partnered with residents of the area. Interviews conducted with program directors and beneficiaries both in Ecuador and the United States supplement the historic data, which includes field notes, photographs, and initial feasibility studies. The preliminary results of this study have shown that community support, ownership, and a long-term commitment to
Project success are crucial to positive outcomes and program sustainability. The findings of this study validate the efficacy of long-term community-based development projects and provide a model for future development practices, proposing a turn from conventional short-term solutions that utilize external inputs.

**Ramezan pour, Bahareh (G)**

**Title:** Exact simulation of polarized light reflectance by particle deposits  
**Primary Author (and presenter):** Ramezan pour, Bahareh  
**Additional Authors:** Mackowski, Daniel  
**Department:** Department of Mechanical Engineering  
**College/School:** Samuel Ginn College of Engineering  
**Description:** The use of polarimetric light reflection measurements as a means of identifying the physical and chemical characteristics of particulate materials obviously relies on an accurate model of predicting the effects of particle size, shape, concentration, and refractive index on polarized reflection. The research examines two methods for prediction of reflection from plane parallel layers of wavelength-sized particles. The first method is based on an exact superposition solution to Maxwell’s time harmonic wave equations for a deposit of spherical particles that are exposed to a plane incident wave. We use a FORTRAN90 implementation of this solution (the Multiple Sphere T Matrix (MSTM) code), coupled with parallel computational platforms, to directly simulate the reflection from particle layers. The second method examined is based upon the vector radiative transport equation (RTE). Mie theory is used in our RTE model to predict the extinction coefficient, albedo, and scattering phase function of the particles, and the solution of the RTE is obtained from adding—doubling method applied to a plane—parallel configuration. Our results show that the MSTM and RTE predictions of the Mueller matrix elements converge when particle volume fraction in the particle layer decreases below around five percent. At higher volume fractions the RTE can yield results that, depending on the particle size and refractive index, significantly depart from the exact predictions. The particle regimes which lead to dependent scattering effects, and the application of methods to correct the vector RTE for particle interaction, will be discussed.

**Rankins, Seth (UG)**

**Title:** Effects of seasonal variation between sexes visiting baited camera sites on population estimates of deer  
**Primary Author (and presenter):** Rankins, Seth T.  
**Additional Authors:** Ditchkoff, Stephen S.  
**College/School:** School of Forestry and Wildlife Sciences  
**Description:** Infrared-triggered camera surveys are frequently used to estimate population parameters of many species of wildlife, including white-tailed deer (*Odocoileus virginianus*). Results from these surveys are heavily dependent upon assumptions regarding animal use of sites that may not be met in field conditions, and violation of these assumptions may introduce bias that compromises the accuracy of survey results. In this study, we used trail camera images of a marked, captive population of white-tailed deer housed in a 175 ha enclosure to evaluate the assumption that male and female white-tailed deer utilize baited sites in a similar manner and investigate potential source of survey bias. We randomly placed cameras set to take pictures at 1 minute time-lapse intervals at 3 baited sites during 3 (Pre-
rut, Rut, and Post-rut), 10-day periods surrounding the breeding season. We used identification numbers found on animal ear tags to determine number and duration (minutes) of visits to baited sites according to sex. We found that both sexes of deer visited sites more frequently during the pre-rut period than during rut or post rut periods; however, males and females did not exhibit between-sex differences in number of visits across all time periods ($\beta = 1.43, SE = 2.24, p = 0.53$). Males and females did, however, exhibit differences amounts of time spent at sites, with males spending fewer minutes at sites during all time periods ($\beta = -2.26, SE = 1.05, p = 0.035$). Our results provide evidence that male and female white-tailed deer may use baited sites differently, and these differences could be a source of problematic bias in surveys. Individuals interested in conducting camera surveys for deer should consider the identified between-sex differences in time spent at baited sites and select picture delay intervals that minimize bias from these sources.

Ransom, Cale (UG)
Title: Comparison of the use of common law in the United States and Sri Lanka
Primary Author (and presenter): Ransom, Cale N.
Department: Department of Justice and Public Safety
College/School: College of Public Policy and Justice, Auburn University Montgomery
Description: Common law is used in several former British territories to varying extents. Two former colonies, The United States and Sri Lanka, both have a mixed statutory and common law system. The United States made efforts after the American Revolution to move away from the system of British common law, but ultimately used a mixed system of codified law and case law. Sri Lanka was originally a Dutch colony, and as a Dutch colony they followed the Dutch system of statutory law. When the British took power in Sri Lanka, they left the old Dutch system of law in place, but added the British court system, including the concept of stare decisis. Because the British system of common law allows for change over time, it is very sustainable in both large and small nations around the world. The comparison between The United States and Sri Lanka will help to show that British common law is a durable system, that works in both large and small nations on opposite sides of the globe with vastly different cultures.

Rashid, MdSanuwar (G)
Title: When do sweatshop allegations negatively impact brands? An entitativity-based account for boundary conditions
Primary Author (and presenter): Rashid, MdSanuwar
Additional Authors: Chattaraman, Veena, PhD.
Department: Department of Consumer & Design Sciences
College/School: College of Human Sciences
Description: Through two studies, our purpose was to understand how consumers react to different brand-types (luxury and non-luxury) and product-categories (symbolic and functional) in the presence of sweatshop allegations. We operationalize sweatshop allegations at two levels: brand-specific (when the stimulus brand itself is accused) and industry-specific (the spillover effect to the stimulus brand from the other brands of the same industry) to illustrate the differential role that ‘entitativity’ plays in consumer reactions to the different brand-types and product categories. Entitativity refers to a group that possesses unity and coherence. We argue that luxury brands and symbolic products are perceived as entitative, and hence will be greater impacted by industry-
specific allegations; whereas users of non-luxury brands and functional products are mere aggregates of individuals, and hence these brands/categories will be more impacted by brand-specific sweatshop allegations. Our findings confirm that for brand-specific allegations, consumer attitudes towards a luxury brand is significantly more favourable than a non-luxury brand, however, for industry-specific allegations, consumer attitudes towards a luxury brand and a symbolic product is significantly less favourable than a non-luxury brand and a functional product. Furthermore, previous literature suggests that entitativity is also perceived differently by consumers who hold differing beliefs about making judgments from social information. In study 2, we apply consumers’ implicit theories (entity and incremental theories) to understand and demonstrate how these consumers have differential reactions towards sweatshop allegations. Our findings from the two studies support the effects of entitativity in luxury branding and symbolic consumption contexts, and offer nuanced implications to brand managers in understanding consumers’ reactions to different levels of sweatshop allegations.

Reece, Jami (UG)
Title: Role of sugary water consumption in adipose gene expression
Primary Author (and presenter): Reece, Jami M.
Additional Authors: Greene, Michael W.; Luo, Yuwen; O’Neill, Ann Marie; Russell, Griffin
Department: Department of Nutrition, Dietetics, & Hospitality Management
College/School: College of Human Sciences
Description: Although obesity is not an infectious disease, one could reasonably describe the state of obesity in the US as epidemic due to the relatively high prevalence that transcends age, gender, and socioeconomic groups. Subsequent conditions linked to obesity include but are not limited to type II diabetes, non-alcoholic fatty liver disease, heart disease and stroke, and even some types of cancer. Although obesity is most closely associated with elevated body mass, it is more accurately diagnosed by excess adipose tissue, which can result from diets high in fat and sugar like those common in the US. To better understand the role of sugar in adipose gene expression, transcriptional profiling using RNA seq was performed in adipose tissues of mice fed a control chow diet, a high fat Western diet (HFWD), and a HFWD with 4% sugary water (HFWDS). We observed 548 differentially expressed epididymal white adipose tissue (eWAT) genes greater than 2-fold in mice fed the HFWDS compared to those fed the HFWD. Quantitative reverse transcription-PCR was conducted on retroperitoneal white adipose tissue and inguinal white adipose tissue in addition to eWAT in order to verify the RNAseq results. Our results confirm expression of key up-regulated and down-regulated genes with diets. Further, statistical analysis revealed that the expression of two key genes also correlated with obesity-associated parameters. The expression of Cacna1e, which was demonstrated to be down-regulated in association with HFWDS, exhibited positive correlation with normalized eWAT mass, and the expression of Glut6d1, which was instead demonstrated to be up-regulated, exhibited positive correlation with blood glucose levels. Additional studies of these genes and their expression in adipocytes will further elucidate their role in adipose tissues. Our findings may pave the way to uncovering novel mechanisms for pathogenesis within adipose tissue and potential targets for therapeutics to treat obesity-linked conditions.

Rege, Shraddha (G)
Resveratrol provides neuroprotection against oxidative damage and memory loss

Primary Author (and presenter): Shraddha D. Rege
Additional Authors: Sruthi Kumar, David Wilson, Geetha Thangiah, Tom Broderick, Ramesh Jeganathan

Department: Department of Nutrition, Dietetics, & Hospitality Management
College/School: College of Human Sciences

Description: Resveratrol is a polyphenolic phytoalexin known to exert anti-diabetic, anti-inflammatory and neuroprotective effects. Various studies have reported a link between obese diabetic state and Alzheimer’s disease. The present study evaluates the neuroprotective action of resveratrol against oxidative stress and proteins associated with memory loss in obese (ob/ob) mice and Aβ-treated H19-7 rat hippocampal cells. Resveratrol was administered orally at the dose of 25-mg/kg-1 body weight daily for 3 weeks to lean and obese (ob/ob) mice and cultured rat hippocampal H19-7 neuronal cell line was pretreated with 75μM of Resveratrol for 2 hrs followed by 25μM of Aβ (1-40) for 24 hrs. Resveratrol treatment did not alter body weight or blood glucose levels in ob/ob mice. The lipid peroxide levels were significantly increased in the brain of obese mice and Aβ-treated H19-7 cells. The enzymic antioxidants such as superoxide dismutase, catalase, glutathione peroxidase, glutathione reductase, glucose-6-phosphate dehydrogenase and non-enzymic antioxidants like tocopherol, ascorbic acid and glutathione were decreased in obese mice brain and Aβ-treated H19-7 cells. Formic Acid fractions in the brain of ob/ob mice and Aβ-treated H19-7 cells were found to have increased expression of Tau, phosphorylated forms of tau (CP13, S202/205; PHF1, S396/404) and glial fibrillary acidic protein whereas decreased expression levels of Insulin Degrading Enzyme (IDE), phospho GSK 3β, synaptophysin, PSD-95, ARC were observed as compared to the control group. Resveratrol treatment attenuated lipid peroxide levels, up-regulated the antioxidant activities and increased the expression of proteins such as IDE, synaptophysin, PSD-95, ARC, and phospho GSK3β involved in neuroprotection. These findings suggest the neuroprotective effect of resveratrol in improving the oxidative damage and memory impairment in the brain of obese mice as well as in Aβ- treated H19-7 cells.

Renfro, Bobbie (G)

Title: Can we swim with the fishes? Impacts of diving tourism on macroalgal grazing behavior by coral reef fishes

Primary Author (and presenter): Renfro, Bobbie L.
Additional Authors: Chadwick, Nanette

Department: Department of Biological Sciences
College/School: College of Sciences and Mathematics

Description: Tropical ecotourism is increasing rapidly, and like most good things moderation is key. Excessive numbers of ecotourists can substantially damage fragile ecosystems. Coral reefs are hotspots for diving and snorkeling ecotourists, but little is known about effects of tourist presence on reef fish behavior. If not sustainably managed, ecotourism can degrade a reef through cascade effects from divers, to fish, down to algal-coral interactions. This degradation defeats the conservation appeal of ecotourism. Coral reef ecotourism is increasing rapidly on the Meso-American Barrier Reef, along Mexico’s Yucatan Peninsula. We assessed effects of tourist presence on the
foraging behaviors of herbivorous coral reef fishes in Akumal Bay, Quintana Roo, Mexico, and quantified current levels of tourism in the bay and the status of the reef benthos. Akumal Bay contains areas with and without intensive snorkeling tourism. Surveys of the abundance of tourists in various sections of the beach and in the adjacent waters revealed clear spatial patterns of use, plus continuing growth of tourism. Herbivorous fishes exhibited immediate short-term behavioral changes in the presence of snorkelers and divers, by switching from foraging and normal swimming, to escaping behaviors. Benthic surveys showed continuing degradation of the corals, especially those in high-tourist areas, since we began studies in 2013. Further studies on the effects of tourist presence on reef fish foraging behavior, and the cascade effects of reduced macroalgal removal that may affect the entire reef system, are needed to provide a more scientific basis for the management of coral reef tourism. Without sustainable management, the high marine biodiversity of coral reefs will continue to degrade, and ecotourism industries will be in danger of collapse.

Richard, Sarah (G)
Title: Quantification of polycyclic aromatic hydrocarbons in biochar
Primary Author (and presenter): Richard, Sarah E.
Additional Authors: Feng, Yucheng; Srivastava, Puneet
Department: Department of Biosystems Engineering
College/School: Samuel Ginn College of Engineering
Description: Mounting concerns regarding fossil fuels and anthropogenic carbon emissions have resulted in an increased interest in biofuels. Biofuels provide a sustainable energy source as well as a potential mechanism for mitigating climate change. Although more studies are necessary in order to ensure sustainability, biofuels may result in an overall carbon negative process through soil application of biochar, a byproduct of pyrolysis. Although biochar has potential to add organic carbon and sequester carbon in soil, the contaminants present in biochar can negatively affect the environment. This study quantified the concentration of total and bioavailable polycyclic aromatic hydrocarbons (PAHs) found in the biochar of feedstocks that underwent slow pyrolysis at 400, 550, and 700 degrees Celsius and biochars produced by gasification at 1100 degrees C. Total concentrations of PAHs were measured using Soxhlet extractions and gas chromatography-mass spectrometry. Bioavailable concentrations were measured using polyoxymethylene passive samplers and Soxhlet extractions of lettuce and soybeans grown in biochar-amended soils. The results of this study will provide information on the potential bioaccumulation of PAHs in crops and will allow researchers to assess public health risks associated with biochar amendment to fields. Policy makers will be able to use the results to determine the potential of biochar amendment as a clean development mechanism under the Kyoto Protocol.

Richardson, Brooke (G)
Title: Urinary tract infections: prevention and management
Primary Author: Richardson, Brooke R.
Additional Authors: Ellison, Kathy Jo
College/School: School of Nursing
Description: Evidence shows the use of bladder catheterization in detecting urine bladder volume to be a key contributor to the percent of those who are catheterized who
develop infections. Evidence-based guidelines suggest the ultrasound bladder scanner (UBS) can accurately detect bladder volume with lower risk of infection and less discomfort compared with bladder catheterization. The purpose of this project was to reduce unnecessary catheterizations and associated UTIs by implementing the use of an UBS. Bladder volume, number of avoided catheterizations and post-procedure patient comfort were assessed. Project population included adults from the post-operative and swing bed units at a small, rural hospital. Qualifying criteria included a need for measurement of post-void residual (Criteria A), a need to determine actual bladder volume (Criteria B) and a need to prevent urinary retention following indwelling catheter removal (Criteria C). Patient agreement to participate in the project was obtained and patient comfort levels were assessed post-procedure. X patients participated. Average age was X years with X % of participants being female. X % (n=x) of participants met Criteria A and X % (n=x) met Criteria C. X % (n=x) of the scans indicated there was no need for catheterization, thus preventing the invasive procedure in X % (n=x) of the scans. Post procedure comfort surveys were completed by X % of participants and recorded a mean discomfort score of X (SD X). Unit infection rates decreased from X% to X% over the course of the project implementation. The findings suggest that replacing bladder catheterization with ultrasound bladder scanning in determining bladder volume is well tolerated and could lead to a decreased infection rate in frail, elderly patients. In conclusion, we support full implementation of the project in this setting.

Ridgeway, Molly (UG)
Title: Sao Paolo women and children’s healing
Primary Author (and presenter): Ridgeway, Molly E.
Additional Authors: Priest, Mally; Stanphill, Caroline; Hoskins, Blaine
Department: Department of Consumer & Design Sciences
College/School: College of Human Sciences
Description: We have chosen Sao Paolo, Brazil for the location. The general design direction for our project is to focus on women and children, specifically pediatrics, perinatal and neonatal care, women's health, and infectious diseases specifically relating to women and children, such as the Zika virus. With this location, comes the challenge of the rising epidemic of the Zika virus. We have to plan for an isolated area to treat this infectious disease because of the possibility of it becoming airborne. In order to plan for this area, we have to design solutions that will help with the treatment and suppression of the virus, such as a fire barricaded wall, separate isolation rooms, and the use of special materials and equipment to halt the spread of the virus. We basically need to create a confined, separate, and specialized hospital within the main structure of the building. We also have to plan for a research area within the walls of the hospital to study the Zika virus. We also must keep in mind the potential threat of air and water quality related issues within the hospital and cases that come through the door, by budgeting for clean and sustainable air and water filters. We are also planning to include a “one-stop-shop” within the hospital that will include a general practitioner, optometrist, and pharmacy. The general design direction we will create is a healing and therapeutic environment with a youthful and energetic feel. With an inspiration of the natural environment, we will focus on natural healing by including day lighting, gardens, and a nature-inspired color palette. Our goal is to create a hospital that offers
affordable healthcare and a comfortable environment for the area’s low-income families, while still offering the luxury of a well-designed healthcare facility.

Riley, Nicole (G)
Title: Immunization education for parents
Primary Author (and presenter): Riley, Nicole T.
Additional Authors: Sanderson, Bonnie
College/School: School of Nursing
Description: There is strong evidence that vaccination rates are influenced by parents’ hesitancy, which has contributed to subpar rates for many childhood immunizations. Evidence-based guidelines recommend educational interventions for parents of children eligible for recommended immunizations. Literature also supports success with community-based settings for interventions. The purpose of this project was to distribute and review an educational tool with evidence-based information to increase parents’ knowledge regarding vaccinations. Parent’s levels of knowledge and vaccination rates were assessed. Target population included parents aged 18 and older with at least one child eligible for CDC recommended vaccinations. Following informed consent, participants completed an immunization survey. Education was conducted face-to-face with an informational handout. A follow up survey was administered after one week to assess for changes in knowledge level. Vaccination rates of the education group were evaluated to determine if an observable change occurred. Descriptive statistics were used to describe the patient population and vaccination rates. Among parents the pre-post immunization survey responses were compared with paired t-tests. X consented to participate (% females), average age of child X mos. X% completed the survey prior to receiving a handout, X % were educated face-to-face, and X% completed the survey after receiving education. Follow up indicated that mean number of correct answers increased from pre (mean, sd) to post (mean, sd) X% increased their knowledge. Vaccine rates #increased after the project was conducted. Educating parents utilizing an informational handout demonstrated an increased level of knowledge about vaccinations. Approaching parents in a community based setting is an appropriate method for providing education about immunizations.

Robinson, Anna (UG)
Title: Irradiance and clownfish sea anemones: Aspects of tentacle morphology and physiology
Primary Author (and presenter): Robinson, Anna C.
Additional Authors: Chadwick, Nanette
Department: Department of Biological Sciences
College/School: College of Sciences and Mathematics
Description: Light exposure is essential to life, providing necessary vitamins to our bodies, and driving primary production through photosynthesis, but unprotected solar irradiance also can greatly damage cells. The effect of irradiance on tentacle shape in clownfish sea anemones has been a topic of speculation because of their ability to produce swellings (bulbs) on their tentacles. The causes of such growth are unknown, but anecdotal evidence indicates a correlation with exposure to irradiance. Bulbs may reduce the negative effects of high irradiance on the anemones, so learning about this mechanism could teach humans how to better protect ourselves from the harmful effects of the sun. This project tested impacts
of irradiance on anemone bulb formation. Anemones were exposed to an experiment in which control groups received no alteration of light, while experimental groups received enhanced irradiance, and changes in tentacle shape were measured. Increased irradiance did not cause significant change in tentacle width, but some anemones developed bulbous tentacles before irradiance was altered; the bulbs rapidly deflated when exposed to darkness. We conclude that removing light may cause bulb deflation, but the enhanced irradiance provided here does not induce tentacle swellings. A second experiment increased ultraviolet irradiance on the anemones and quantified responses of tentacle shape as well as symbiotic microalgal abundance. Microalgal populations were measured monthly, and although they changed dramatically, the changes were not as predicted; anemone tentacles did not change shape. These experiments indicate a possible connection between irradiance (but not UV), tentacle shape, and symbiotic microalgal populations in anemones, but more experimentation is needed. Future projects could isolate UV emission from visible photosynthetic emission to detect the effects of specific wavelengths on sea anemone morphology and physiology.

Robinson, Matthew (UG)
Title: My Everyday Hero
Primary Author (and presenter): Robinson, Matthew L.
Additional Authors: Pattillo, Tiffany; Poitevint, Bobby
Department: Communication and Theater
College/School: College of Arts and Sciences
Description: This article will be a part of a poster showcasing three articles from the AUMNIBUS, AUM's student newspaper. The articles were chosen based on their use of journalistic research as well as overall quality. The authors of each article will co-present a poster of the articles and explain the research process of each. The authors will also touch upon the articles' significance to AUM's student body, as well as why each topic was chosen. This article was written as a profile story of my mother. It details her journey to America and her life since immigrating. In order to write the article, I had to interview my mother and do a lot of research into her past, something that we had not spoken about before. The research process was extremely eye opening and has given me a better grasp of what goes into effective journalistic research.

Roe, David (G)
Title: Effects of supercritical fluid media and a nanoscale catalyst in Fischer-Tropsch fuel production
Primary Author (and presenter): Roe, David P.
Additional Authors: Roberts, Christopher B.
Department: Department of Chemical Engineering
College/School: Samuel Ginn College of Engineering
Description: Fischer-Tropsch Synthesis (FTS) is polymerization process that produces long-chain hydrocarbons and oxygenates along with heat, water, and CO2. As the feed gas—a mixture of H2 and CO—can in turn be produced from coal, natural gas, or biomass, FTS plays a part in providing an alternative to petroleum for the production of many fuels and chemicals. While FTS produces many of the compounds in liquid transportation fuels however, the additional production of light gases, heavy wax, and a large amount of waste heat make the economics of large scale production
challenging. This research aimed to improve the FTS reaction in two ways. First, a nanoscale iron-based carbon-supported catalyst was utilized. Nanoscale catalysts have high surface area per mass, which translates to higher FTS activity. The carbon support is stable, eliminates some difficulties often seen with more traditional supports. Secondly, the reaction was conducted in supercritical hexane. A supercritical reaction medium has been shown to improve product selectivity and activity maintenance by alleviating some of the heat and mass transfer challenges of the reaction. The simultaneous use of both the nanoscale catalyst and supercritical fluid reaction media resulted in an active, stable Fischer-Tropsch catalyst with relatively high selectivity towards valuable hydrocarbon and oxygenate products.

**Root, Michelle (G)**  
**Title:** Bydureon (exenatide QW) in Type 2 diabetes mellitus  
**Primary Author (and presenter):** Root, Michelle H.  
**Additional Authors:** Ellison, Kathy  
**College/School:** School of Nursing  
**Description:** The amount of uncontrolled Type 2 diabetics increases every day. For some, the medications they take do not work and for others, compliance is the issue. The once-weekly (QW) formulation of the glucagon-like peptide-1 receptor agonist exenatide has been demonstrated to improve hemoglobin A1C and FSBS in patients with Type 2 diabetes mellitus. The purpose of this project was to help uncontrolled Type 2 diabetes patients find control over their hemoglobin A1C and FSBS with the use of Bydureon (exenatide QW). Target population included adults (30-70 years) with Type 2 diabetes mellitus in a primary care clinic. Following participant agreement, blood was drawn for HgbA1C levels. The results were reviewed by the nurse practitioner to determine if the patient was eligible to proceed with treatment in this project. If so, Bydureon was prescribed. Follow up appointments were made weekly to assess side effects, average FSBS, and promote adherence to the treatment regimen. After 6 weeks, a follow up HgBA1C was performed. Among the patients who were uncontrolled at baseline, pre-post HgBA1C results were compared with paired t-tests. X consented to participate (% females), average age of X (sd) years. X% was identified as uncontrolled Type 2 diabetics, and X% was treated with Bydureon. Follow ups indicated that X% adhered to treatment. Among those with baseline uncontrolled Type 2 diabetes, the mean HgbA1C, and FSBS results improved from pre (mean, sd) to post (mean, sd) significantly [p =<0.05]. Screening for uncontrolled Type 2 diabetes patients helped guide treatment with an alternate method (Bydureon). Patients treated with Bydureon in this pilot project improved HgbA1C and FSBS, supporting its continued use in this practice as achievable and appropriate.

**Rush, Charles (UG)**  
**Title:** Are you gonna eat that - Global and national food waste  
**Primary Author (and presenter):** Rush, Charles L.  
**Department:** School of Architecture, Planning, & Landscape Architecture  
**College/School:** College of Architecture, Design, & Construction  
**Description:** I began this research for one of my ENVD classes asking the questions relative to the harsh reality of food waste on a global and local scale. Imagine that you have been born into an impoverished environment. Times are tough and meals don’t come easy.
You sit down at the dinner table and the person sitting in front of you has a nice, hot, heaping meal sitting in front of them. This person has more than their fill and leaves a third of their food untouched. Instead of offering you the remainder of the meal, they get up and throw it in the trash leaving you sitting there alone and starving. The first half of my project looks at food waste on a global scale. I gathered data collected from many different environmental websites including, but not limited to, UNEP.org and feedbackglobal.org. The data I gathered informs us on the epidemic of food waste across the globe. The overwhelming food waste statistic that encompasses the globe, is that 1/3 of all food produced is thrown away and wasted. How much is 1/3 of all food produced? Here are some REAL numbers from the United Nations Environment Programme to put this statistic into perspective: One third of globally wasted food is roughly 1.5 quadrillion k cal. Based on the standard 2,500 calorie/day diet, 1.5 quadrillion k cal could feed the earth roughly 235 times over. So the question remains: Why are 1 out of every 9 human beings going to bed hungry? The second portion of my research I focused on the amount of food wasted in the United States alone. Globally we may waste 1/3 of all food produced, but as Americans, we waste 40% of all food we produce. If we consolidated this 40% of waste we could feed 2 billion people annually! Not only does this waste effect those who have less, but it also has an adverse effect on our physical environment. The food wasted in the U.S. accounts for 1/4 of all fresh water consumption and 300 million barrels of oil per year!

Sabey, Allen (G)

Title: “Lots of hugs and kisses”: Expressions of parental love as reported by mothers, fathers, and their children

Primary Author (and presenter): Sabey, Allen K.

Additional Authors: Rauer, Amy; Haselschwerdt, Megan

Department: Department of Human Development & Family Studies

College/School: College of Human Sciences

Description: Given the importance of parental love for children’s healthy development (Shonkoff & Phillips, 2000; Sroufe, 2005), it is surprising that no studies to date have identified how parents demonstrate love and affection to their children. Rather, previous research has largely assumed how parents express their love and how children perceive that love. These assumptions have resulted in a potential discrepancy between researchers’ and lay persons’ conceptualization of parental love. Therefore, the current study drew from a sample of 58 happily married, primarily Caucasian, financially stable couples and their children to examine how mothers ($M_{age} = 35$), fathers ($M_{age} = 37$), and their young children ($M_{age} = 57.5$ months, 43% males) reported that love and affection were typically expressed within their parent-child relationships. Mothers and fathers were individually asked, “What types of things do you do with your children that shows them you feel affectionate or loving towards them?” Children were separately asked, “What types of things does your mommy/daddy do that lets you know she/he loves you?” Transcripts of these interviews were analyzed through an inductive thematic analysis approach (Braun & Clarke, 2006). Results from both parents and children revealed the importance of both physical (e.g., hugs, kisses) and verbal affection (e.g., “I love you”, praise). There were also differences in how mothers and fathers reported commonly expressing their love to their children. For example, fathers reported various forms of play (e.g., wrestling) as an expression of love more frequently than mothers. Lastly, the ways children perceived parental love were
largely similar to the ways parents reported expressing it. These findings provide qualitative support for previously theorized expressions of parental love and inform parenting programs by providing tangible examples of parental love to foster meaningful and healthy parent-child interactions early in the lifespan.

Saha, Partha (G)
Title: Low temperature fabrication process of Microelectromechanical Systems (MEMS) from a renewable and biodegradable source with unique mechanical and optical properties
Primary Author (and presenter): Partha Saha
Additional Authors: Virginia A. Davis, W. Robert Ashurst
Department: Department of Chemical Engineering
College/School: Samuel Ginn College of Engineering
Description: We report a photolithographic fabrication process for making microelectromechanical systems (MEMS) from cellulose nanocrystal (CNC) films. Aqueous dispersions of sulfuric acid hydrolyzed CNC were blade coated onto patterned photoresist layers on silicon substrates. The properties of the resulting films were controlled by many parameters including the initial dispersion concentration, wet thickness, shear rate, substrate roughness, and drying kinetics. Optimization of these parameters alleviated the well documented difficulties with CNC films cracking during drying. Anchored CNC films were fabricated into the following MEMS testing devices: comb drive resonators (CDR), mechanical strength testers (MST), cantilever beams arrays (CBA) and residual stress testers (RST). Preliminary results based on phase shifting interferometry (PSI), polarized optical microscopy (POM) and scanning electron microscopy (SEM) validated that shear induced alignment of CNC can be used to introduce anisotropic mechanical properties in micromechanical devices. Completely freestanding and mechanically flexible arrays of cantilever beams have been fabricated. Additional device design and fabrication process optimization are needed to enable a broader range of structures. This will enable CNC MEMS to be used for investigating the elastic modulus, fracture strength, surface stiction, and residual stress for CNC devices and the development of CNC MEMS for specific applications.

Sahinoglu, Hakan (UG)
Title: Screening of soil microbial isolates for broad antibiotic activity
Primary Author (and presenter): Sahinoglu, Hakan
Additional Authors: Thomase, Patrick; Daniels, Nyeshia; Brasher, Shani; Ingram, Christiane; Okeke, Benedict
Department: Department of Biology
College/School: College of Arts and Sciences, Auburn University Montgomery
Description: The development of antibiotic resistance by pathogenic microorganisms necessitated the search for new antibiotic substances. For example, strains of *Staphylococcus* are responsible for a range of infectious diseases, and treatment of *Staphylococcus* infections is becoming increasingly difficult due to high rates of development of antibiotic resistant strains. Reasons that account for antibiotic resistance by microorganisms include genes for enzymes that inactivate antibiotics, ejection of the antibiotic by plasma membrane proteins, and mutations affecting mode of action of the antibiotic. This research attempts to isolate from soil a potent natural antibiotic substance with broad activity. Soil samples were
collected from Prattville, AL, North-Montgomery, AL, and around the AUM campus in Montgomery, AL. Three random samples were collected from each area and pooled together. Nineteen tentative antibiotic producing isolates were purified by repeated streaking on tryptic soy agar plates. After two screening steps, four isolates, N-1, P-2, P-12, P-13, were selected for further studies. Isolate P13 significantly inhibited *Staphylococcus aureus, S. epidermidis*, and *Citrobacter freundii* suggesting broad spectrum antibiotic activity. DNA based techniques are being employed to characterize the selected isolates.

**Saini, Ekjyot (G)**

**Title:** Neighborhood social fragmentation associations with objective sleep among women

**Primary Author (and presenter):** Saini, Ekjyot K.

**Additional Authors:** Philbrook, Lauren E.; El-Sheikh, Mona

**Department:** Department of Human Development & Family Studies

**College/School:** College of Human Sciences

**Description:** Poor sleep among adults is an area of increasing concern in the United States and around the world. Sleep is a key regulatory process that is associated with individual health and well-being, making it imperative to identify factors that contribute to poor sleep. Research examining social determinants of health indicates that neighborhood contexts can influence sleep, however little is known about how neighborhood characteristics influence adult sleep. This study examined neighborhood social fragmentation, a measure of social cohesion, as a predictor of adult women’s objective sleep outcomes using a multilevel model. Participants were a representative community sample of 181 women (*M* age =37.9 years) who were ethnically diverse (65% EA, 32% AA, 3% Other) and ranged in socioeconomic status (66% ≤ poverty line). Objective assessments of sleep (eg. duration, latency, efficiency) were derived from actigraphy data for seven consecutive nights. Neighborhood social fragmentation was assessed with a composite consisting of the proportion of residents living in the same house for < 5 years, proportion of vacant homes, and proportion of owner occupied homes (reverse scored). Social fragmentation indicators were obtained from the U.S 2012 American Community Survey. The results showed that neighborhood social fragmentation was associated with shorter sleep duration (β = -7.20, *p* < .001), decreased activity during sleep (β = -2.81, *p* < .001) and greater sleep efficiency (β = 1.10, *p* < .05). Analyses controlled for race, age, medication use, season of sleep assessment, cohabitation with a partner, and shift work. These findings indicate that greater neighborhood social fragmentation has complex associations with women’s sleep where reduced sleep activity and improved efficiency may compensate for shorter sleep duration. Future studies should explicate pathways between these sleep characteristics and other aspects of women’s mental and physical health.

**Sajib, Abdul (G)**

**Title:** Evaluation of tumor specific promoters for use in conditionally replicating adenovirus mediated virotherapy of canine lymphoma

**Primary Author (and presenter):** Abdul Mohin Sajib

**Additional Authors:** Samantha Morici, Dr. Maninder Sandey, Dr. Payal Agarwal, Dr. Bruce F. Smith
Transcriptional targeting utilizes tumor-specific promoters driving the expression of genes in a tumor-specific manner to allow replication of the virus in tumor cells while sparing normal cells. Previous studies have shown high levels of expression of several promoters, including human telomerase reverse transcriptase (hTERT), survivin, chemokine receptor 4 (CXCR4) and progression elevated gene 3 (PEG3) in a variety of human cancers and murine models. The exogenous promoter PEG3 from rats has not only shown tumor-specificity in the human model, but has also shown pan-tumor properties with active transcription occurring in almost all tumor cells. None of these promoters have been tested for their potential as a transcriptional targeting tool for canine cancers. Non-Hodgkin lymphoma accounts for 83% of all hematopoietic cancer. Resistance to current treatments has emerged as a critical challenge for lymphoma treatment due to the presence of genetic diversity among tumor cells. These studies explore tumor-specific activity of these promoters with the goal of identifying a suitable canine lymphoma specific promoter to generate transcriptionally targeted conditionally replicating adenoviruses (CRAds) facilitating viral replication in canine lymphoma, but not in normal cells. In this regard, a GFP reporter gene driven by the rat PEG3 promoter was evaluated for activity after transfection into canine lymphoma cells as well as normal canine cells. The activity of the endogenous canine promoters CXCR4, cTERT, and cSurvivin were examined using quantitative reverse transcriptase PCR. Results showed negligible expression differences between normal and lymphoma cells for cTERT and PEG3 whereas cSurvivin and cCXCR4 showed markedly higher expression in tumor cells when compared with most normal cells and tissues. However, cCXCR4 also showed a high level of expression in normal peripheral blood mononuclear cells (PBMC) cells. In contrast, cSurvivin showed increased expression in canine lymphoma cells, along with other canine tumors, with reduced expression in normal canine cells/tissues and PBMCs. These findings will be used to generate a canine lymphoma specific CRAd.

Santiago, Rafael (G)

Title: Coppicing evaluation in the southeast of the U.S. to determine harvesting methods

Primary Author (and presenter): Santiago, Rafael A.

Additional Authors: Gallagher, Tomas V; Mitchell, Dana

College/School: School of Forestry and Wildlife Sciences

Description: Renewable fuels are being tested as an alternative for fossil fuels. For the Southeast of the U.S., the use of woody biomass has been proven to be an excellent source of renewable energy in terms of cost-benefit and availability. Short rotation woody crops (SRWC) are timber plantations with exclusive characteristics that greatly meet intensive wood demand due their fast growth and ability to coppice. Generally, SRWC require more maintenance than other popular woody crops, which might cause elevated costs for the establishment of each new cycle of rotations. However, due to the coppicing ability, the same plantation may be harvested up to 5 times with no need of establishing a new one. There are still uncertainties related to the best silviculture treatments at the harvesting stage and after the sprouting period in order to optimize the volume and vigor of the coppiced stems. The species used on this
experiment are Eucalypt (Eucalyptus urograndis) (Florida) and Cottonwood (Populus deltoides) (Arkansas). The original plots were used on an experiment with different felling methods in different seasons of the year. The plots were revisited two years after harvested to examine the sprouts. This study aims to analyze the coppiced stem’s development through volume gains, shape of sprouts, and mortality rates in order to determine improved methods of harvesting.

Sauer, Alexander (G)
Title: Methylmercury exposure in adolescence saturates memory and enhances psychomotor responding in mice
Primary Author (and presenter): Sauer, R. Alexander
Additional Authors: Boomhower, Steven R.; Newland, M. Christopher
Department: Department of Psychology
College/School: College of Liberal Arts
Description: Human exposure to methylmercury (MeHg), an environmental neurotoxicant that bioaccumulates in fish, is a significant public health issue in the United States and abroad. Adolescence may represent a period of increased susceptibility to MeHg because brain regions that underlie choice and decision making mature during this time. To assess whether adolescent MeHg exposure results in long-lasting behavioral changes, thirty-six male C57Bl/6n mice were randomly exposed to three MeHg exposure groups (n=12 in each): 0, 0.3, and 3.0 ppm MeHg (via drinking water). Exposure lasted from postnatal day (PND) 21 to 60, the murine adolescent period. As adults (PND 300), mice were trained to press a lever for a 0.1-cc droplet of sweetened-condensed milk solution. Lever pressing was placed under a multiple fixed-ratio (FR) schedule of reinforcement in which the number of lever presses for milk delivery increased within a session (FR 1, 5, 15, 30, 60 and 120). Response rates (lever presses/sec) were analysed using Mathematical Principles of Reinforcement, a theoretically-driven model of reinforcement-based learning. Adolescent MeHg exposure decreased estimates of minimum response time, indicating psychomotor enhancement. The highest dose of MeHg also increased saturation rate, indicating that past target responses were less likely to be strengthened by reinforcement. These findings suggest that adolescence may represent a vulnerable developmental window during which neurotoxicant exposure may have long-lasting behavioral effects.

Segars, Jonothon (UG)
Title: The physiological effects of Triadica sebifera on Rhinella marina
Primary Author (and presenter): Segars, Jonothon H.
Additional Authors: Rawls, Brittney; Smith, Gayle; Swann, Christopher
Department: Department of Biology
College/School: College of Arts and Sciences, Auburn University Montgomery
Description: Triadica sebifera, commonly referred to as the Chinese Tallow tree, is a native tree species to Southeast Asia that is invasive to much of the Southeastern United States. Field observations have been made that where there is a large density of Triadica sebifera there is a low density of amphibians. Previous studies have shown that Chinese Tallow tree leaf litter does have a negative effect on amphibian larvae growth and survival. However, to our knowledge no studies have been performed to understand the physiological effects of Chinese Tallow trees on adult amphibians. In order to understand this relationship our
group designed an experiment that looks at the immunologic effect Chinese Tallow trees have on adult *Rhinella marina* (Cane toad, n=30). Our study utilized three different water types (water from a Chinese Tallow infiltrated pond, water from a pond without Chinese Tallows, and then normal tap water). Toads were divided into 3 experimental groups (n=10/group) and each group was given free access to one of the 3 water sources. Blood samples were collected weekly for 9 weeks and tested for phagocytic activity, novel antibody titer, and white blood cell counts. Exposure continued and at 20 weeks of exposure the toads were tested again weekly, for four weeks to measure chronic exposure.

**Setti, Sharay (G)**

**Title:** P301L tau expression exacerbates memory deficits and tau phosphorylation in the aged brain  
**Primary Author (and presenter):** Setti, Sharay E.  
**Additional Authors:** Hungsberger, Holly; Weitzner, Daniel; Rudy, Carolyn; Reed, Miranda  
**Department:** Department of Drug Discovery and Development  
**College/School:** Harrison School of Pharmacy  
**Description:** To date, aging is the greatest known risk factor for Alzheimer’s disease (AD), the most common form of dementia, accounting for 60 to 80 percent of dementia cases. One of the more prominent pathologies indicated in the progression of AD is the formation of neurofibrillary tangles composed of mutant Tau protein. In animal models, this particular pathology is studied by examining mice that express mutant P301L human tau. Unfortunately, though this is the most common approach taken in preclinical mouse trials, it is unclear whether behavioral deficits observed are due to tau expression in an aged brain or prolonged tau expression. Here, we used an innovative model in which expression of P301L tau can be suppressed until mice have aged, allowing us to study the effects of aging independently of prolonged P301L-tau protein expression. Comparing mutant P301L-tau expression in young versus aged mice revealed age-specific disruptions in the Morris water maze and y-maze. In addition, we observed age-related alterations in hippocampal levels of proteins associated with tau pathology not observed in young AD mice.

**Seung-Bickley, Rebecca (G)**

**Title:** Establishing credibility through conflict: An examination of anti-vaccination rhetoric  
**Primary Author (and presenter):** Seung-Bickley, Rebecca  
**Department:** School of Communication & Journalism  
**College/School:** College of Liberal Arts  
**Description:** Within the vaccine debate, both pro and anti sides criticize the decisions of the other, one for endangering children by exposing them to preventable diseases and the other for endangering children by exposing them to toxic chemicals. In this sense, they are diametrically opposed, much like enemies in war. For that reason, this paper explores this controversial topic by comparing the rhetorical strategies used by the anti-vaccination movement to prowar rhetoric. For example, when political leaders presented arguments for invading Iraq due to weapons of mass destruction, they did so by discrediting Saddam Hussein. If Hussein cannot be believed, then any evidence he provided to show Iraq’s innocence would also be dismissed. In much the same way that
politicians justified war by vilifying Hussein, so have vaccine truthers characterized pharmaceuticals. By implying that big pharma places more interest on profit than safety, truthers identified their enemy as a deceitful and corrupt enterprise that cannot be trusted. They then extended this depiction to include all other pro-vaccine sources, like doctors and health organizations. With this demonization, truthers could call into question the motivations of all sources of information, thereby discrediting any outside authority. Without this process of elimination, the anti-vaccination movement would have no credibility. Instead, by rejecting all traditional evidence, they positioned themselves as the true experts, hence the term vaccine truthers. They continue to recommend to parents to become their own experts, which further diminishes the idea of formal expertise. Rather, truthers preferred experience, basing their credibility on their own struggles with vaccinations. Thus, this paper presents a new avenue for exploring how credibility is established through dissenting rhetoric in science and health, which can help to further illuminate the critical issue of anti-intellectualism within subversive movements.

Shakya, Rajdeep (G)
Title: Upgrading of bio-crude obtained from hydrothermal liquefaction of algae
Primary Author (and presenter): Shakya, Rajdeep
Additional Authors: Mahadevan, Ravishankar; Wang, Zhouhong; Adhikari, Sushil
Department: Department of Biosystems Engineering
College/School: Samuel Ginn College of Engineering
Description: Production of renewable fuels and valuable chemicals from aquatic biomass such as algae have recently gained significant attention. The main merit of using algae for biofuel is their high photosynthetic efficiency, faster growth rate and higher area-specific yield relative to terrestrial biomass. Of the different pathways to produce renewable fuels from algae, hydrothermal liquefaction (HTL) has been regarded as an innovative technique due to its acceptance of water as a reactant and reaction medium, which ultimately leads to the elimination of energy-intensive drying process. The bio-crude obtained from HTL of algae have a significant advantages over other biomass sources in terms of calorific value and moisture content. But, the crude oil also has a high oxygen content, high nitrogen content, high viscosity and is acidic in nature which are undesirable for fuel. So, further processing of the algal HTL crude is necessary to overcome this drawback and to make it more desirable as a fuel. In this study, HTL of Nannochloropsis sp. was performed at 320 °C, a holding time of 30 minutes, and solid loading of 15 solid wt.% to produce bio-crude. The bio-crude obtained were further upgraded with five different catalysts (Ni/C, ZSM-5, Ni/ZSM-5, Ru/C and Pt/C) in the presence of hydrogen at relatively lower upgrading temperature of 300 and 350 °C. The upgraded oil had relatively higher heating value (40-45 MJ/kg) and oil yield in the range of 45-80 wt.%. The upgraded oil were further characterized for its physical and chemical properties. Deoxygenation, denitrogenation and desulfurization capability of the catalysts were also studied.

Shannon, Ian (UG)
Title: Value in space: the importance of literary journals and printed material in a digital age.
Primary Author (and presenter): Shannon, Ian D.
College/School: School of Forestry and Wildlife Sciences
**Description:** This paper seeks to answer two research questions: how can literary magazines function as an archive of literary culture, and what value is there in the written/printed word in a digital age. With the evident growth and focus on digital technology in modern society, there is often a push for entities like literary magazines or book publishers to shift to more of a digital position than a print one, but much more value can be seen when such entities choose to remain and continue to produce in print. The paper analyses the *Southern Humanities Review* specifically, a literary magazine produced through Auburn University, and includes interviews with its managing editor, Dr. Aaron Alford, as well as other sources to support both questions. The paper uses these sources, as well as the writer’s voice and analysis, to argue that not only do entities such as literary magazines serve as cultural archives, printed material such as this has value in the space that we give it, and because such entities have such value they will continue to remain a part of our modern society.

**Shepp, Kasey (UG)**
**Title:** Exploring genetic associations between hydroxy-carboxylic acid receptors and hereditary breast cancers
**Primary Author (and presenter):** Shepp, Kasey J.
**Additional Authors:** Chandler, Madison; Merner, Nancy
**Department:** Department of Drug Discovery and Development
**College/School:** Harrison School of Pharmacy

**Description:** Breast cancer (BC) susceptibility genes harbor variants or mutations that increase an individual’s risk of developing hereditary BC. BRCA1 and BRCA2, the most common BC susceptibility genes, specifically play a role in homologous recombination repair (HRR); since discovery, HRR has become a target of cancer therapy by using PARP inhibitors. This promising therapy can potentially help any individual with a germline mutation in a BC susceptibility gene that is involved in DNA repair. Unfortunately, all known BC susceptibility genes only explain ~30% of hereditary BC cases, leaving ~70% of hereditary BC cases genetically unexplained. G protein coupled receptors (GPCRs) have a wide array of functions and are very common therapeutic targets. Recently, O’Hayre et al. demonstrated that GPCRs are associated with tumorgenesis, and deep sequencing studies have revealed that 20% of human tumors have mutations in GPCRs. Thus, GPCRs could be therapeutic targets for more personalized cancer treatment or prevention. More recently, a group of three GPCRs classified as hydroxy-carboxylic acid receptors (HCAR1, HCAR2, and HCAR3) were found to have an effect on cancer proliferation. The expression of HCAR1 and HCAR3 has been shown to be crucial for BC cell metabolism and survival; however, HCAR2 has been classified as a BC tumor suppressor. According to Exome Variant Server, variants in HCAR1, 2, and 3 are extremely rare. Interestingly, HCAR genetic variants and their association with hereditary BC has not been investigated. They have generally been overlooked as potential BC susceptibility genes because of their connection to metabolism rather than DNA repair. My research will involve screening the HCAR genes in an Alabama BC cohort, using polymerase chain reactions and Sanger sequencing, in order to discover novel variants that increase risk of BC and, ultimately, identify individuals who may benefit from personalized therapies that target these hydroxy-carboxylic acid receptors.

**Shirley, Pamela (G)**
**Title:** Evidence based practice and cardiac chest pain; Motivating nurses to embrace EBP versus tradition
Primary Author (and presenter): Shirley, Pamela S.
Additional Authors: Hamilton, Cam
College/School: School of Nursing
Description: Traditional nursing care of patients experiencing cardiac chest pain includes use of morphine, oxygen, nitrates and aspirin (MONA). Informing nurses of the most current clinical practice guidelines (CPG) for non ST elevated MI and acute coronary syndrome (NSTE/ACS) is the purpose of this project. The American Heart Association and the American College of Cardiology have recently updated the CPGs for NSTE/ACS based on current best evidence pointing to a need to reconsider traditional use of both supplemental oxygen and morphine (Amsterdam et al., 2014). Motivating nurses to provide evidence based care informed by these guidelines is the goal of this project. Target population was nurses of a hospital. Participants signed consent. A pre-test measured nurse knowledge of the current AHA/ACC 2014 CPGs for NSTE/ACS and a self-assessment of willingness to implement best evidence. Demographic data was also collected including area, time in practice, age and gender. Following the pretest, an educational intervention was implemented in the form of an in-service with handouts listing the AHA/ACC 2014 CPGs for NSTE/ACS followed by a post-test repeating the test of knowledge of the CPGs and self-assessment of willingness to implement best evidence. The two tests were compared and statistically analyzed by the project leader to determine the level of change in nurse knowledge and willingness to exercise evidence based practice (EBP). 29 consented to participate. 92% were female. 10% were masters of science nurses (MSN), 45% bachelor degree nurses (BSN) 38% associates degree nurses (ADN) and 6% licensed practical nurses (LPN). Results indicated that X% increased (?) significantly (p=<0.05) in knowledge and willingness to implement EBP. Educating nurses using best evidence motivates implementation of EBP. Ongoing education will motivate nurses to rethink and make changes to traditional nursing practice for patients presenting with NSTE/ACS.

Shrestha, Anshu (G)
Title: Bench scale analysis of off-gas emissions from stored loblolly pine grinds
Primary Author (and presenter): Shrestha, Anshu
Additional Authors: Fasina, Oladiran; Wood, Wes; Loxley, Thomas; Wang, Zhouhong
Department: Department of Biosystems Engineering, Department of Crop, Soil and Environmental Sciences
College/School: College of Engineering; College of Agriculture
Description: Woody biomass emits condensable and non-condensable gases and volatile organic compounds when stored in humid environments for extended periods, a process known as off-gassing. The rate of off-gassing changes as the temperature, time of storage and quantity of material increases, which could potentially bring about changes in chemical composition and physical properties of the biomass. In this study, loblolly pine grinds at two particle sizes (1/8 inch and <1 mm), 10% moisture content and headspaces (25% and 50%) were tested for off-gas emissions (CO, CO₂, and CH₄) and volatile organic compound emissions during a storage period of 30 days. Glass test containers with air tight gas-collection ports were used to conduct the experiments at room temperature and in an oven set at 60°C. The preliminary results indicate that the concentrations of CO ranged from 100 ppm – 9,000 ppm and were the highest at 60°C for both particle sizes and headspaces than at room temperature. The concentration of CO₂ ranged from 500 ppm – 61,000 ppm and
were the highest also at 60°C for both particle sizes and headspaces than at room temperature. Volatile organic compounds that were released during the course of the study were mainly terpenes and aldehydes. This study shows that gas emissions (CO, CO₂) and the release of volatile organic compounds from loblolly pine grinds stored at 60°C is much higher for both particle sizes and headspaces than at room temperature. The gas emission results from this study reiterates the importance of eco-friendly and safe storage. The potential hazards from gas emissions will require development of proper safe handling procedures of stored biomass.

Silverstein, Madison (G)
Title: A model of risky sexual behavior on college campuses: The role of sexual victimization history, sexual sensation seeking, alcohol use, and masculinity
Primary Author (and presenter): Silverstein, Madison W.
Additional Authors: Fix, Rebecca; Alexander, Apryl
Department: Department of Psychology
College/School: College of Liberal Arts
Description: With the high costs associated with consequences of risky sexual behavior (RSB; e.g., pregnancy, STIs, sexual assault), reducing RSB on college campuses is a high priority (CDC, 2014). In fact, research has found a positive association between sexual victimization history (SVH) and RSB (Champion et al., 2004). However, other malleable factors such as alcohol use (AU) and sexual sensation seeking (SSS) might contribute as mediators to the link between SVH and RSB as both are associated with SVH (Miller et al., 1993) and RSB (Cooper, 2002). Additionally, masculine attitudes (MA) have been found to be associated with RSB (Shearer et al., 2005), AU (De Visser et al., 2006), and sensation seeking (Ongen, 2007). Therefore, MA might play a moderating role in the associations between SVH and these mediating factors. Participants were 493 undergraduate students. They completed the Alcohol Use Disorders Identification Test (WHO, 1982), Sexual Sensation Seeking Scale (Kalichman et al., 1995), Risky Sex Scale (O’Hare, 2001), Auburn Differential Masculinity Inventory (Burk et al., 2004), and Sexual Victimization History Scale from the Juvenile Victimization Questionnaire (Finkelhor et al., 2005). A moderated mediation model was run examining the association between SVH and RSB, with SSS and AU tested as mediators of the relationship between SVH and RSB. Further, MA was tested as a moderator of the mediated relationship between SVH and the aforementioned mediator variables. Results indicate that AU and SSS account for the association between SVH and RSB and that higher levels of MA lead to higher levels of AU, SSS, and RSB. Therefore, individuals with a SVH might be at a higher risk for AU, SSS, thus putting them at higher risk for RSB, particularly those who have higher levels of MA. Policy implications include incorporating AU interventions into university curriculum and examining campus organizations that propagate hypermasculine attitudes.

Skjellum, Hannah (UG)
Title: “His love was in the earth…his love was faraway feeding on the rain”: Other Voices, Other Rooms and mutable queer spaces
Primary Author (and presenter): Skjellum, Hannah H.
**Department:** Department of English  
**College/School:** College of Liberal Arts  
**Description:** In this presentation I propose to discuss the early criticism of Truman Capote’s *Other Voices, Other Rooms* and how this criticism sought to reduce the importance of queer spaces that play pivotal roles in the text. Queer spaces present in both this text and in the world refuge from the dominant, heterosexual spaces that are normalized, called heteronormative spaces. In Capote’s text, queer spaces present themselves to main character Joel throughout his journey of queer self-discovery; often these spaces appear in contention with heteronormative culture and spaces. The identity cultivated by other queer characters in the text depends upon this interplay of queer and heteronormative and the different kind of queer spaces—transient, physical, and metaphysical—and how this interplay shapes acceptance or rejection of queer identity. Research and criticism of Capote’s *Other Voices, Other Rooms* historically depends upon a Freudian dichotomy of the ego and the id as outlined in Dianne B. Trimmier’s article “The Critical Reception of Capote’s *Other Voices, Other Rooms*”; however, I propose that Trimmier’s treatment of the text and the previous criticism following this logic fails to recognize the importance of queer and heteronormative space in favor of analyzing the psychological framework of the text—psychological framework that devotes itself to demonizing Joel’s journey through these spaces rather than attributing the importance of the spaces to his queer identity and the queer identities of the characters around him. Through this argument, this presentation will reconstruct the importance of those spaces to the core of the text and decenter the importance of the Freudian criticism from Trimmier’s article.

**Slade, Abbie (UG)**  
**Title:** Auckland city women and children’s hospital  
**Primary Author (and presenter):** Slade, Abbie P.  
**Additional Team Members:** Barnes, April; Thomas, Avery; Williams, Erin  
**Department:** Department of Consumer and Design Sciences  
**College/School:** College of Human Sciences  
**Description:** Our hospital, located in Auckland, New Zealand along the Hobson Bay, will focus on serving pediatrics and obstetrics needs as an extension hospital to provide more healthcare services to women and children. Auckland is expecting a large population increase due to an increase from immigration. It is also necessary to take into account the rapidly growing aging population in New Zealand. With a holistic wellness approach the hospital will incorporate alternative medical approaches including spaces such as yoga and fitness studios, meditation spaces, and biophilic design features. When dealing with the location, it will be important to consider the high humidity levels year round, especially since it is located near a large water source. Summer heat needs to be taken into account when developing the design of the hospital as it has proven to be a major problem both from the health perspective and the energy conservation perspective. The bay may also cause problems with general access and emergency access to the hospital and emergency room. Our design recognizes the issues the area faces and aims to better serve the needs of women and children of Auckland.

**Slear, Susan (G)**  
**Title:** A qualitative method to promote equivalency in distance learning  
**Primary Author (and presenter):** Slear, Susan E.
**Additional Authors:** Slear, James N.

**Department:** Department of Educational Foundations, Leadership, and Technology

**College/School:** College of Education

**Description:** This action research seeks to establish a method for promoting more equivalent learning outcomes between leadership courses taught in both resident and distance learning formats. Both courses teach foundational leadership concepts, such as introspection, vision, and goal setting, and have advanced assessments where students apply foundational leadership concepts in the context of their personal and professional experience. The resident students continuously collaborate on their practicum while the distance-learning students work independently. As a result, the distance-learning students do not benefit from the exposure to varying and often conflicting perspectives shared among the resident students. This creates a gap in learning outcomes where distance-learning students are shaped only through their interaction between the curriculum and their individual personal and professional experiences where the resident students’ learning is further influenced by exposure to diverse ideas. To lessen this gap, this research seeks to learn about the distance learning population through qualitative analysis of their capstone leadership essay, the Personal Leadership Development Plan. The analysis identifies thematic groupings, which describe various leadership-related perspectives. These themes represent the diversity of thought and experience found within the student population. Each theme offers curriculum developers the chance to design course content specifically targeting students existing perspectives on various leadership topics. By challenging their values and perspectives as identified in the themes, the distance learning curriculum could fill the void created by the lack of collaboration present in the resident course and create the context for a more equivalent outcome.

**Sloan, Arthur (UG)**

**Title:** Single-Walled carbon nanotube dispersion in a complex microbiological medium

**Primary Author (and presenter):** Sloan, Arthur W. N.

**Additional Authors:** Santana-Pereira, Alinne L. R.; Goswami, Joyanta; Liles, Mark R.; Davis, Virginia A.

**Department:** Department of Chemical Engineering

**College/School:** Samuel Ginn College of Engineering

**Description:** This research examines the ability of Tryptic Soy Broth (TSB), a growth medium commonly used to cultivate bacteria, to disperse single-walled carbon nanotubes (SWNT). There has been notable research into how specific proteins and biological macromolecules interact with SWNT; however, relatively little is known about SWNT’s interactions with complex microbiological media. The dispersions examined in this study were prepared via probe ultrasonication of SWNT and TSB mixtures in the 0.05 wt% to 0.1 wt% range at 60W for 30 minutes. These dispersions were then subjected to centrifugation for 1 hour at 17,000 x g. The resulting supernatants were analysed via various methods including ultraviolet-visible spectroscopy and ATR-FTIR spectroscopy in order to characterize the ability of TSB to disperse SWNT. Dried samples were analysed with atomic force microscopy, scanning electron microscopy, optical microscopy and infrared spectroscopy in order gain additional insight into TSB-SWNT interactions. These results combined with earlier work on SWNT-lysozyme interactions suggest that π-π stacking interactions between SWNT and the amino acid tryptophan are a key factor in polypeptide
based dispersion. The ability to disperse SWNT in biologically relevant media provides a starting point for further research to assess possible SWNT interactions with pathogenic bacteria without concerns about the antimicrobial properties of the dispersion medium. This research could also be used to facilitate identification of new peptide based dispersants.

**Smith, Gayle (UG)**

**Title:** *spes, please: A screen for new spermatogenesis defective mutants in the nematode C. elegans*

**Primary Author (and presenter):** Smith, Gayle G.

**Additional Authors:** Yoon, Kwan; Robbs, Emily; Heo, Won; Kroft, Tim L.

**Department:** Department of Biology

**College/School:** College of Arts and Sciences, Auburn University Montgomery

**Description:** In order for fertilization to occur, a sperm and egg must fuse to form a zygote. Understanding more clearly the molecular interactions of fertilization could have beneficial clinical applications both for the treatment of infertility and for the development of new contraceptives. We use the nematode worm *Caenorhabditis elegans* as a model for studying sperm-egg interactions during fertilization. Because it exists as either a male or a hermaphrodite, hermaphrodites can produce self-progeny or, in the presence of males, outcross-progeny. These features provide researchers with a powerful tool for the discovery of new fertilization-defective mutants. A screen was performed to look for new fertilization defective alleles. Hermaphrodite worms were mutagenized with EMS and screened for spermatogenesis defects that render the hermaphrodites self-sterile. These worms were then mated to males that produce wild type sperm, which rescue the sterility defect, allowing production of progeny. This screen produced many mutants. Each of the mutants was outcrossed seven times to wild type males to eliminate other mutations present in the genome. Fifteen *spermatogenesis defective (spe)* mutants survived seven rounds of outcrossing and re-selection for the sterility defect. During the outcrossing process, we determined that many of these mutants were temperature sensitive, showing the sterility defect at 25°C, but not at 16°C. We have begun preliminary mapping for several of these mutants, determining on which of the six *C. elegans* chromosomes they lie. Our ultimate goal is to define new genes that are required for fertilization. Any gene that, when mutated, results in a sterile phenotype is, by definition, required for fertilization in wild type nematodes. Many of these genes will have homologs in other species, suggesting that they also function in the same process.

**Sokienah, Yaman (G)**

**Title:** General hospital for low-income community

**Primary Author (and presenter):** Sokienah, Yaman Y.

**Department:** Department of Consumer & Design Sciences

**College/School:** College of Human Sciences

**Description:** Problem: The problem is to design a general hospital that serves the downtown area of New Orleans, LA. The target customers or beneficiaries of this project are the low-income people, who work hard to have a living while they cannot afford maintaining their health. The main goal of this project is to provide a high-end healthcare services to the people who are located close to New Orleans Downtown to get the appropriate healthcare because of the low number of healthcare facilities in that area due to the damage from Katrina Hurricane. In addition, it serves as a starting point to start building and providing such facilities in such locations. The project is translating and
transforming a solution to a national and international issue of providing healthcare facilities for low-income communities, that needs more attention from governments, society, healthcare providers, insurance companies, architects, and designers. The main idea of the project is providing a general hospital that can treat as much people as possible at a lower cost and high quality service. The project will have different departments from emergency, diagnostics, reaching to the major surgeries. The space will be having a friendly and less stressful environment, through the application of evidence-based design principles. At the same time, the building will contain other facilities that support the people and the community who visit the center not just for healthcare issue, but they can make use of their time and money to do other things at low-cost.

Sparks, Minju (G)
Title: Healthy heart lifestyle intervention for women at high risk and/or diagnosed coronary heart disease
Primary Author (and presenter): Sparks, Minju E.
Additional Authors: Sanderson, Bonnie
College/School: School of Nursing
Description: Evidence based guidelines recommend that gender specific interventions in women’s heart disease management can reduce mortality and adverse events. The project’s purpose was to develop a plan, specific to women, to incorporate healthy lifestyle behaviors. Patient adherence to recommendations and changes in lifestyle behaviors were assessed. Target population included women (18 years and older) diagnosed or at high risk for coronary artery disease in a primary care clinic. Following informed consent, participants completed a questionnaire regarding their lifestyle habits. Participants were counseled on healthy heart lifestyle behaviors. A follow-up phone call at 4 weeks was made and participants completed a post-questionnaire. Outcomes measured included amount of days women adhered to diet, exercise, and medication recommendations. Results from the initial questionnaire and post-questionnaire were compared. Descriptive statistics were used to describe patient population, lifestyle behavior trends, and adherence to recommendations. Difference in lifestyle changes were compared with paired-t-test based on the number of days they adhered to lifestyle behaviors. X women consented to participate, average age of X (sd) years. X% were identified to be a high risk, X% were identified to be diagnosed with coronary heart disease. In comparison to pre-questionnaire, post-questionnaire revealed that X% adhered to diet recommendation, X% adhered to exercise recommendation, X% adhered to smoking cessation, and X% adhered to medication recommendation. Data compared from pre-questionnaire (mean, sd) and post-questionnaire (mean, sd) improved significantly (p=0.05). Assessment of current lifestyle behaviors on women with heart disease identifies appropriate treatment and recommendations and helps to improve self-management behaviors. Early lifestyle intervention and counseling specific to women is applicable in a primary care setting.

Spencer, Robin (G)
Title: Improving health literacy in type II diabetic patients
Primary Author (and presenter): Spencer, Robin L.
Additional Authors: Ellison, Kathy Jo, PhD, RN
College/School: School of Nursing
**Description:** Current data suggest a strong link between limited health literacy and poor health outcomes, this becomes most apparent with the Type II Diabetes Mellitus patient population. Evidence-based guidelines indicate the need for individualized patient education in the diabetic population. The purpose of this project was to evaluate the efficacy of individualized education based upon the patient’s health literacy assessment scores. Patient blood glucose levels and self-care confidence levels were assessed to evaluate for efficacy. Target population included adults (21-80 yrs) with type II Diabetes Mellitus seen in the primary care setting for disease management. Following participant agreement, they completed the Stanford Diabetes Self-Efficacy Survey (DSES). The nurse then administered the Newest Vital Sign (NVS), a health literacy risk assessment tool. The physician and nurse provided education tailored to the health literacy level of each patient. Descriptive statistics were used to describe the patient population, blood glucose levels (Hgb A1C), and diabetes self-efficacy score. The pre-post DSES responses and blood glucose levels were compared with paired t-tests. X consented to participate (% females), average age of X (sd) yrs. The mean DSES scores improved from pre- (X mean, X sd) to post (X mean, X sd) significantly (p=<0.05) and the mean Hgb A1C level improved from pre- (X mean, X sd) to post (X mean, X sd), but this improvement was not significant. Providing patient education based upon the health literacy levels indicated on assessment gives a significant increase in confidence of self-efficacy in the diabetic population. Implementation of individualized education tailored to patient health literacy levels is both feasible and effective.

**Spina, Stephanie (UG)**

**Title:** Studying the noncoding genome, specifically microRNAs, to identify novel breast cancer genetic risk factors

**Primary Author (and presenter):** Spina, Stephanie M.

**Additional Authors:** Chandler, Madison; Merner, Nancy

**Department:** Department of Drug Discovery and Development

**College/School:** Harrison School of Pharmacy

**Description:** Although many risk factors influence the development of breast cancer (BC), genetic risk factors are reported to contribute to hereditary BC, which is characterized by early age of onset and a family history of BC and other cancers. Genetic risk factors can be grouped based on risk of developing BC: high, moderate, and low risk variants. Genes with these risk variants are referred to as BC susceptibility genes. Only ~30% of hereditary BC cases are considered genetically solved with rare variants of high and moderate risk identified; the majority in DNA repair genes. Identifying the genetic risk factors that contribute towards the ~70% of hereditary BC cases that remain genetically unsolved will require unbiased approaches that involve exploring the noncoding portion of the genome. The goal of this research project is to search for variants in microRNAs that could potentially contribute towards BC development and account for a portion of the genetically unsolved hereditary BC cases. MicroRNAs, or miRNAs, are small RNA sequences that are noncoding and regulate genes post-transcriptionally. To do so, miRNAs have specific mRNA targets that they bind to in order to inhibit gene expression. Thus, inherited genetic variants within miRNA sequences that target tumor suppressor genes or oncogenes can alter expression and increase cancer risk. Most studies that have investigated the role of miRNAs on BC risk have carried out case/control SNP analysis under the “common allele, common disease hypothesis.” Meaning, common (low penetrant) SNPs that are known to be within
miRNA sequences are specifically genotyped to note differences in allele occurrences between cases and controls. Fully sequencing miRNA genes is a rarer approach but can identify rare variants of high or moderate risk that can explain familial risk. In 2009, Shen et al. Sanger sequenced 17 miRNAs known to regulate BC susceptibility genes and identified seven rare variants; two of which (one each in miR-17 and miR-30c-1) were demonstrated to alter the expression of the mature miRNA. I am screening the miRNA families of both miR-17 and miR-30c-1 through PCR and Sanger sequencing in order to validate the previously suggested miRNA-BC risk associations and find new associations using Dr. Merner’s Alabama hereditary BC cohort.

**Spitzer, Elizabeth (G)**

**Title:** Examining the relationship between PTSD symptom clusters and the acquired capability for suicide using DSM-5 criteria

**Primary Author (and presenter):** Spitzer, Elizabeth G.

**Additional Authors:** Zuromski, Kelly; Davis, Margaret; Witte, Tracy; Weathers, Frank

**Department:** Department of Psychology

**College/School:** College of Liberal Arts

**Description:** Despite the breadth of research supporting the link between PTSD and suicidal behavior (e.g., Nock et al., 2009), little research has focused on the mechanisms by which these mental health outcomes are related. One theoretical framework that may help explain this relationship is the interpersonal-psychological theory of suicide (IPTS; Joiner, 2005). According to the IPTS, for fatal self-injury to occur one must have increased fearlessness about death and pain tolerance, which constitute acquired capability for suicide (ACS; Van Orden, 2010). Limited research exists on PTSD symptom clusters and ACS. Bryan and Anestis (2011) found a significant relationship between ACS and the re-experiencing symptom cluster. Zuromski et al. (2014) found no relationship between ACS and re-experiencing symptoms and instead found that the anxious arousal cluster was negatively associated with fearlessness about death and the numbing symptom cluster was positively associated with pain tolerance. The primary aim of the current study is to resolve the discrepant findings of these two studies and extend them to DSM-5 criteria. Procedures: Participants are 619 undergraduates who have experienced a DSM-5 Criterion A traumatic event. Multiple regression will be used to examine relationships between PTSD symptom clusters and both facets of ACS. Results: Data collection was recently completed; analyses will be conducted by March 1, 2016. Based on previous findings, we hypothesize that anxious arousal symptoms will be negatively associated with fearlessness about death, numbing symptoms will be positively associated with pain tolerance, and that re-experiencing symptoms will be positively associated with both facets of ACS. Implications: Our findings will elucidate the relationship between PTSD symptom clusters and a theoretical mechanism proposed to underlie suicidal behavior (i.e., ACS), which may enhance understanding of the high rate of suicidal behavior among individuals with PTSD.

**Stacey, Melanie (G)**

**Title:** Adolescent restraint and seclusion educational process improvement initiative.

**Primary Author (and presenter):** Stacey, Melanie V.

**Additional Authors:** Hamilton, Cam

**College/School:** School of Nursing
**Description:** Evidence shows that early detection and response to aggression can lead to a decrease in the use of restraints and seclusion. The project location was a hospital with high rates of restraint and seclusion use in adolescent populations. The need to reduce the use was recognized for the facility to be compliant with CMS guidelines and for safety of the patients and staff. The purpose of the project was to provide education on early identification of aggression to prevent use of restraints or seclusion. The population was nurses on an adolescent psychiatric unit. A pre-education questionnaire was distributed to the nurses. After completing the questionnaire, an educational poster was displayed on the unit for review. The poster included evidence-based techniques to reduce aggression in adolescents. The nurses were required to review the poster. The nurses also completed a questionnaire one month post-education. The pre and post education restraint data collected were compared to determine if there was a decrease in restraint/seclusion use post-education. X nurses completed the questionnaire (n=X). The mean age was X (SD), X% was female, X% was male, X% had an ADN, X% had a BSN, X% had other, X% worked AM shift, X% PM shift, and mean years of work experience was X (SD). Post-education restraint data from February and March were compared to pre-education restraint data from January. This showed a significant reduction in restraint use post-education (p=X). Educating nurses on ways to reduce aggression in adolescent psychiatric patients demonstrated significance in reducing restraint and seclusion usage. Evidence-based educational programs such as this can lead to early identification and treatment of patients with aggressive behavior potentially leading to decreased restraint use and improved compliance with CMS guidelines. Findings highlight the need for continued education for long-term reduction of restraints.

**Stagner, Christopher (G)**

**Title:** Increasing hand washing in the immunocompromised dialysis patient

**Primary Author (and presenter):** Stagner, Christopher P.

**Additional Authors:** Sanderson, Bonnie

**College/School:** School of Nursing

**Description:** Evidence suggests that infections are directly associated with morbidity, mortality and increased treatment cost. Evidence-based guidelines suggest these health problems can be prevented by proper education and training programs. Understanding the pathophysiology of infectious diseases and drug resistant organisms will assist the dialysis community with improving overall health of their patient population. This project implemented an effective, low cost form of infection prevention; hand washing. Undisputed evidence support strict hand hygiene reduces the risk of spreading these organisms. Patient adherence to the recommendations and changes in hand washing were assessed. Target population included adults (30-60yrs) with chronic kidney failure in an outpatient dialysis clinic. All participants were given a questionnaire to determine their perception and knowledge about handwashing. The questionnaires served as a platform to build and improve knowledge and skills based on the participant’s baseline knowledge scores. The patient’s knowledge was assessed by questionnaire prior to education and re-evaluated following education. Results were reviewed by the clinical education specialist to guide hand washing and infection prevention recommendations. Descriptive statistics were used to describe the patient population. Paired T- test were used for
comparison of pre- post mean scores for handwashing knowledge and spread of germs, and perception of their ability to perform effective hand washing was measured by a Likert scale. Patients (n=x) consented to participate (X Females Y Males), (W White B Black), and average age was X (sd). Mean scores improved from pre- (mean, sd) to post (mean, sd) significantly (p=<0.05). Screening of patient education and self-perception among dialysis patients was performed with deficits identified. Results guided appropriate education to improved handwashing knowledge and prevention methods of the spread of infectious disease.

**Staley, Molly (G)**
**Title:** Insights into the role of host exposure in limiting disease emergence in a natural host-pathogen system.
**Primary Author (and presenter):** Staley, Molly
**Additional Authors:** Bonneaud, Camille; Armbruster, Jonathan W.; Hill, Geoffrey E.
**Department:** Department of Biological Sciences
**College/School:** College of Sciences and Mathematics
**Description:** In 1994, the bacterial pathogen *Mycoplasma gallisepticum* switched hosts from poultry into house finches (*Haemorhous mexicanus*). The result was a devastating epizootic that killed tens of millions of house finches. The factors that enabled *M. gallisepticum* to switch into the very distantly related and novel house finch host remain unclear. Here we tested whether a lack of exposure of *M. gallisepticum* to house finches was a limiting factor in this host switch. We experimentally infected house finches with either a known virulent chicken *M. gallisepticum* strain (Rlow; N=15) or a house finch *M. gallisepticum* strain (N=15) through an ocular inoculation. We then monitored house finches for infection development over eight weeks. While Rlow colonized and persisted in the mucosal epithelium of the upper respiratory tract (i.e., trachea) in 11 house finches, it did not cause clinical symptoms; the only exception was one bird that exhibited mild conjunctivitis after 7 days. In contrast, all 15 house finches inoculated with the house finch *M. gallisepticum* strain became infected. Additionally, these birds had an earlier onset of infection, took longer to clear the infection, and exhibited variable conjunctivitis symptoms. Given that inoculation with Rlow led to colonization of the respiratory tract but neither infection levels nor clinical disease symptoms comparable to what was seen at the start of the epizootic or in the house finch *M. gallisepticum* treatment, our results suggest the emergence of *M. gallisepticum* in house finches was unlikely to have been limited by host exposure. Rather, genetic changes in the bacteria would have been necessary to initiate this epizootic.

**Stephan, John (G)**
**Title:** Examining online consumer’s intention to book hotel rooms
**Primary Author (and presenter):** Stephan, John T.
**Additional Authors:** Bardwell, Amy; Rahman, Imran
**Department:** Department of Nutrition, Dietetics, & Hospitality Management
**College/School:** College of Human Sciences
**Description:** There has been little empirical research available on online consumer’s intention to book hotel room through either a third party website, chain hotel website, or independent hotel website. The purpose of this exploratory study is to develop an
integrative model utilizing the Theory of Reasoned Action, the Technology Acceptance Model, and the Innovations Diffusion Theory to analyze the determinants of online consumers’ intentions to purchase hotel rooms through chain, independent, and third party websites. Attributes were gathered from the literature for all the variables and adapted to booking a hotel room online. Data was collected through Amazon Mturk, with a final sample of 693 responses. Reliability of the measurement items were checked by calculating Cronbach’s alpha. A confirmatory factor analysis and structural equation model using AMOS were used as data analysis methods. Results show that perceived behavioral control influences intention to book a hotel room through an independent hotel website, as well as compatibility, communicability and attitude influences intention to book through a chain hotel website. By determining what factors motivate a traveler to book hotel rooms depending on the type of website, this allows online travel websites to focus on improving the sites based on what factors significantly contribute.

Stevenson, Sarah (UG)
Title: Physiological and psychological effects of music
Primary Author (and presenter): Stevenson, Sarah A.
Additional Authors: Bobrowski, Paula; Knipschild, Ann
Department: Department of Psychology
College/School: College of Liberal Arts
Description: Most listeners of music will affirm that music evokes emotions, such as pride, elation, or relaxation. Research suggests that music does more than that; it stimulates various parts of the human brain and body, releasing numerous stress hormones. If thoroughly investigated, implications may apply to areas such as healthcare, therapy, etc. Our current research project aims to answer the question: How do different kinds of music affect the human body, specifically biologically and psychologically? We predicted that certain songs (i.e., The Rite of Spring) would produce more biological and psychological activity than others (i.e., Gymnopedie). To test this, participants from a Music and Science course at Auburn University wore a respiration belt, two electrodermal activity electrodes, and two electrocardiogram electrodes and listened to audio recordings of Stravinsky's "The Rite of Spring" and Satie’s "Gymnopedie No. 1" as the BIOPAC software recorded their responses. After the songs, they completed a paper-and-pencil psychological survey to rate emotions elicited by the music clips. We then analyzed the data to obtain values such as electrodermal event counts, skin conductance levels, overall beats per minute, sympathetic and vagal nerve activity responses, etc. Preliminary results indicated that there is a significant difference in physiological activity between the two songs, particularly the skin conductance level. The data suggests that there was less sympathetic activity in the first song compared to the second, contrary to what we expected. The psychological results indicated, as expected, that the first song provoked higher ratings of alertness, interest, and attentiveness, while the second song was rated high on relaxation, calmness, and inspiration. By April, after more experimentation and analyses, we expect to see more significant differences in sympathetic and parasympathetic activity between the two songs. Additionally, we expect the psychological survey results to reflect this; participants will feel more alert/attentive during the first song and more relaxed/calm during the second. These results will contribute to the body of knowledge regarding music and science and may have implications in other fields.

Stokes, Stacie (G)
Title: Sexually transmitted disease education for college students
Primary Author (and presenter): Stokes, Stacie B.
Additional Authors: Hamilton, Cam
College/School: School of Nursing
Description: There is evidence that the lack of knowledge about sexually transmitted diseases (STDs) among college students leads to unsafe sexual practices. Evidence-based guidelines recommend STD education for college students. The purpose of this project was to implement an STD educational program to college students to improve awareness of the many diseases and ways to reduce risks. The target population was undergraduate students, ages 19-22, seen at Auburn University Medical Clinic. Half of the students seen in the clinic were given an educational pamphlet on STDs and the other half did not receive the pamphlet. All of the students answered demographic information and took a test evaluating their knowledge of the many STDs and risk reduction behaviors at the end of their clinic visit. Consent was implied with each student’s voluntary participation in the project. The participants received an informational letter explaining the project and how the collected data would be used. Descriptive statistics measured was age, gender, ethnicity, and year in college. A comparison between the two groups was made of perceived knowledge, risk, and test score. The average age was X years (sd). There was X% male and X% female participants. The predominant ethnic group was X (X%). The predominant year in college was X. The independent t-test sample tests were used to determine differences in the two groups. A mean of X(X) in no education group compared to X(X) in education group for test scores, t-score of X and p=X, which determined a significant difference in test scores. There was not a significant difference in perceived knowledge and risks in the two groups. In addition, crosstabs were evaluated. Chi-square tests comparing the groups also identified a significant difference in test scores. Education on STDs had a significant impact on increasing awareness of unsafe sexual behaviors. The introduction of a mandatory sexual health education program to college students would increase their knowledge about STDs.

Stuart, Mark (G)
Title: Anemone shrimp microhabitat utilization in a marine cleaning mutualistic network: Optimization for different behavioral strategies
Primary Author (and presenter): Stuart, Mark A.
Additional Authors: Chadwick, Nanette E.
Department: Department of Biological Sciences
College/School: College of Sciences and Mathematics
Description: In marine cleaning mutualisms, small cleaner fishes often position themselves on large coral heads or sponges that provide conspicuous visual cues to attract passing fish clients. Some cleaner shrimps likewise occupy giant sea anemones, which serve as long-range visual cues advertising their cleaning stations. We hypothesized that cleaner shrimps position themselves near the periphery of sea anemones in microhabitats that provide access to passing clients, whereas non-cleaner shrimp occupy the centers of anemones in microhabitats that provide shelter from fish predation. We tested this hypothesis in-vitro at Auburn University using the cleaner shrimps Ancylomenes pedersoni, and Periclimenes yucatanicus, on their associated host sea anemones Bartholomea annulata, and Condylactis gigantea. We placed shrimps in each of 3 treatments: with B. annulata, with C. gigantea, or with both types of hosts. We
then quantified microhabitat selection behaviors of the shrimp for 14 days, by recording their locations on or near the anemones in each of 5 microhabitat zones, distance from the anemone, and choice of host species. We also measured effects of the presence of potential predators/clients, by adding damselfishes to the treatments for 7 of the 14 days. We found that \( A. \text{pedersoni} \) occupy microhabitats around the periphery of anemones, and do not move closer to anemone centers when fish are present. In contrast, \( P. \text{yucatanicus} \) occupy microhabitats closer to the center of the anemones, and shift even closer when a fish is present. These results support our hypothesis, and are consistent with shrimp behaviors observed in the field. They demonstrate that \( P. \text{yucatanicus} \) appears to be more dependent on its host anemone for protection, than is \( A. \text{pedersoni} \), and supports the idea that \( P. \text{yucatanicus} \), while sometimes termed a cleaner shrimp, may in fact be an evolving cleaner mimic that does not clean fish on the Caribbean coral reefs.

**Sustarich, Jake (UG)**

**Title:** Enhanced expression of p75NTR induced by proNGF leads to neuronal apoptosis  
**Primary Author (and presenter):** Sustarich, Jake  
**Additional Authors:** Suchdeva, Sanmeet; Zheng, Chen; Jeganathan, Ramesh Babu; Thangiah, Geetha  
**Department:** Department of Chemistry  
**College/School:** College of Arts and Sciences, Auburn University Montgomery  
**Description:** Nerve growth factor (NGF) regulates cell survival and differentiation by binding TrkA and p75NTR receptors. ProNGF is the precursor form of NGF, binds to p75NTR and induces cell apoptosis. We have recently shown that the expression of proNGF was significantly increased and NGF level was decreased in Alzheimer’s disease (AD) hippocampal samples compared to control. In addition, we also found that the expression of p75NTR is enhanced in AD human hippocampal samples. However, it is not known whether the increased p75NTR expression is due to the accumulation of proNGF. Here, we used PC12 cells stimulated with proNGF and found that the expression of p75NTR was enhanced compared to NGF. The proNGF stimulation also increased the RhoA kinase activity leading to apoptosis. The expression of active RhoA kinase was found to be increased in human AD hippocampus compared to control. These results suggest that overexpression of proNGF in AD enhances activation of RhoA thereby leading to neuronal cell death.

**Talebinezhad, Hossein (G)**

**Title:** Energy storage properties of BaTiO3-SiO2 composites  
**Primary Author (and presenter):** Talebinezhad, Hossein  
**Additional Authors:** Tong, Yang; Cheng, Zhongyang  
**Department:** Department of Mechanical Engineering  
**College/School:** Samuel Ginn College of Engineering  
**Description:** Recently, there is a great need to develop a new ceramic composite which exhibits high dielectric constant, high dielectric strength, low dielectric loss for applications ranging from electronic packaging, embedded capacitors, to energy storage. Compare with conventional batteries and super capacitors, energy storage capacitors based on dielectric have many excellent performances including wide operating temperature range, fast charge and discharge behaviours, high output voltage, and higher rechargeable cycle number. A higher dielectric constant or dielectric
strength would allow a higher energy density, are highly desirable for the dielectrics used in energy storage devices. As a widely accepted ferroelectric ceramic in the field of capacitors, barium titanate ceramics (BaTiO3) have been widely used in the electronics industry because of its high dielectric constant and low loss. The BaTiO3-SiO2 composite with different SiO2 concentrations (5, 7.5, 10 wt. %) were prepared by chemical coating methods. In the experiments of chemical coating, chemical reaction between TEOS (SiO4C8H20) and H2O was used to obtain the SiO2 coated BaTiO3 nano-sized powders. After composite prepared, hand granulation method was used in the ceramic samples preparation and the pills sintered with different temperatures. The dielectric properties of the samples were characterized by Agilent 4294A impedance analyser from 100 Hz to 1 MHz using $C_p~D$ function. The Precision-LC100 system with H.V. Supply Amplifier/Controller was used to test the breakdown field and P-E loop of composite samples. The sintering effect, amount of SiO2 and size of powders influence on dielectric properties were studied for these composite. The energy density in these nanocomposites can reach around 6 J/cm3 with volume fraction of coated SiO2 around 10 wt. %, which makes them attractive for high energy density capacitors and electric energy storage devices.

**Thomas, Larry (G)**

**Title:** Pediatric asthma: Recommendations to reduce readmissions  
**Primary Author:** Thomas, Larry W.  
**College/School:** School of Nursing  
**Description:** The need for active participation by parents of children diagnosed with asthma has led to new guidelines that require the use of a written asthma action plan as a component of treatment. Studies aimed at evaluating the usefulness of an asthma action plan in the pediatric population are limited. The purpose of this project was to determine if having a written asthma action plan would improve symptom control. The target population included the parents of pediatric patients (birth-18 yrs) with a diagnosis of asthma. The project was performed in the primary care setting. After agreement and consent was obtained from the parents the pediatric asthma control & communication instrument (PACCI) was completed to determine asthma severity and symptom control. A 2-4 week follow up PACCI was performed by clinic visit or telephone interview to reassess the severity of asthma symptoms and adherence to the plan. The pre and post questionnaire results were compared with paired t-tests. X parents agreed for their children to participate. X% were male, X% were female (N=X) with an average age of X. X participants were black, X were white, and X other. X% (X of X) already had a written action plan. The pre (mean, SD) and post (mean, SD) questionnaire results were compared. The results showed a significant improvement in symptom control ($P=<<0.05$). Asthma action plans that are written and individualized lead to improved symptom control and improve overall patient outcomes. Improving symptom control and reducing hospital readmissions and acute care visits can be achieved in the primary care setting with the proper use of a written action plan.

**Thomas, Lauren (UG)**

**Title:** Hospital Saint Paul de Tarsa  
**Primary Author (and presenter):** Thomas, Lauren W.  
**Additional Authors:** Douglass, Christina; Foster, Alyssa; Grabinski, Anna
Brazil is currently experiencing turmoil due to the expansion of the Zika virus, gang-related violence, and the ever-growing rate of poverty. Even though Sao Paulo is one of the wealthier cities in the world, it presents its own unique socioeconomic challenges. Hospital Saint Paul de Tarsa, the proposed 150,000 sq.ft. facility, will strive to overcome these challenges by universally treating and caring for all of the city's economic demographics. In order to overcome these presented issues, a number of proposed design solutions will be incorporated into the hospital's design. First, biophilic design will be shown through the utilization of natural views and artwork in patient rooms, statistically shown to improve recovery time. Synthetic materials will be used in lieu of natural ones for ease in cleaning and durability purposes. Second, the isolated infectious disease unit, accessed only by approved personnel and given the most stringent security standards, will adapt to treat the current Zika virus epidemic, as well as the more common ailments found in the region, i.e., yellow fever, measles, and AIDS. Third, the hospital will strive to become one of the foremost intensive care centers for critically ill patients, neonatal intensive care units, and pediatric care units. Evidence-based design implemented through appropriate space planning, equipment, and technology needed for these intensive care units will further solidify the design decisions. Lastly, the design of the hospital will account for indoor air quality, acoustics, glare, moisture, heat, and humidity, and a clean water supply. Appropriate selection of materials and finishes to achieve these goals will create a successful healthcare facility design while striving to advocate for the client's bottom line.

Thorn, Caitlin (G)

Title: Optimization of a turboramjet hot section with an interstage turbine burner

Primary Author (and presenter): Thorn, Caitlin R.

Additional Authors: Hartfield, Roy J.

Department: Department Aerospace Engineering

College/School: Samuel Ginn College of Engineering

Description: Fifty years after the SR-71 first became operational, the design of its successor has commenced, poised to take over the reigns as the fastest air breathing aircraft. Dubbed the “Son of the Blackbird,” the SR-72 promises to deliver twice as much speed with similar range and mission requirements. With a projected operating range of 0 to Mach 6, an entirely different propulsion system than its predecessor is required: a turbine based combined cycle which merges a modified fighter turbine engine with a dual-mode ramjet/scramjet. The turbine provides thrust up to and beyond Mach 3 at which point the ramjet takes over. This mode transition has been identified as one of the major challenges of the system design and may also be a point where significant fuel efficiency is lost. To increase efficiency as the cycle transitions, it is proposed to place a combustor in the transition duct between the high and low pressure turbines. A turbine engine with an interstage turbine burner (ITB) may yield fuel efficiency gains over a conventional design, specifically in the supersonic and hypersonic regimes. Further three dimensional optimization of turbine blade geometries with an innovative evolutionary strategies algorithm may yield increased gains with a significant reduction in computation time versus traditional optimization algorithms.

Thornton, John (UG)
Title: Arpeggio – The mobile tool for music appreciation students
Primary Author (and presenter): Thornton, John W.
Department: Department of Music
College/School: College of Liberal Arts
Description: The purpose of this project is to develop a mobile application for music appreciation courses, which will have interactive and engaging features to improve student learning. Music appreciation aims to expose and inform students campus-wide about classical music styles with exposure to other music traditions. This app will shorten the gap between truly appreciating music and just filling answers on a test for students. In order to remedy this, the application aims to make studying for the class more enjoyable through trivia quizzes similar to the popular mobile apps Song Pop and QuizUp. The quizzes will use Song Pop style for piece recognition and time period identification, and QuizUp style for learning important information about pieces and composers studied throughout the course. The quizzes are divided into sections so as to follow each class as closely as possible, regardless of what textbook is being used, and are meant to let students study periodically instead of right before a test to build memorization. Another aspect of the application is a concert check-in feature, where the students can join a professor’s class on the app, and go to pre-defined concerts and check in using the app to show attendance. After the concert, the students will have an hour to take an after concert short-answer quiz made by the teacher, to show they actively listened to the concert instead of writing a paper. The purpose of this feature is to give the students a better experience at the concerts equip them to write a more structured and accurate response through the guided questions. With these features, and likely more as the project continues, Arpeggio will hopefully help music appreciation students get more out of the class and learn to appreciate all types of music.

Tian, Yuan (G)
Title: Endothelial progenitor cell encapsulated in poly(ethylene glycol)-fibrinogen hydrogels for injectable delivery of cells and neovascularization
Primary Author (and presenter): Tian, Yuan
Additional Authors: Seeto, Wen; Winter, Randolph; Caldwell, Fred; Wooldridge, Anne; Lipke, Elizabeth
Department: Department of Chemical Engineering
College/School: Samuel Ginn College of Engineering
Description: Neovascularization is critical to restoring blood flow to ischemic tissue in numerous disease states across species. This study established the ability to encapsulate endothelial progenitor cells (EPCs) within poly (ethylene glycol) fibrinogen (PEG-Fb) hydrogel microspheres using a microfluidic system and investigated the ability of these microsphere-encapsulated EPCs to be used in promoting tissue vascularization. EPCs circulate in the blood and have the ability to differentiate into endothelial cells (ECs), which are the cells that form the lining of the blood vessels. When there is a vascular injury, the EPCs participate in neovascularization. PEG-Fb is a biocompatible material that is photocrosslinkable and enzymatically degradable; it can serve as a 3D biomimetic environment supporting cell growth and can also protect cells used for cell therapy from the shear stress associated with injection. The aim of this study was to prepare EPC-containing PEG-Fb microspheres using a technique that could readily provide large quantities of cell-laden microspheres and the necessary tight control and uniformity of size, appropriate for needle injection. The established process resulted
in the maintenance of high cell viability (> 95%). EPCs were demonstrated to maintain cellular phenotype after going through encapsulation process and shear stress of injection. For clinical applications, injection of encapsulated cells has advantages of minimizing the trauma and maintaining high cell survival compared to implantation therapy and direct injection of cells suspended in aqueous solution. Following in vitro characterization, encapsulated equine EPCs were shown to be able to be injected into a dermal wound model and be retained at the injection site, with encapsulated EPCs remaining viability and migrating outward from the PEG-Fb microsphere edge. Overall PEG-FB microsphere encapsulation provides an advantageous platform for cell delivery, including the delivery of EPCs to promote neovascularization of ischemic tissue.

**Tilton, Skyler (UG)**
**Title:** 3D printing embedded circuits
**Primary Author (and presenter):** Skyler Tilton
**Department:** Department of Chemical Engineering
**College:** Samuel Ginn College of Engineering
**Description:** Innovation in manufacturing is needed. Currently, 3D printers create static objects. Manufacturing electronic products requires multiple processes. A solution to both limitations is to manufacture electronics by 3D printing the entire product in a single process. 3D printing electronics reduces the need for individual parts to be manufactured, stored, and logistically moved around the world. PCB’s (printed-circuit board) are the foundation of which electronics are built. The initial step for 3D printing electronics is 3D printing electrical traces within an object. The product’s PCB will be embedded in the design and creation, not added in a separate process. The PCB will be the product itself. While working on 3D printers over the last 4 years, I noticed this would be the next big step within the realm of manufacturing. The attempt has been made by others but fails to provide a viable option outside of the current PCB method. As a sophomore I will present my experiment which will be performed over the next year. A single-laser sintering 3D printer will be used in the test. Photo-reactive polymers will create two distinct reactions based on the wavelength of light used: conductive and non-conductive. My first year of research stated theoretical inquiries. This last year defined qualitative exploration. Over the next year, I will collect and analyze data regarding the viability of polymers as photo-reactive in multiple conductive states. If this can be determined as successful, it is a small step forward to printing the everyday electronics you desire, in the comfort of your own home.

**Torres, Jose (G)**
**Title:** Detecting a subsurface smoldering event using Landsat thermal imaging: Bridgerton landfill case study
**Primary Author (and presenter):** Torres, Jose
**Additional Authors:** Chaney, Philip; Mitra, Chandana; Marzen, Luke
**Department:** Department of Geosciences
**College/School:** College of Sciences and Mathematics
**Description:** Remote sensing and aerial photography monitoring of landfills are important aspects of current day waste management operations. Although landfill fires are a rare occurrence, as many as 8,400 dump and landfill fires or thermal anomalies are reported annually in the United States according to a 2002 study that cited a National Fire Incidence Reporting System dataset (FEMA 2002.) The objective of this Capstone
project is to use Landsat Thermal Infrared (TIR) raster data downloaded from the United States Geological Survey (USGS) database to detect the multi-temporal changes of a Subsurface Smoldering Event (SSE) at the Bridgeton Sanitary Landfill in northwest St. Louis County, Missouri. On December 23, 2010 the owners of the facility, Republic Services, Inc. found higher than normal temperature level readings at their onsite surface gas extraction wells. The digital processing method for this project utilizes both ArcGIS 10.2 and Erdas Imagine 2015 raster image processing software to render atmospheric corrections and document a multi-temporal analysis of the Landsat TIR scenes in order to detect changes in Land Surface Temperature (LST) before and after the incident report date of December 23, 2010. Landsat 5 and 8 scenes from 2003 to 2015 winter months (Coldest months on record: November-March) were processed with the software to derive At-Satellite Surface Temperature for a temporal comparison. Analysis of scenes recorded between 2009 and 2011 indicate a clear change found in LST for the landfill in question. More current scenes from 2015 show that the SSE is still active and has concentrated in the southeast sector of the landfill. This preliminary project demonstrates how remotely sensed satellite imagery is an indispensable tool in the detection and temporal monitoring of landfill thermal anomalies.

Tumwebaze, Joel (G)
Title: Community gardening to reduce food insecurity and child malnutrition in Chacraseca-Nicaragua
Primary Author (and presenter): Joel, Tumwebaze
Additional Authors: Thornton, Kate; Brown, Onikia; White, Douglas
Department: Department of Nutrition, Dietetics, & Hospitality Management
College/School: College of Human Sciences
Description: School-aged-children in Nicaragua have a high rate of chronic malnutrition with rural areas having double the rate compared to urban areas. Chacraseca is a farming community in rural Nicaragua whose agricultural productivity was devastated by hurricane Mitch in 1998 and by the constant volcanic activities. Poor farming practices such as agricultural burnings of natural pastures and crop residue removal in preparation for planting is a common practice in Nicaragua. Most households have less than an acre of land for growing food and very few families store food for periods of scarcity. Most foods consumed in Nicaragua are imported from other Central American countries and United States. These practices coupled with insufficient intake of products of animal origin and other sources of micronutrients, predispose families to protein, energy and micronutrient deficiencies. This project will evaluate the impact of community gardening on food security in Chacraseca. The twelve districts of Chacraseca will be randomized between the control and study groups. Community needs assessment will be determined using Focus Group Discussions. The study group will be trained in community gardening and nutritional education for two years. By using pre and post-gardening questionnaires perceptions of families towards reach, effectiveness, adoption, implementation and maintenance of community gardens will be explored. Through measurement of height, weight and immune status, the effect of community gardening on health and nutritional status of school-aged-children will be determined. Food security and nutritional status are anticipated to improve in the study group. Success of this research will open study abroad opportunities for students in the college of Human
Sciences to give students hands on exposure to community gardens, teach students about the sources of fresh produce, demonstrate community stewardship, and highlight importance of environmental sustainability.

**VahidMohammadi, Armin (G)**

**Title:** Freestanding electrodes of interlayer expanded 2D Ti3C2 (MXene) for high performance supercapacitors

**Primary Author (and presenter):** Armin VahidMohammadi

**Additional Authors:** Majid Beidaghi

**Department:** Department of Mechanical Engineering

**College/School:** Samuel Ginn College of Engineering

**Description:** Two-dimensional (2D) transition metal carbides and carbonitrides, called MXenes, have recently attracted significant attention as high capacitance electrode materials for supercapacitors and lithium ion batteries. MXenes are produced by selective removal of A-layer atoms from MAX phases; a large group of ternary carbides and nitrides, where M is an early transition metal, A is usually a group 13 or 14 element and X is carbon and/or nitrogen. Ti3C2, is the most studied MXene material which presents a volumetric capacitance of 900 F cm⁻³ in some aqueous electrolyte. This capacitance value is about three times higher than the specific capacitance of advanced carbon-based electrodes. In this study, we report performance of freestanding hybrid electrodes of Ti3C2 and various polymers synthesized by intercalation of relevant monomers in between the layers of Ti3C2 followed by their in situ polymerization. These hybrid electrodes show volumetric capacitances as high as 1100 F cm⁻³, gravimetric capacitances as high as 360 F g⁻¹, and excellent cycling stability up to 5000 cycles. XRD results confirmed the increase in the interlayer spacing of the electrodes after the intercalation and polymerization process which increases the accessibility of the electrolyte ions to Ti3C2 atoms, resulting in their improved performance. The hybrid materials are further characterized by a variety of materials and electrochemical characterization methods to understand the effects of various synthesis parameters on the performance of the electrodes.

**Vaughn, Bailey (UG)**

**Title:** Women’s and Children’s Specialized Hospital

**Primary Author (and presenter):** Vaughn, Bailey E.

**Additional Authors:** Nicholson, Virginia J.; Day, Caylee D.; Bliss, MaryAnna M.

**Department:** Consumer and Design Sciences

**College/School:** Human Sciences

**Description:** The new Women’s and Children’s Specialized Hospital located in Auckland, New Zealand, will focus on high-risk pregnancy and childhood illnesses. Challenges to overcome include successful work flow and adjacencies, maximum acoustical properties, a reduction in humidity levels, Labor Delivery Recovery and Postpartum (LDRP) room counts, and obstetrics security. Strategies and solutions to be implemented in the design are proper work flow and adjacencies from evidence-based design, proper acoustical properties, and daylighting with views highlighting the Auckland Bay. Safety access to high security areas such as the nursery, patient files, and obstetrics will be highly monitored and secure. Safety
features such as slip-resistant flooring, anti-bacterial and anti-microbial surfaces, and will be fully implemented throughout the design.

The lobby will have a hospitality environment, making visitors feel more comfortable and at ease. The public cafeteria and play areas will be not only a place to come for each specific activity, but also a place where visitors and patients can come to find a comfy place to sit and relax away from their rooms.

The children’s pediatric ward will be located on the first floor, which will include private outpatient rooms, waiting rooms, and general practitioner area. Administrative offices concerning this department will be concealed from public corridors.

The inpatient children’s wing of the hospital will include an Intensive Care Unit (ICU), surgical unit, and inpatient rooms. Design will be focused on not only safety and care, but also healing children through uplifting and restorative design strategies. Daylighting and local views will act in this.

The OBGYN will be three floors of the women’s and children’s hospital. The first floor of the unit will be the general gynecology department, as well as emergency receiving for obstetrics. Low risk pregnancies in Labor Delivery Recovery and Postpartum (LDRP) rooms will be located on the second floor, and high risk pregnancies will be in LDRP rooms on the third floor.

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**Venkatasubramanian, Murali (G)**

**Title:** Quest for a quantum search algorithm for testing stuck-at faults in digital circuits

**Primary Author (and presenter):** Venkatasubramanian, Murali

**Additional Authors:** Agrawal, Vishwani D.

**Department:** Department of Electrical & Computer Engineering

**College/School:** Samuel Ginn of College of Engineering

**Description:** It is colloquially known that searching for test vectors to test the last few hard to detect stuck-at faults is computationally most expensive and mathematically NP-complete. Due to the complex nature of this problem, attempts made to successfully test a digital circuit for all faults in computational linear time start becoming exponential with an increase in circuit size and complexity. Various algorithms have been proposed where new vectors are generated by using previous successful vectors with similar properties. However, this leads to a bottleneck when trying to find hard to detect stuck-at faults which have only one or two unique tests and their properties may not match other previously successful tests. We propose a new unique algorithm that attempts to vastly improve the test search time for these few hard to detect faults by classifying all test vectors in the vector space in three categories: Category I vectors that activate the desired stuck-at fault but may not propagate it to the primary outputs (POs), Category II vectors that propagate the fault site value to the POs, and Category III vectors that neither activate nor propagate the fault. By bounding our search to vectors in categories I and II, and avoiding category III vectors, it is easier to arrive at the solution faster than other algorithmic implementations. The final solution itself lies in the intersection of categories I and II vectors, and it is easier to search for a test vector in a smaller subset of the large vector space. We have demonstrated the proof of concept and detailed working of our algorithm by comparing it with a random test generator.

**Walker, Erin (UG)**
Comparing coercive sexuality scores with sexual sensation seeking, hostility towards women, sexual compulsivity, and rape myth acceptance scores

Primary Author (and presenter): Walker, Erin A.
Additional Authors: Thrift, Mindy; Kelner, William; Fix, Rebecca; Alexander, Apryl
Department: Department of Psychology
College/School: College of Liberal Arts

Description: There is a growing awareness of coercive sexual behavior on college campuses. Those engaging in sexually coercive behavior have more hostile attitudes towards women (Forbes et al., 2004; Hines, 2007), are more accepting of rape myths (Forbes et al., 2004; Burt, 1980), and are more likely to be sexually compulsive (Johnson & Knight, 2007). Few studies have examined the relationship between sexually coercive behavior and sexual sensation seeking. The purpose of this study was to examine predictors of coercive sexual behaviors in college students, as measured by the Coercive Sexuality Scale (Rapaport & Burkhart, 1984). We hypothesized that a) hostility towards women, b) sexual sensation seeking, c) sexual compulsivity and d), rape myth acceptance would significantly and positively predict coercive sexual behavior. Data were gathered from 469 undergraduates at Auburn University. Participants completed several self-report questionnaires online to obtain credit in their general psychology courses. This study was approved by the university’s Institutional Review Board for the Protection of Human Subjects. Participants were provided an explanation of their role in the study and informed consent was obtained. Next, participants completed the demographic questionnaire and a battery of questionnaires. The majority of participants were college-age European American women. Our model of sexually coercive behavior was statistically significant. Sexual compulsivity was the greatest predictor of sexually coercive behavior, followed by hostility towards women and rape myth acceptance. Sexual sensation seeking was not predictive of sexually coercive behavior. These findings suggest programs which promote awareness of healthy sexual behaviors would be beneficial on college campuses. Additionally, the negative views of women which may contribute to coercive sexual acts could be addressed by proactive organizations looking to make a more welcoming environment for all students.

Wang, Jin (G)

Title: Effects of median widths on wrong-way incidents on multilane divided highways
Primary Author (and presenter): Wang, Jin
Additional Authors: Zhou, Huaguo; Pour-Rouholamin, Mahdi; Turochy, Rod
Department: Department of Civil Engineering
College/School: Samuel Ginn College of Engineering

Description: Wrong-way movements are a major safety concern at interchange terminals, where past studies show that the Green Arrow has been used to replace the Green Ball. However, no regulation mentions any specifics about the effectiveness of the Green Arrow or the Green Ball for reducing wrong-way driving (WWD) at interchange terminals in current federal and state-level Manual on Uniform Traffic Control Devices (MUTCD) documents and existing research articles. Therefore, the objective of this research is to investigate and compare the effectiveness of the Green Arrow and the Green Ball on reducing WWD incidents at interchange terminals. Two major types of data are collected: data on drivers’ understanding of the Green Arrow and the Green Ball, and WWD data at interchange terminals that have either the Green Arrow or the Green Ball. These data are collected by Survey/Questionnaire, field observations, and cross-
section comparisons of crash records. The data analysis focuses on two major parts: (1) testing the hypothesis that the Green Arrow features have significant influences on drivers’ behavior, and (2) evaluating the effectiveness of the Green Arrow and the Green Ball for preventing wrong-way crashes at interchange terminals. Conclusions are drawn that the Green Arrow is more effective than the Green Ball to reduce WWD incidents at interchange terminals and revisions should be made to MUTCD and other traffic practices on the subject. We recommend adding guidelines on replacing the Green Ball with the Green Arrow at interchange terminals in efforts to improve traffic safety by reducing wrong-way driving.

Wang, Martin (UG)
Title: Computational study of electrostatically tunable band offsets in MoS2 multilayers
Primary Author: Martin Wang
Additional Authors: Marcelo A. Kuroda
Department: Department of Physics
College/School: College of Sciences and Mathematics
Description: The recent isolation of few-layer transition metal dichalcogenide MoS2 opened promising opportunities for flexible optoelectronic applications. The 2H-phase of MoS2 has a band gap in the range of 1.2 – 1.8 eV and has been proposed as a candidate for the semiconducting channel in field-effect transistors. However, similar to other two-dimensional materials, achieving low-contact resistances to this layered system is limited by Fermi level pinning and poses an important limitation in their application in electronic devices. In contrast, the 1T-phase of MoS2 (stable at high temperatures) is metallic and has been proposed as a solution to circumvent this issue, as it has been shown to produce a low in-plane contact resistance. Alternatively, the use hybrid heterostructures combining metallic and semiconducting layers may also offer out-of-plane alternatives to the problem. In these heterostructures, the band offsets may be tuned with external electric fields altering the contact resistance. Here we study the physical properties MoS2 multilayers using large-scale computer calculations within the density functional theory. We characterize the electronic dispersion based on the phase composition of the layer (1T and 2H) and the number of layers. We analyse the electronic band structure of multilayers subjected to external electric fields and quantify their offsets. The understanding of the tunability of the band offsets based on the multilayer thickness and composition may prove useful for the realization of flexible two-dimensional electronics. The authors would like to acknowledge computational resources at Auburn University CASIC-HPC cluster and Alabama Supercomputing Center.

Wang, Shiqiang (G)
Title: Gamma-ray irradiation effects and temperature-dependent density of state analysis of Sol-Gel derived ZnO thin-film transistors I-V characteristics
Primary Author (and presenter): Wang, Shiqiang
Additional Authors: Mirkhani, Vahid; Yapabandara, Kosala; Cheng, Ran; Sk, Mobassar; Park, Minseo; Hamilton, Michael
Department: Department of Electrical & Computer Engineering
College/School: Samuel Ginn College of Engineering
Description: Zinc oxide (ZnO) is a metal-oxide semiconductor with a direct and wide energy band gap of 3.37 eV and has been considered and demonstrated as a viable candidate for electronic and optoelectronic applications. Additionally, ZnO is known to
be more resistant to radiation damage than other semiconductor materials, and is considered for electronics in a radiation harsh environment such as space. In spite of this, only a small amount of research has been carried out on the analysis of radiation effects on ZnO transistors. Previously, ZnO thin film transistors based on plasma enhanced atomic layer deposition were irradiated with gamma-rays and its characteristics were analyzed. However, no research has been reported on the study of gamma-ray irradiation of sol-gel derived ZnO transistors. Therefore, in this work, we have fabricated ZnO transistors with sol-gel derived active layer and studied gamma-ray irradiation effects. Additionally, we also use temperature-dependent measurement to determine the local density of states between semiconductor layer and insulator.

**Ward, Meghan (UG)**

**Title:** Exploring zinc compounds as potential anti-oxidant pharmaceuticals

**Primary Author (and presenter):** Ward, Meghan B.

**Additional Authors:** Goldsmith, Christian R.

**Department:** Department of Chemistry and Biochemistry

**College/School:** College of Sciences and Mathematics

**Description:** The goal of the research was to examine the anti-oxidant capabilities of zinc(II) complexes with redox-active ligands. The complexes were previously made and characterized with manganese(II) to develop MRI contrast agents. Studies showed that these complexes detect oxidative stress while also catalytically degrading superoxide, an ROS associated with oxidative stress. This activity has been attributed to the ligand itself, not the metal. We hypothesize that Mn(II) can be replaced by redox-inactive Zn(II), a more strongly bound and less intrinsically toxic metal, while retaining anti-oxidant activity. We synthesized two Zn(II) complexes with quinol-containing ligands and characterized them with NMR, mass spectrometry, X-ray crystallography, UV Vis, and potentiometric titration. Anti-oxidant behaviour was assessed through DPPH and superoxide dismutase (SOD) mimicry assays. These assays quantify the compound's ability to donate hydrogen atoms and degrade superoxide, respectively. Initial findings of Zn(II) complexed with H2qtp1 suggest that zinc improves the SOD activity of the ligand but not its ability to donate hydrogen atoms to a meaningful extent. The unbound ligand and both Zn(II) and Mn(II) complexes have similar IC50 values when tested with the DPPH assay. Although SOD activity is still being explored, initial results suggest that the Zn(II) complex is more active than the unbound ligand but less active than the Mn(II) complex. The results suggest that redox-active ligands are comparable substitutes for redox-active metals as SOD mimics. The similar hydrogen donating capabilities of the ligand and its complexes suggest that the differences in SOD cannot be attributed to the metal ions' facilitating hydrogen atom transfer to and from HO2, but it seems so far that the energetics of the O-H bonds are roughly equivalent. The exact effect of the metal component on the anti-oxidant activity of the ligand is still unknown, leading us to explore further.

**Welling, Emily (UG)**

**Title:** Evaluating the relationship between energy expenditure and oxidative damage in the house finch, *Haemorhous mexicanus*

**Primary Author (and presenter):** Welling, Emily M.

**Additional Authors:** Conte, Alexandra N.; Hood, Wendy

**Department:** Department of Biological Sciences

**College/School:** College of Sciences and Mathematics
Mitochondria are a main source of adenosine triphosphate (ATP) and damaging free radicals, such as reactive oxygen species (ROS). Many investigators assume a direct positive correlation exists between energy expenditure of an animal and oxidative damage, but recent studies on the function of the electron transport system (ETS) suggest the opposite. In addition, studies investigating oxidative damage assume blood is an accurate indicator of oxidative damage in other tissues, but little data exist to explicitly test this assumption. To determine if energy expenditure and oxidative damage are positively correlated and if blood is an accurate indicator of oxidative damage throughout an animal’s body, we collected 24 house finches and randomly placed them into 1 of 3 enclosure sizes to encourage different levels of activity. After 2 weeks in assigned treatments, pectoralis muscle, liver, and blood samples were collected. Oxidative damage of proteins in the 3 tissues was measured using a protein carbonyl enzyme-linked immunosorbent assay (ELISA). Protein carbonyls are a product of proteins modified by ROS. Other indicators of damage, such as lipid peroxidation, are currently being evaluated. We found no significant differences between protein carbonyl content relative to cage size (ANOVA, Blood: P=0.10; Liver: P=0.25; Pectoralis: P=0.56). Significant differences were found between protein carbonyl content in blood and carbonyl content in muscle and liver (ANOVA, P<0.005), though no correlation between the damage in blood and damage in muscle and liver existed (Linear regression: Blood vs. Liver: P<0.39; Blood vs. Pectoralis: P=0.17). Our results do not support the hypothesis of a direct positive correlation between energy expenditure and oxidative damage and are more consistent with recent advances in our understanding of the mechanisms of ETS function. Further, our results indicate that blood is not likely an accurate predictor of oxidative damage throughout the body.

West, Maya (G)
Title: Uranyl sensing using Quinoxalinol Salen-based ligand
Primary Author (and presenter): West, Maya M.
Additional Authors: Gorden, Anne E.V.
Department: Department of Chemistry and Biochemisty
College/School: College of Science and Mathematics
Description: The increasing need for reliable energy with low greenhouse gas emissions makes the use of nuclear power an attractive option. Unfortunately, the nuclear fuel cycle produces a plethora of radioactive metal enriched waste. Research has shown that implementation of a 2-quinoxalinol salen-based ligand has the ability to enhance the detection signal of dilute $^{2+}$ metal ions. Coupling this ligand with a solid support enhances the ease of using this metal-scavenging ligand to aid in the sensing of metals from the environment. A 3-(2-hydroxyethyl)-1-vinyl-pyrrolidin-2-one, EtOH-NVP, solid-support resin attached to a 2,6-diformyl-4-methylphenol-2-quinoxalinol ligand with a tetradeinate-binding pocket was synthesized in hopes of improving metal sensing. Performing extractions with the ligand, both with and without the solid support, allows insight into the effects the solid support has on the molecular recognition of uranyl and selectivity potential of the ligand. Synthesis and sensing using a symmetric water-soluble ligand, 3-Formyl-4-hydroxybenzenesulfonic-2-quinoxalinol, allows an eco-friendly option for the sensing of 2$^{+}$ metal ions. The water-soluble ligand allows extraction and sensing to be conducted in aqueous media, which is where most metal contaminants naturally occur. Sensing with these salen ligands will allow insight of the chemistry of
2+ metal ions, in particular the selective coordination chemistry of the uranyl and donor-acceptor interactions.

**White, James (G)**
**Title:** The impact of change orders on construction projects at Auburn University
**Primary Author (and presenter):** White, James H.
**Additional Authors:** Collins, Dr. Wesley
**Department:** McWhorter School of Building Science
**College/School:** College of Architecture, Design, and Construction
**Description:** Change orders are extremely common on construction projects. The aim of this research is to determine what practices can be implemented or improved by the Auburn University Facilities Management department during the design process to minimize the number and impact of change orders. The research to be conducted will examine change orders on previously completed renovation and new construction projects at Auburn University. The research scope is limited to construction projects at Auburn University that were completed between the years of 2005 and 2015 with a minimum cost of $100,000. A Quantitative-Archival research methodology will be used to obtain numerical data (i.e. cost data) from archival records, which will be compiled and statistically analysed to determine the leading causes and trends of change orders over the stated time period. Basis of change classifications attributed to each change order will also be compiled and numerically analysed. The conclusions of the analysis, which will be complete by April 12th, will include recommendations as to specific construction types, project types, and contracting sectors that should be focused on in the design phase of future projects to minimize the amount and impact of change orders.

**Whitener, Ricky (G)**
**Title:** Using nucleic acid aptamers to modulate specificity, binding, and quantity of drug for personalized treatment
**Primary Author (and presenter):** Whitener, Ricky J.
**Additional Authors:** Windham, Katherine; Wower, Jacek; Byrne, Mark
**Department:** Department of Chemical Engineering
**College/School:** Samuel Ginn College of Engineering
**Description:** In this work, we synthesize, characterize, and optimize a versatile and flexible nanocarrier with controllable loading and release properties resulting in production of the first avidity-driven high drug payload programmable nanocarrier. Our nanocarrier consists of a 15-nm gold nanoparticle (AuNp) detectable by x-rays, single-stranded DNA anchors covalently bound to the AuNp surface, and DNA aptamers. We used aptamers that are known to bind to a specific cultured cancer cell line and modified them by adding a drug-binding site that can accommodate 5-7 molecules of daunomycin. Each aptamer is equipped with a single-stranded segment that is complementary to the single-stranded DNA anchor. Such design produces a drug nanocarrier that can be readily programmed with either one or several cancer-specific aptamers. By increasing or decreasing the size of the AuNps, we can regulate the targeting, binding constant, and payload of drug taken up by cancer cells. By “Mutating” nucleic acid strands that hold the drug we were able to modulate its release. To increase the drug payload, we extended the length and changed the sequence of the double-stranded drug-binding DNA segment.
of the nanocarrier. Furthermore, the nanocarrier is programmable to bind either one type of target or different targets by using an array of aptamers, for instance, a series of cancer cell-specific aptamers. Presently, we are studying the cellular uptake of our nanocarriers using transmission electron microscopy (TEM), hyperspectral microscopy, and other techniques that allow for visualization of particles inside cells and complemented by cell viability and carrier/drug effectiveness tests (XTT Assay). Preliminary results indicate that by manipulation of nanocarrier size, aptamer structure, and its drug-binding segment, we have created a highly tuneable platform that is capable of recognizing a specific tumour with controlled drug delivery for personalized treatment.

Wilburn, Christopher (G)
Title: Quantifying the effects of athletic socks on foot function during gait
Primary Author (and presenter): Wilburn, Christopher M.
Additional Authors: Fox, John; Nabity, Chloe; Javage, Erika; Jagodinsky, Adam; Smallwood, Lorraine
Department: School of Kinesiology
College/School: College of Education
Description: Previous research in the field of footwear science has looked at the effect of specialty and athletic socks (i.e. socks with reinforced arch bands) on force attenuation during locomotive tasks in both clinical and athletic populations. However, the influence that sock types have on foot function and stability remains theoretical in literature. Therefore, the present study analyzed the impact of these various sock types on foot function and stability during gait. For this within-study design, foot function and stability, measured on a specialized instrumented walkway (GAITRite), were investigated following the completion of three successful trials across three randomized barefoot conditions in collegiate students of comfort and support during wear. Additionally, GAITRite provided various measurements and parameters, such as center of pressure trajectory and deviation, which are associated with foot functionality. Results revealed that sock types, specifically athletic socks, provide more stability with nominal center of pressure deviations compared to barefoot walking (p = .034). Additionally, athletic socks exhibited a greater ability of sustaining a controlled center of pressure trajectory relative to the other conditions, but, this failed to reach statistical significance (p = .052). The findings of this study suggest that the difference in compositional properties of socks improve foot function and stability during walking.

Wilhelm, Gabrielle (UG)
Title: Investigating a novel technique for tribological analysis of equine articular cartilage under sustained constant force and a migrating contact area
Primary Author (and presenter): Wilhelm, Gabrielle A.
Additional Authors: Hanson, Reid; Wilhite, Dewey; Hayden, Lyndsey; Jones, Patrick; Baker, Cole; Knotts, Micheal; Jackson, Robert
Department: Department of Animal Sciences
College/School: College of Agriculture
Description: Purpose: The purpose of this study was to develop an efficient, accurate method for analyzing cartilage frictional properties that more closely resembles physiologic
conditions. Materials and Methods: A total of nine samples were taken from five deceased horses. The right and left second carpal bone and the right and left distal radial carpal bone facet were dissected from each horse. Four samples from two horses were refrigerated and tested within 24 hours of collection and five samples from three horses were frozen at -80°C to be tested at a later date. Frictional properties were tested and analyzed using the UMT Bruker TriboLab and a custom fixation device. The distal radial facet was tested using the second carpal bone as an opposing contact surface. Six tests were performed on each bone with varying force and time. Tests were conducted at 5N for 5 minutes, 10N for 10 minutes, and 10N for 42 minutes and were repeated for two different abaxial and axial testing surfaces. Velocity and sliding distance were held constant at 1mm/s and 2.5mm respectively.

Results: Recorded frictional coefficient of collected cartilage samples is comparable to previous studies. No statistical difference was observed in the frictional coefficient between frozen and fresh cartilage samples. Frictional coefficient rose with increasing load but not with increasing time. Conclusions: Cartilage on cartilage testing does not show an increase in frictional coefficient over time compared to cartilage on glass, making it superior in this regard. Freezing cartilage samples does not affect tribological properties and is an acceptable practice. The method tested in this study is robust and viable for use in future studies. The use of a cartilage on cartilage method would be best suited in studies that require lengthy frictional tests.

Williams, Caitlin (G)

Title: An exploratory factor analysis of the stigma of suicide scale-short form

Primary Author (and presenter): Williams, Caitlin L.

Additional Authors: Cero, Ian; Witte, Tracy

Department: Department of Psychology

School: College of Liberal Arts

Description: Attitudes toward suicide may have important implications for suicide prevention and intervention strategies (Kodaka, Postuvan, Inagaki, & Yamada, 2011) and can affect both individuals who engage in suicidal behavior as well as suicide survivors (Cvinar, 2005). A concrete understanding of attitudes toward suicide has the potential to aid in suicide prevention and intervention. As of yet, a stable factor structure has not been established for any suicide attitudes measure, limiting both the quality of inferences that can be made and confidence in previous findings. Batterham and colleagues (2013) designed the Stigma of Suicide Scale (SOSS) to address the limitations of existing suicide attitudes measures. The SOSS is a 58-item measure designed to assess attitudes toward a prototypical individual who has died by suicide (Batterham et al., 2013). The authors established a three-factor solution of the SOSS: Stigma (e.g., Shallow, Pathetic), Isolation/Depression (e.g., Lonely, Disconnected), and Glorification/Normalization (e.g., Strong, Brave; Batterham et al., 2013). The authors also established the SOSS-Short Form (SOSS-SF), a 16-item subset designed to be representative of the three-factors of the SOSS. To date, no other research has evaluated the factor structure of the SOSS or SOSS-SF. We analyzed the factor structure of the SOSS-SF using an exploratory factor analysis (EFA) in a sample of 475 undergraduate students. We further investigated convergent validity with other measures of stigma toward suicide. Participants completed a battery of online questionnaires including basic demographics, the SOSS-SF, Suicide Opinion Questionnaire (Domino, 1980), and other measures known to be associated with suicide (e.g., depression). Results of the EFA
suggest that the three-factor model yielded the best results ($\chi^2[75]=154.06$, $p<.001$; RMSEA (90% CI) = .048 [.037, .059]; CFI = .964; TLI = .943; SRMR = 0.025). The SOSS-SF demonstrated good convergent validity with the SOQ and related constructs. The SOSS-SF has promising characteristics, including good fit statistics, length, and representativeness of stigmatizing attitudes toward suicide. Future research is needed to replicate the factor structure of the SOSS-SF in order to establish the SOSS-SF as a reliable measure of attitudes toward suicide.

Williams, Candy M. (G)

Title: Heart failure readmission prevention

Primary Author (and presenter): Williams, Candy M.

College/ School: School of Nursing

Description: Fifty percent of adult heart failure patients are readmitted within 6 months of discharge (Kim & Han, 2013). Research suggests patient understanding of discharge instructions, scheduling cardiology appointments before discharge, educating weight monitoring, and discussing medication plans are linked to preventing costly readmissions. The purpose of this project was to determine if heart failure education during hospitalization and prescheduling cardiology appointments before discharge will reduce readmission rates. The population target included consenting adults diagnosed with heart failure upon admission to the hospital. Participants received a heart failure pamphlet and an individualized heart failure management. A follow-up cardiology appointment was scheduled prior to discharge. An American Heart Association questionnaire tool was used to test admission knowledge of heart failure to compare with discharge knowledge. Current discharge instructions were compared to newly developed discharge instructions which included the addition of weigh monitoring, medication adherence and scheduling of cardiology appointments. X consented to participate; X% female and X% male. The average age was X (means, sd). There was an increase of X% of knowledge of weighting daily, an increase of X% of the importance of following-up with the cardiologist and attended their prescheduled cardiologist appointments. Improvement in understanding of medications increased by X%. Calls were made within 30-45 days of discharge and readmission occurred in X% of participants. The chi-square test for readmissions resulted in $p=X$, mean = X, sd = X and the t-value =X. Heart failure education during hospitalization along with scheduling a cardiologist appointment prior to discharge showed significant results in reducing heart failure readmissions. The results support the need to change discharge instructions for heart failure patients.
Williams, Candy Popwell (G)

Title: Interventions to reduce readmissions and mortality in patients with COPD.

Primary Author (and presenter): Candy Popwell Williams

College/School: School of Nursing

Description: COPD readmissions have begun to increase recently and are currently a focus by CMS. Hospitals are now identifying why patients are being readmitted and how to prevent the readmissions. Evidence indicates that through interventions which include follow up and education, a reduction in readmissions/mortality in the patients should be seen. With proper education and follow up, COPD patients should see an increase in their quality of life and experience better disease management. The purpose of this project is to determine if the use of education and interventions on adult patients with COPD admitted to the hospital and followed for 30 days will result in a reduction in readmissions/mortality rates. The target population is adults over 65 admitted with COPD. A participant agreement was obtained then the participants received a questionnaire regarding COPD. The participants also received a COPD post discharge action plan. Follow-up calls were made each week and at 30-45 days after discharge to ensure patients had not readmitted. Descriptive statistics were used to describe the patient population. The comparison of readmission rates and mortality pre and post use of interventions was completed through chi-squared test to determine significance. 10-15 participants consented to participate, X% female and X% males. The average age was X (mean, sd), X% Caucasian, X% African American, X% Hispanic. Follow-up calls were made within a 30-45 day time period and readmission occurred in X%. The chi-squared test for readmit resulted in p=X. The interventions resulted in a significant decrease in readmissions/mortality in COPD patient from X% in pre interventions to X% in post interventions. The results support the need for further implementation if the practice change within the setting and the recommendations were presented to the stakeholders regarding the results for the practice change to occur.

Williams, Christalyn (G)

Title: Distress screening in adult oncology

Primary Author (and presenter): Williams, Christalyn J.

Additional Authors: Ellison, Kathy

College/School: School of Nursing

Description: There is substantial evidence that distress is prevalent in cancer patients. Evidence-based guidelines recommend routine distress screening for adult cancer patients. The purpose of this project was to implement routine distress screening to increase the identification and treatment (e.g., medication and/or psychosocial referral) of distress. The percent change in the identification and treatment of distress was assessed. Target population included adults (18-85 yrs) with a new cancer diagnosis in an outpatient oncology clinic. After obtaining permission, participants completed a validated distress screening tool (NCCN Distress Thermometer & Problem List). Outcomes measured included the level (0-10) and nature (physical, psychosocial, etc.) of distress. The oncologist or nurse practitioner reviewed the results and provided treatment recommendations (medications and/or psychosocial referral). Descriptive statistics were used to describe the participant population, level and nature of distress, and treatment modalities. Pre-screening data was obtained via chart audits. The number of prescribed medications and psychosocial referrals pre-post screening were compared with paired t-tests. X consented to participate (% males), mean age of X (sd) yrs. Pre-
screening indicated X% positive for distress, X% received a medication, X% received psychosocial referral, X% received medication and psychosocial referral. Post-screening indicated X% positive for distress, X% received a medication, X% received psychosocial referral, X% received medication and psychosocial referral. The mean scores improved from pre (mean, sd) to post (mean, sd) significantly (p<0.05). Distress screening among adult cancer patients identified the level and nature of distress and increased the identification and treatment of distress. Routine distress screening should be continued in a larger program of distress management in this outpatient oncology clinic.

Williams, Haley (UG)
Title: Bayside Hospital: women and children’s healthcare of Auckland
Primary Author (and presenter): Williams, Haley L.
Additional Authors: Buhler, Sarah; Ohly, Rachel; Perry, Kelsie
Department: Department of Consumer & Design Sciences
College/School: College of Human Sciences
Description: Our healthcare facility is located in Auckland, New Zealand, a country that is known for being environmentally conscious. We are going to channel these ideals into our proposed design by implementing sustainable aspects guided by the Green Star principles, New Zealand’s equivalent to LEED certification. Our focus will be placed on designing to promote healing, as opposed to the negative connotations that are typically associated with hospitals. This hospital will specialize in women’s and children’s health. However, this region has intense UV rays causing skin cancer to be more prominent; we will address this issue by including an oncology center. Some of the challenges we will face include adjacencies, patient vs. work-flow, advocating for patients needs while also considering the needs of the staff, acoustics, wayfinding, and having a holistic design for the overall hospital while having clear differences between the departments. Our strategies for tackling these issues include having vertical adjacencies between floors and horizontal adjacencies among the departments on each floor, and addressing acoustical needs by space planning and material selection. By having half the team advocate for the patient and the other half advocate for the staff there will be a balance between the patient and work flow. We will apply the same technique to the sustainability aspects. Two team members will focus on achieving the highest degree of sustainability while the others concern will be placed on budget/practical specifications. Because evidence based design shows that using biophilic principles has a positive impact on occupant’s wellbeing, we plan to include natural elements holistically in the design of the departments as well as in the wayfinding for the facility. By implementing these strategies, our team will propose a design that will benefit the community of Auckland as a whole.

Williamson, James (G)
Title: Statin therapy for the secondary prevention of atherosclerotic cardiovascular disease in individuals 65 years of age and older
Primary Author (and presenter): Williamson, James S.
Additional Authors: Sanderson, Bonnie
College/School: School of Nursing
Description: Statins are the first-line therapy for secondary prevention of cardiovascular disease (CVD). Evidence shows that many patients age 65 years or older who are at higher
risk for CVD complications are undertreated. The project uses the American Heart Association Prevention Guidelines to assess and improve secondary prevention of CVD among older adults. The target population is adults age 65 or older who take statin medication for secondary prevention of CVD in the primary care setting. Participants received counseling during their scheduled office visit and asked the following questions: 1) In the past 7 days, how many days have you taken your statin medication as ordered? 2) How many days of the last 7 days did you participate in at least 30 minutes of exercise? 3) How many days of the last 7 days have you experienced unusual muscle symptoms such as muscle weakness or fatigue, aching, pain tenderness, cramps, or stiffness? Telephone follow-up occurred every seven days and included the same questions about adherence to medication, symptoms of side effects, and exercise patterns. Lab work was evaluated for therapeutic goals and medication dosage was recorded. Descriptive statistics was used to analyze drug type, dosage, and participant’s age. Pre-post mean scores from initial to last phone call were compared using paired t-tests. X consented to participate, average age of X (sd) yrs. X% of participants were taking X (Statin name), at mean dose X. X% of participants received treatment according to the latest AHAP Guidelines. Follow-up indicated a mean of X days/week for medication compliance. A mean of X days/week for 30 minutes of exercise. A mean of X days/week of symptoms related to adverse effects from statins. Follow-up based on current AHAP Guidelines proved beneficial as participants exhibited compliance with medications and exercise.

Williamson, Steven (UG)

Title: A statewide assessment of wildlife intake at Alabama’s wildlife rehabilitation centers

Primary Author (and presenter): Williamson, Steven T.

Additional Authors: Lepczyk, Dr. Christopher A.

College/School: School of Forestry and Wildlife Sciences

Description: Wildlife species that are injured are often brought to wildlife rehabilitators due to injuries. Many of the animals brought to rehabilitators suffer from injuries caused by human contact. Our objective was to determine the most common reasons for wildlife species being admitted to wildlife rehabilitation facilities as well as to identify what species are most commonly brought in. We collected intake records from wildlife rehabilitators for 2014, the first year data were required to be kept on intake, across the 5 wildlife districts of the state. Data were entered into a database and analyzed for the most common species, intake reasons and disposition as well as how many were taken in each month. Nearly 87% of the animals recorded (nT = 834) were either orphaned, injured, or both. The most common animals taken in were squirrels (n = 306) and opossums (n = 217). Almost 66% of the animals admitted were taken in by wildlife rehabilitators in district 4. The majority of animals were brought in during August (n = 158) and September (n = 138), representing approximately 35% of the annual total. Almost 57% of animals taken in were released after rehabilitation (n = 474). The intake records from most wildlife rehabilitators simply put ‘orphan’ or ‘injured’ as the reason for intake, not a reason for being orphaned or injured. Most of the general public do not know if a small animal is truly an orphan or if it is mature enough to be on its own which could cause them to label it as being an orphan. Most animals brought in during the year seem to be during the time they would be leaving the care of their parents for most species. Since a majority of animals were released, it is possible they were only being held long enough to reach a healthy state and then released. Identifying the
causes for wildlife entering rehabilitation facilities could help create an education program for the public as well as to lower the number of incidences of wildlife/human conflict.

**Williford, Carson (UG)**
**Title:** War damn Iron Bowl: Possible legend and legendary possibility in a house divided
**Primary Author (and presenter):** Williford, Carson B.
**Department:** Department of English
**College/School:** College of Liberal Arts
**Description:** After studying creative nonfiction in an Honors Special Problems course with English Professor Diana Eidson, I have spent my Honors Thesis course writing a piece of literary journalism on the 2015 Iron Bowl. Involving myself as the narrator—a characteristic of literary journalism—I approach game day as someone who, though raised in Auburn, has failed to understand my town’s football culture. In an attempt to understand, I dig into the history of the rivalry back to the founding of Auburn University, attempt a spirited game day experience, and learn to lose. How, though, am I supposed to understand Auburn’s football culture? Do I understand by reading the Plainsman and the game’s Program? Do I understand simply by getting caught up in the game? By pursuing these questions, the essay uncovers ways that I, an outsider to an alien culture, can better understand different practices and people, clarifying, in turn, tensions that prevent people like me from understanding other cultures. I approach these questions phenomenologically, a stance vital to literary journalism and an enlivened understanding of culture. My approach allows for a kind of knowledge not available through reductive analysis. Though my essay as journalism may offer valuable information and elucidate relevant issues—e.g., the Iron Bowl edition of The Plainsman covers the Paris attacks, Gov. Bentley’s executive order against Syrian refugees, and Mizzou-related racial anxiety—my essay as literary work intends only a developed self-understanding for writer and readers. By offering clarity in the form of descriptions, I hope to illuminate real problems that underlie the mere confusions of stereotyping, creating for readers, at the same time, a memorable experience.

**Willis, Amy (G)**
**Title:** Mediterranean diet intervention in obese men and women using both nutrition education and supplementation of extra virgin olive oil and mixed nuts.
**Primary Author (and presenter):** Willis, Amy W.
**Additional Authors:** Greene, Michael W.; Braxton-Lloyd, Kimberly
**Department:** Department of Nutrition, Dietetics, & Hospitality Management
**College/School:** College of Human Sciences
**Description:** Obesity and high blood pressure are contributing factors to cardiovascular disease, a clinical condition which causes approximately 18 million deaths in the United States annually. The Southeastern United States contains four of the top five states (Arkansas, Mississippi, Louisiana, and Alabama) with the highest adult obesity rates. Nutritional interventions which promote healthy food habits and choices can manage obesity and cardiovascular disease. However, a more effective strategy to reduce cardiovascular disease couples a nutritional intervention that promotes the dietary patterns of those seen in the Mediterranean and the supplementation of the diet with extra virgin olive oil or mixed nuts. The Mediterranean Diet is a pattern of eating derived from the diet of Crete, most of Greece, and southern Italy in the 1960s which encouraged eating plant-based foods, extra virgin olive oil as the primary fat source, smaller amounts
of fish, poultry, dairy and eggs with little to no red meat. The population where this diet was the cultural norm had high life expectancies and low rates of chronic diseases such as cancer and heart disease. To promote healthy food habits and choices and broaden the state of knowledge on the effects of the Mediterranean Diet on human health, the primary objective of the project is to examine in overweight adults in Lee County, Alabama, whether nutritional education on the Mediterranean Diet coupled with extra virgin olive oil and mixed nuts reduces cardiovascular risk factors to a greater degree than nutritional education promoting the American Heart Association’s dietary recommendations for optimizing heart health. The proposed project is a collaborative effort between AU Nutrition and Pharmacy Health Services partnered with the Auburn University Pharmaceutical Care Center (AUPCC) as part of the Healthy Tigers Initiative to improve the health of individuals in need within our local community.

Windham, Katherine (UG)
Title: Engineering nucleic acid aptamers responsive to physiological conditions creating controlled drug delivery platforms
Primary Author (and presenter): Windham, Katherine A.
Additional Authors: Whitener, Ricky; Wower, Jacek; Byrne, Mark
Department: Department of Chemical Engineering
College/School: Samuel Ginn College of Engineering
Description: In this work, we synthesize, characterize, and optimize a versatile and highly-tuneable 15nm carrier with controllable loading and release properties for targeted delivery of doxorubicin to small-cell lung carcinoma (SCLC). Our platform, designed for cell-specific drug delivery, consists of an anchor DNA strand bound to a 15nm gold nanoparticle (AuNp) and base-paired to a DNA aptamer. The anchor DNA chosen has been shown to have a high efficiency for binding to AuNps from previous work in our lab. Using known doxorubicin DNA binding sequences, an aptamer strand was engineered containing drug-binding sites, and a SCLC cell targeting sequence derived from Chen et al. Our therapeutic carrier was designed for binding of intercalating agents only in the drug-binding base-pair region, which is double stranded due to synthesis of a complementary strand. The versatility and flexibility of this platform is evident in each component. By modifying the nucleic acid strands which bind the drug, we can regulate both the drug binding and control release as needed. Extending the sequence of the double-stranded DNA segment of the nanocarrier increases the drug payload. The nanocarrier can be programmed to bind specifically to targeted cells by using either a single aptamer or an array of aptamers. Presently, we are investigating the cellular uptake of the drug-loaded carrier using selected SCLC cell lines using the programmable drug-loaded AuNps with aptamers that specifically recognize and bind to the SCLC cells. By attaching multiple DNA aptamers, the resulting AuNp is expected to act as a “molecular octopus,” able to target different markers on the surface of SCLC cells. The binding of aptamer-programmed nanoparticle to cancer cells will be very strong being that it is avidity rather than affinity driven. The use of biohybrid strategies in the creation of novel controlled and targeted drug release carriers has significant potential to affect a number of cancer treatment regimes.

Wolert, Patryk (G)
Title: Permit load model of a flat slab bridge
Primary Author (and presenter): Wolert, Patryk J.
**Description:** Alabama Department of Transportation has an eleven-span flat slab concrete bridge for which there are no construction drawings or other details that can be used to perform a load rating of the structure. Project’s objective is to provide ALDOT a structural model(s) of an eleven-span continuous flat concrete slab bridge that can be used for analyses required for issuing permits to non-standard trucks. Work plan for the project consists of: Task 1 – Baseline Structural Model - The basic dimensions of the bridge are known. The primary unknowns are the amount and details of the steel reinforcement, the yield strength of the reinforcement, and the compressive strength of the concrete. These parameters were obtained with usage of non-destructive reinforcement detection and thickness measuring instruments and destructive tests of concrete cores drilled. Task 2 – Evaluation of Standard Reinforced Concrete Slabs - There are no design drawings of any continuous reinforced concrete flat slab bridges, but there is a standard drawing for simple span flat slab bridges (dated September, 1922). Two types of analyses were performed on these standard slab designs. The results provided insight regarding the reserve. Task 3 – Advance Structural Analyses of Baseline Model - Based on information from the baseline structural model, a 3D finite element model was developed to obtain expected bridge response under the load of test vehicle(s) and its capacity. After field tests are performed, the numerical model will be recalibrated to produce results close to the measured values. Task 4 – Field Tests - Field load tests will be performed to confirm that the final structural model is representative of the actual bridge structure. Task 5 – Final Structural Model - Researchers will coordinate with ALDOT engineers to identify the most appropriate format for the structural model. Final structural model will be developed that represent the researcher’s best estimate the capacity of the actual structure.

**Wong, Ryan (G)**

**Title:** Predicting vancomycin AUC24 based on plasma concentrations: A simulated evaluation

**Primary Author (and presenter):** Wong, Ryan

**Additional Authors:** Ravis, William R.; Tsiao, Emily

**Department:** Department of Drug Discovery and Development

**College/School:** Harrison School of Pharmacy

**Description:** For vancomycin (VAN), the ratio between AUC over 24 hr (AUC24) and the MIC for bacteria determines effectiveness. Due to the multi-compartment features of VAN, routine plasma concentrations monitoring may not accurately permit estimates of AUC24’s. The study investigated the utility of several proposed and new methods for estimating AUC24 from limited plasma concentration sampling. A VAN population pharmacokinetic model was selected from the literature and used to predict VAN plasma concentrations for subject with 100%, 50%, 25% and 5% renal function on days 1, 3, and 7. There were 50 subjects in each renal function group and simulations were based on a loading dose followed by maintenance dose given at a time interval adjusted for renal function. Values of AUC24 were determined by a method suggested by Bauer (Method B), based on a 1-compartment model (Method C), as well as single point relationships.
Sampling times utilized in the calculation included time 0 and post-dose times of either 1.5, 2, and 3 hr, and at the trough. Concentration values at the dosing interval midpoint (C_{mid}) and minimum (C_{min}) were also estimated. The accuracy of AUC_{24} predictions was influenced by the method chosen, points selected, and degree of renal function. For all subjects, by the B and C methods, AUC_{24} was overestimated more when the post-dose sampling time was 1.5 hr (20.6±11.2% and 20.8±8.7%) as compared with 2 hr (10.8±7.9% and 13.1±6.6%) and 3 hr (2.7±10.1% and 7.0±7.2%) times. For the B and C methods, AUC_{24} prediction errors were significantly less for the normal renal function group compared to groups with 0.5, 0.25, and 0.05 fractions of renal function. Equations were determined to predict AUC_{24} based upon C_{mid} and C_{min} and these AUC_{24} estimates were better than Methods B and C with % errors of 0.3±5.9% and 0.6±10.1%, respectively. After 3-7 days of VAN dosing, values of C_{mid} or C_{min} may be useful in accessing AUC_{24} and appear to be a better approach than methods utilizing 3 sampling times.

Woodfin, Elizabeth (G)
Title: Comprehensive screening for suspected hypothyroidism
Primary Author (and presenter): Woodfin, Elizabeth O.
Additional Authors: Sanderson, Bonnie
College/School: School of Nursing
Description: There are guidelines for screening for suspected hypothyroidism yet many providers do not follow through. The purpose of this project is to educate and encourage practitioners to increase their knowledge and confidence in screening and diagnosing suspected hypothyroidism. Evaluations are used to evaluate the effectiveness of education by identifying differences in scores prior to and after an educational session. Participants included practitioners in a family practice clinic. Prior to education, a questionnaire was given to assess current knowledge and practice patterns in screening for suspected hypothyroidism. The questionnaire evaluated their understanding on the current guidelines, their knowledge on the signs and symptoms present in suspected hypothyroidism and medications used to treat the disease. Measures included comparing pre- and post correct answers to evaluate improvement in knowledge, and assessing perceived importance of more comprehensive evaluation. Descriptive statistics described the population and independent t-tests compared the differences of pre-post mean scores for statistical significance (p<0.05). A total of X practitioners attended the session and completed the pre/post evaluation. All questions were relating to the screening of suspected hypothyroidism. Changes of mean scores included those of confidence in diagnosing, familiarity of current guidelines, lab tests ordered, symptoms listed, clinical signs and symptoms, medications, checking for antibodies, and further testing. Among the practitioners, the questionnaire scores improved from pre-score (mean, sd) to post (mean, sd) significantly (p=<0.05). Knowledge and confidence among practitioners who screen for suspected hypothyroidism improved with education. This allows for practitioners to further test and screen patients, which may allow for better follow-up, medication changes, decrease in symptoms, and improved referrals to specialists when needed.

Woodie, Lauren (G)
Title: Characterization of recombination-activating gene 1 function in peripheral physiology and hippocampal synaptic plasticity
Primary Author (and presenter): Woodie, Lauren N.
Additional Authors: Alhowail, Ahmad; Bloemer, Jenna; Smith, Warren; Suppiramaniam, Vishnu; Greene, Michael
Department: Department of Nutrition, Dietetics, & Hospitality Management, Department of Drug Discovery and Development.
College/School: College of Human Sciences, Harrison School of Pharmacy

Description: Recombination-activating gene 1 (Rag1) matures T and B cells, which are characterized in the regulation of lipid glucose metabolism and insulin regulation. Mice with Rag1 knock-out (KO) have inactive T and B cells and exhibit increased adiposity and insulin resistance in peripheral tissues. Diet-induced insulin resistance is also observed in the brain resulting in impaired memory. Insulin resistance in the hippocampus impairs synaptic plasticity mechanisms including long-term potentiation (LTP), a well-accepted cellular model of memory. Rag1 KO has been characterized in rodent models of obesity and insulin resistance, however, there are no studies exploring the effects of impaired metabolism on learning and memory in this rodent model. Our study aimed to explore the effects of T and B cell immune deficiency on diet-induced insulin resistance and memory. Rag1 KO mice and WT B6 mice were introduced to a chow diet with tap water (CD) or a 55% Western diet supplemented with 1% sugar water (HFS) and maintained for 12 weeks. Rag1 KO and WT on HFS diet had higher body weight than CD groups, but HFS groups did not show any significant difference between strains. HFS groups had significantly elevated blood glucose and normalized body fat than CD animals, but were not different from one another. Interestingly, CD animals had heavier brain weight than the HFS animals in both WT and Rag1 KO strains. Electrophysiology assessment revealed no difference in LTP between Rag1 KO and WT on the same diet, but HFS fed animals had higher LTP than CD groups suggesting altered synaptic plasticity in the HFS fed brain. Our data suggest that diet has an effect on fat deposition, glucose tolerance and LTP, but B and T cell function doesn’t have an effect on metabolism or neural function in animals on the same diet.

Wu, Hao (G)
Title: Process-based design within the post-industrial model
Primary Author (and presenter): Wu, Hao
Department: School of Architecture, Planning, and Landscape Architecture
College/School: College of Architecture, Design and Construction

Description: Landscape can be generally misunderstood in the way of splitting its components into elements or objects and then ordering them by a certain hierarchy. This understanding grounds landscape in a static perspective, and simultaneously twists the design process and representing medium. The misunderstanding – landscape is static – omits the truth that the fluid, dynamic and hybrid tendencies of the whole living systems is the essence of landscape. Process-based design is based on the recognition that landscape is constantly changing and growing over time. Thus it immerses itself in revealing and selectively working with the hidden and omitted connections of the setting landscape rather than planning for a complete vision which frequently overrides stationary data analysis to objectify the decision making, thus guiding towards a static composition. The application of process-based design is specified into three points of emphasis:
a. Investigating the processual richness of the given landscape through the lens of
time and selectively working with them. The design should imply or be supported by the
setting processes. The design outcome may even yield to the given processual setting.
b. Tangibly and legibly mirroring the in-between design process and the design intent.
c. Providing opportunities for the public realm to be involved in the processes and evolve
over time with the field. The public realm here is considered as the most important
medium group to pass on the nature of non-static landscape. It has great potential to
fundamentally adjust the misunderstanding of static landscape when the public witness
and appreciate the ongoing processes towards relentless “becoming.”

Process-based design as the product of revealing the time and culture of the environment,
is capable of highlighting the time sequence of the environment. It generates the wider
dialogue for the public to engage with the timeline of the space. From the historic
significance to the future revolutions, this design approach offers the public opportunities
to experience and understand every transitional moments and processes.

Xie, Zhaoxing (G)

Title: Effect of recycling agent on performance of high RAP and RAS mixtures: field
and lab experiments

Primary Author (and presenter): Xie, Zhaoxing; Tran, Nam

Additional Authors: Julian, Grant; Taylor, Adam

Department: Department of Civil Engineering

College/School: Samuel Ginn College of Engineering

Description: Reclaimed asphalt pavement (RAP) and recycled asphalt shingles (RAS)
have been increasingly used in asphalt mixtures. The use of RAP and RAS in asphalt
mixtures not only reduces the consumption of virgin materials, conserves energy and
protects the environment but also improves rutting resistance of asphalt pavements.
However, as more recycled materials are used in asphalt mixtures, there is increasing
concern over their potential negative effects on the mix cracking resistance. To improve
the cracking resistance of asphalt mixtures with high RAP/RAS contents, one of the
approaches considered is using recycling agents to potentially restore performance
properties of the aged binder. This project was conducted to evaluate the effect of a
recycling agent (RA), known as Hydrogreen®, on the long-term field performance of
high RAP and RAS mixes. The field study consisted of three test sections, each
constructed by placing a dense-graded surface lift at a depth of 1.75 inches on SR 7 near
Harrisonville, Missouri in August 2013. The three mixes placed in the three test sections
included (1) a control mix containing 30% RAP using an SBS-modified PG 70-22 binder
with no RA, (2) a 40% RAP mix using the same PG 70-22 binder with RA, and (3) a
25% RAP and 5% RAS mix using a neat PG 64-22 with RA. This paper presents data
collected during the construction of the test sections, laboratory performance testing
results, and early field performance. The research results showed that the recycling agent
could be used in the 40% RAP and 25% RAP and 5% RAS mixes to achieve similar
construction quality, laboratory performance, and early field performance to the 30%
RAP control mix. As these sections are still in service, it is recommended that they
continue to be monitored in order to evaluate their long-term performance.

Yanes, Julio (G)
Title: Neurobiological impact of chronic cannabis use: a meta-analysis of functional neuroimaging studies

Primary Author (and presenter): Yanes, Julio A.
Additional Authors: Riedel, Michael C.; Ray, Kimberly L.; Kirkland, Anna; Robinson, Jennifer L.; Laird, Angela R.; Sutherland, Matthew T.

Department: Department of Psychology

College/School: College of Liberal Arts

Description: As recently as March of 2015, 23 states and the District of Columbia have enacted legislation that facilitates using cannabis to treat various medical conditions, with several states permitting recreational use. Despite this sharp rise in prevalence, our understanding of the neurobiological changes associated with chronic use remains limited. Here, we derived brain regions consistently showing functional alterations among chronic users within the Activation Likelihood Estimation (ALE) meta-analytic framework. Results from 32 studies, involving 595 users and 559 comparison controls, were examined for statistically convergent modulations ($p_{\text{cluster-corrected}}<0.05$; $p_{\text{voxel-wise}}<0.005$). When considering convergent hypoactivations, chronic users showed reduced functional activity in the anterior cingulate, dorsolateral prefrontal, insular, parietal and occipital cortices. Ancillary analyses suggested co-occurring alterations among the anterior cingulate and prefrontal cortices (sub-network 1), which were associated with pain and conflict monitoring. Moreover, co-occurring alterations were found in parietal and occipital regions (sub-network 2), linked with fine motor movement and vibrotactile perception. When considering convergent hyperactivations, chronic users showed increased functional activity in the caudate, inferior frontal gyrus, medial frontal gyrus, bilateral prefrontal and parietal regions. Ancillary analyses suggested co-occurring alterations among the caudate and prefrontal regions (sub-network 3), which were associated with processing rewards, pain, and action inhibition.

These meta-analytic findings indicate that chronic cannabis use is linked with region-specific effects across the brain, as well as with various mental processes. Enhanced understanding of cannabis’s impact on the human brain is important for providing patients, healthcare providers, and policy makers with scientific information allowing for informed decision-making regarding cannabis use.

Yang, Liu (G)

Title: Foraging orientation, oviposition preference and development of kudzu bug, *Megacopta cribraria* (Hemiptera: Plataspidae) on six legume crops

Primary Author (and presenter): Yang, Liu

Additional Authors: Hu, Xingping

Department: Department of Entomology & Plant Pathology

College/School: College of Agriculture

Description: *Megacopta cribraria* (F.) (Hemiptera: Plataspidae) is a recent exotic invasive insect in North America. Series of greenhouse choice tests were conducted to evaluate foraging orientation preference of overwintered adults for plant growth stages and plant species of six entries. The flowering stage (R1) was the most attractive (attracted >50% of the tested adults) in *Glycine max* (soybean) and *Phaseolus lunatus* (lima bean), whereas the preferred stage (attracted relatively more adults than other stages) varied among other legumes. Given choice of six entries their
respective attractive growth stage, adult *M. cribraria* significantly preferred lima bean over soybean and *Phaseolus vulgaris* (kidney bean), but showed little interest to others. In greenhouse no-choice test, copulated adults oviposited and neonates completed development on soybean, *Vigna radiata* (mung bean) and lima bean, but development survival on lima bean was significantly low. These results will be helpful for predicting timing of invasion, optimizing timing of treatment and trap cropping for efficient control of this pest.

**Yang, Zechun (UG)**

**Title:** Assigning uncertainties to diagnostics of astrophysical objects

**Primary Author (and presenter):** Zechun Yang

**Additional Authors:** R. Smith, A. Foster, C. Ballance, M.S. Pindzola, R. Sutherland, S.D. Loch

**Department:** Department of Physics

**College/School:** College of Sciences and Mathematics

**Description:** Most of the information that we have about astrophysical objects comes from the light that is given off by them. This light is split into the colors of the spectrum and used to determine what elements are in the objects, along with their properties such as temperature, density, and velocity. This basic information in turn allows scientists to determine large-scale quantities such as the age of the Universe, the rate of acceleration of the Universe, and the proportion of the energy in the Universe that consists of dark matter and dark energy. Implicit in these studies is the use of atomic data to interpret the spectra of astrophysical objects. However, it is usually assumed that this atomic data has no uncertainty, thus the range of possible values of the atomic data is not reflected in the error bar on the final diagnosed quantity. This is in contrast to most other areas of science where one can associate an uncertainty with any measurements or diagnosed quantity. It is likely that many astrophysical mysteries are in fact due simply to such uncertainties. For this project, we present methods to assign uncertainties to atomic physics processes and use a Monte-Carlo approach to propagate the uncertainties. We use O⁶⁺ as an example, considering two well known diagnostics (for temperature and density), showing how to put a range of values on the plasma parameters.

**Yeo, Yoonsoo (UG)**

**Title:** Simultaneous saccharification and fermentation of switchgrass and waste paper to bioethanol

**Primary Author (and presenter):** Yeo, Yoonsoo

**Additional Authors:** Daniels, Nyeshia; Ingram, Christiane; Okeke, Benedict

**Department:** Department of Biology

**College/School:** College of Arts and Sciences, Auburn University Montgomery

**Description:** Fossil fuel is non-renewable and a major cause of atmospheric pollution. Moreover, crude oil reserve is decreasing, and demand is increasing due to rapid industrialization. These factors have introduced renewed world-wide interest in the development of biofuel. The first process in conversion of plant materials to bioethanol is saccharification involving the enzymatic conversion of biopolymers into simple fermentable sugars, and the second process is fermentation of sugars to bioethanol. The natural cellulolytic and xylanolytic fungal isolate, *Trichoderma* sp. SG2 (PTA-120389) is a strong producer of β-glucosidase and is a candidate organism for simultaneous saccharification and fermentation (SSF) of biomass to ethanol. This study explored SSF of biomass to ethanol
using cell-free enzymes and whole-broth enzymes for biomass saccharification and fermentation to bioethanol. Furthermore, stability of biomass hydrolyzing enzymes of *Trichoderma* SG2 at different temperatures for SSF was examined. In whole broth SSF of switchgrass and waste paper powder the highest ethanol yield was observed with 5% shredded waste paper followed by 10% switchgrass. Results indicate that whole broth SSF compared with cell free enzyme SSF using *Trichoderma* SG2 enzyme is potentially a more cost-effective approach for converting biomass to bioethanol.

**Yooket, Pattanin (G)**

**Title:** Regulation of Thiamine Transporter SLC19A3 by HIF1α: a possible potential therapeutic in heart failure

**Primary Author (and presenter):** Pattanin Yooket

**Additional Authors:** Abdullah Alasmari, Shravanthi Mouli, Robert Arnold, Rajesh Amin

**Department:** Department of Drug Discovery and Development

**College/School:** Harrison School of Pharmacy

**Description:** Heart failure (HF) is the major health concern leading to increased morbidity and mortality in the U.S.A. Thiamine (vitamin B1) is a major coenzyme primarily involved as a cofactor in the redox reactions in the body and is critical in metabolic reactions including glucose metabolism, pentose cycle and the TCA cycle. Thiamine is significantly involved in the mitochondrial energy metabolism, ATP production, and reduction of cellular oxidative stress and is, therefore, a key player of mitochondrial biogenesis. The deficiency in the formation of the active form of thiamine or thiamine pyrophosphate (TPP), in the heart is believed to lead to myocardial energy dysregulation, increased oxidative stress and subsequently heart failure. Therefore, improving tissue TPP levels would significantly improve mitochondrial energy metabolism and regenerate capacity of antioxidant under ischemic-reperfusion injury and eventually slowing the progression of heart failure (HF) secondary to I/R injury. Administration of thiamine in cardiomyocytes was found to be cardioprotective against ischemic injury. Recently, we have observed that the master transcription factor, Hypoxia Inducible Factor-1 (HIF-1), is involved in the cardioprotective response to ischemia by regulating myocardial energetics. Our preliminary data indicated that HIF-1α transcriptionally regulates the thiamine transporter gene expression, SLC 19A3 in cardiomyocytes, by approximately 4 to 6 fold increase in expression under hypoxic conditions at 48 and 72 h when compared to a normoxic condition. This result is correlated with the transporter protein expression which increase approximately 4 folds compared to normoxia as well. These findings led us to hypothesize that the expression of SLC19A3 was transcriptionally regulated by HIF-1α and the HIF-1α-SLC19A3 signaling axis could be a potential cardioprotective therapeutic against myocardial energy dysregulation and CHF. Our future work will utilize a HIF-1α knock out model to study the effect of preconditioning with thiamine on ischemic reperfusion injury to better understand the transcriptional control of thiamine homeostasis gene and the mechanism underlying cardioprotective activity of thiamine against ischemic heart.

**Young, April (G)**

**Title:** Evidence based practice for an asthma action plan
Primary Author (and presenter): Young, April L.
Additional Authors: Ellison, Kathy Jo
College/School: School of Nursing
Description: Asthma is the national leading cause of childhood morbidity from chronic disease. Evidence-based guidelines recommend every child have a written asthma action plan. The purpose of this project was to promote respiratory health and investigate the efficacy of an asthma action plan to improve health outcomes and impact practice change. Comparison of the participant’s pre-post asthma control and symptoms were assessed. The target population included pediatric patients (2-18 yrs), with asthma, being treated by a primary care provider at an outpatient facility. Following participant agreement, self-management education and an asthma action plan was provided. The nurse practitioner reviewed prevention and response strategies. Questionnaires and interviews were used to collect pre-post implementation data. Follow-up phone calls were made at 2-3 weeks to assess participant symptoms and adherence to the action plan. Evaluation of patient-focused behavioral and health outcomes compared pre-post data. The impact of the practice change was measured by improved asthma control, and decreased exacerbations, school absences, and outpatient/hospital visits. Descriptive statistics were calculated on all variables and pre-post responses were compared with paired t-tests. X consented to participate (% females), and average age of X (sd) yrs. Follow-up indicated X% utilized the plan. Frequency analysis showed an improvement in subjective asthma control; Pre X%, post X% rated control as excellent. Comparison of pre-post data reveals significant symptom improvement from pre (mean, sd) to post (mean, sd) (p=<0.05). The results show integration of an asthma action plan, by primary care providers within an outpatient setting, improved pediatric asthma prevention, management, and health outcomes. Implications for the larger project are to expand implementation within the practice to include more providers, and to evaluate long-term patient outcomes.

Young, Taylor (UG)
Title: PPAR-gamma activation helps clear insulin induced amyloid beta
Primary Author (and presenter): Taylor W. Young
Additional Authors: Anna Marie Buchanan, Rajesh Amin
Department: Department of Drug Discovery and Development
College/School: Harrison School of Pharmacy, College of Sciences and Mathematics
Description: Type 2 diabetes is known to be a significant risk factor for Alzheimer’s disease (AD). The relationship between diabetes and AD is so prevalent that it has become known as “type 3 diabetes”. Many reports verify direct pathological links such as amyloid-beta (Aβ) plaque formation and insulin resistance in the brain leading to hyperinsulinemia, which highlights the contribution of diabetes to the development of AD. Insulin sensitizing agents, thiazolidinediones, that activate the nuclear receptor peroxisomal proliferator activating receptor gamma (PPARγ) have been shown to improve memory deficits in rodents; however, these agonists display poor blood brain barrier (BBB) permeability and their clinical application is limited by adverse effects on human health. Poor BBB permeability requires high dosing, which increases the risk of deleterious effects such as myocardial infarction and bladder cancer. Further, there
lacks knowledge for understanding why hyperinsulinemia in the brain is so closely related to development of AD. In order to explore specific targets for selectively activating PPARγ in the hippocampus, we developed selective PPARγ modulators (SPPARγMs). Our lead compound, Compound 9, was found to have enhanced BBB permeability, stimulated expression of brain derived neurotropic factor (BDNF), and improved cognitive deficits in diabetic type 2 mice. More specifically, we found that Compound 9 induced an increase in insulin degrading enzyme (IDE) in hippocampal neuronal cells, which is centrally involved in degrading amyloid beta. Our research investigates the activity of IDE in a hyper-insulin environment, where it is known to be competitively inhibited by insulin. As a result, IDE is not degrading Aβ properly and plaque begins forming in the brain leading to AD. These studies express the potential for a novel therapeutic drug that can be applied to combat the effects of hyperinsulinemia in diabetic patients and hinder the development of Alzheimer’s disease.

Zeng, Yuan (G)
Title: Novel constitutive and inducible antibacterial activities against multidrug resistant bacterial pathogens in the Eastern Subterranean Termite Reticulitermes flavipes
Primary Author (and presenter): Zeng, Yuan
Additional Authors: Hu, Xingping; Suh, Sang-Jin
Department: Department of Entomology & Plant Pathology
College/School: College of Agriculture
Description: The Eastern subterranean termite, Reticulitermes flavipes, faces strong pathogenic pressures as they nest and forage in soil, reflecting its remarkable capacity to control and eliminate pathogens. The constitutive and inducible antibacterial activities of R. flavipes (Blattodea: Isoptera: Rhinotermitidae) were investigated against three nosocomial multidrug resistant pathogens (MDRs) (Pseudomonas aeruginosa, methicillin-resistant Staphylococcus aureus (MRSA), Acinetobacter baumannii), six infectious human pathogens (Escherichia coli O157:H7, Salmonella enterica serovar Typhimurium, Staphylococcus aureus, Streptococcus pyogenes, a laboratory strain E. coli), and a common soil-borne entomopathogenic bacterium (Bacillus subtilis). Naïve termite body extract exhibited a broad-spectrum constitutive activity on all six non-MDRs and the one entomopathogen but showed no activity on the three MDRs. Feeding termites with heat-killed MDR pathogens induced dramatic anti-MDR activities and altered activities against non-MDR bacteria. Termites fed with heat-killed P. aeruginosa exhibited potent activities against P. aeruginosa and MRSA, and enhanced constitutive activities against all but one non-MDRs. Termites fed with heat-killed MRSA displayed inducible potent activity specifically on MRSA, altered constitutive activities on three Gram-positive non-MDRs (B. subtilis, S. aureus, and S. pyogenes), and inhibited constitutive antibacterial activities on the three Gram-negative pathogens (E. coli, S. Typhimurium, and P. aeruginosa). Neither the naïve nor the MDR induced activities were effective against A. baumannii. Comparative assays of inhibitory activities between hemolymph and hindgut extracts indicated hemolymph was the primary source of antibiotic activities. Two-dimensional gel electrophoresis analyses illustrated that 83 proteins and 38 proteins were differentially expressed at least 2.5-fold in the hemolymph of termite when it was fed with heat-killed MRSA and P. aeruginosa, respectively. Our results provide the first evidence of inducible and constitutive antimicrobial activities produced by R. flavipes against multiple bacterial pathogens. These
findings expand our knowledge about termite immunity mechanisms and suggest potential new avenues of combating the MDR pathogens such as MRSA and *P. aeruginosa*.

**Zhang, Bowen (G)**

**Title:** Net exchange of CH$_4$ fluxes between terrestrial ecosystem and atmosphere in the Arctic-Boreal Region under future climate change scenarios

**Primary Author (and presenter):** Bowen Zhang

**Additional Authors:** Hanqin Tian, Chaoqun Lu, Jia Yang

**College/School:** School of Forestry and Wildlife Sciences

**Description:** Methane (CH$_4$) is an attractive target, due to its relative (approx. 28 times) higher global warming potential (GWP) and shorter lifetime (approx. 9 years), to reduce the total radiative forcing caused by GHGs. Due to large portion of wetland and permafrost distribution as well as great soil carbon storage, boreal and arctic terrestrial ecosystem has long been recognized as a potentially huge CH$_4$ source in the future. In the 21$^{st}$ century, temperature is expected to increase globally, with largest increase in this region, while the change in precipitation may vary substantially across the globe, with high confidence of increasing in the boreal and arctic region. However, the question of how future climate change might influence the CH$_4$ emissions still remains unclear. Increasing disturbances, like permafrost-thaw and climate extreme, would greatly change the patterns and variations of CH$_4$ emission and further affect the feedback between terrestrial ecosystem and climate change. In this study, we used a process-based model (Dynamic Land Ecosystem Model), together with temperature, precipitation, atmospheric CO$_2$, and nitrogen deposition projections under the RCP 26, RCP 45 and RCP 85 scenarios, to quantify the magnitude, spatial and temporal variation of CH$_4$ fluxes across the boreal and arctic regions. By implementing a set of factorial simulations, we further quantify the relative contribution of climate, atmospheric CO$_2$ and nitrogen deposition to the CH$_4$ fluxes. Our results indicated that the estimated CH$_4$ emission from wetland showed an increasing trend from 2006-2099. Under the RCP26, RCP45 and RCP85 scenarios, the magnitude of CH$_4$ emission from wetland in the study area is expected to increase 5%, 16% and 56% compared with the contemporary level, respectively. The analysis on the attribution of multiple environmental factors on the CH$_4$ emission showed that climate was the dominant factor for the increase in the CH$_4$ emission, followed by atmospheric CO$_2$ and nitrogen deposition. Given the importance of the potential positive feedback between CH$_4$ emission and climate change, it is vital to have reasonable estimation of CH$_4$ emission before developing the adaptation strategies.

**Zhang, Lingxin (G)**

**Title:** Identification of a biased agonist for P2Y2 receptor to suppress pro-thrombotic gene expression in human coronary artery endothelial cells

**Primary Author (and presenter):** Lingxin Zhang

**Additional Authors:** Chuan Wang, Yiwei Liu, Wanshu Ma, Thamer Alqurashi, Jianzhang Shen

**Department:** Department of Drug Discovery and Development

**College/School:** Harrison School of Pharmacy

**Description:** Recently we reported that in human coronary artery endothelial cells (HCAEC), the P2Y2 nucleotide receptor (P2Y2R) regulates the pro-
thrombotic gene tissue factor (TF) expression through positive and negative signaling mechanism. Here, we report the identification of a P2Y2R ligand JZS0312 which selectively activates the negative, but not the positive pathways, leading to decreased TF expression. Unlike the endogenous agonist UTP, JZS0312 alone had no effect on TF mRNA transcription, but it unexpectedly inhibited UTP-induced TF expression. Mechanistic study showed that JZS0312 induced intracellular Ca\(^{2+}\) mobilization in HCAEC which exhibited the same efficacy as UTP and was inhibited by AR-C118925, a P2Y2R-selective antagonist. However, when evaluated in their activation of the MAPK pathways, JZS0312 only activated the ERK1/2, but not JNK and p38, whereas UTP activated all the three, suggesting JZS0312 as a biased ligand for the P2Y2R. This notion was supported by the fact that JZS0312-induced ERK1/2 activation was inhibited by AR-C1189258 and it had no effect on ERK1/2 in P2Y2R-null cells. In addition, JZS0312 selectively activated the TF gene repressor Fra-1, but not the positive AP-1 subunits c-Jun and ATF-2, whereas UTP activated all of them. Furthermore, luciferase activity assay indicates that JZS0312 suppressed TF gene promoter activity via ERK1/2 activation, while UTP increased overall TF promoter activity. These findings reveal that JZS0312 acts as a biased agonist in human endothelial P2Y2R, in which it selectively activates the ERK1/2-Fra1 pathway, leading to suppression of TF gene transcription. Thus, JZS0312 represents the first identified biased ligand in the P2Y receptor family, opening new avenue for potential drug discovery in relevant inflammatory and thrombotic diseases.

Zhao, Rong (G)

**Title:** Solar-driven waste-to fuels in a hybrid photoelectrochemical reactor

**Primary Author (and presenter):** Zhao, Rong

**Additional Authors:** Radich, James

**Department:** Department of Chemical Engineering

**College/School:** Samuel Ginn College of Engineering

**Description:** With the deficiency of fossil energy and the increasing concerns of environmental issues, substitute energies of fossil fuels have gained great attention. Of which, hydrogen is gained most concerns because it is economic, carbon-free and renewable. Chemicals such as hydrazine have been taken into account as the promising hydrogen sources. However, factors such as cost, toxicity and sustainability limit their application in hydrogen production. Some other chemicals with high hydrogen content such as urea and human urine are considered as the alternative hydrogen source because of wide availability, low cost and non-toxicity. Besides, it can solve the waste problem at the same time. Conventional methods to produce hydrogen from urea are energy-consuming and hence costly. Solar driven hydrogen production by employing catalysts in photoelectrochemical cell is a promising way as it can produce hydrogen continuously by using natural sunlight. CdS is a good candidate as its narrow bandgap of about 2.4eV, which can absorb the sunlight with wavelength longer than 510 nm. We describe herein a high performance photoelectrode FTO/TiO\(_2\)/CdS/Ni(OH)\(_2\) prepared by successive ionic layer adsorption and reaction (SILAR) in hydrogen production in urea and human urine. In the electrode, CdS generates electrons and holes under illumination, and electrons are accepted by TiO\(_2\) and transferred to cathode to reduce H\(_2\)O to H\(_2\), and holes are accepted by Ni(OH)\(_2\) and oxidize Ni(OH)\(_2\) to NiOOH and NiOOH is
used to oxidize urea or human urine. Ni(OH)₂ is performed as the photocatalyst. With the successful generation of H₂ and oxidation of human urine, this electrode has a potential to be applied in real life and hence has a practical significance.

Zheng, Chen (G)
**Title:** TRAF6 leads to ubiquitination and activation of Akt
**Primary Author (and presenter):** Zheng, Chen
**Additional Authors:** Thangiah, Geetha; Kothari, Vishal; Carter, Andrea; Sustarich, Jake; Jeganathan, Ramesh
**Department:** Department of Nutrition, Dietetics, & Hospitality Management
**College/School:** College of Human Science

**Description:** Akt, a serine/threonine kinase, also known as protein kinase B, is responsible for glucose metabolism upon insulin signaling. Binding of insulin to its receptor on cell membrane activates several downstream signaling components in sequence, which eventually leads to Akt phosphorylation and activation. For its activation, the Akt is translocated from cytoplasm to cell membrane. This process is through Lys63-linked ubiquitination by TRAF6, an ubiquitin E3 ligase. However, it remains unclear where the interaction occurs. Here, we show that TRAF6 through its RING finger domain interacts with Akt, leading to Akt ubiquitination, which is essential for Akt activation upon insulin stimulation. Absence of TRAF6 or its RING finger domain resulted in impaired the Akt ubiquitination thereby prevented it from activation. These results suggest that TRAF6 induces Akt ubiquitination by interaction of its RING finger domain with Akt, which regulates Akt activity in insulin signaling.

Zhou, Lang (G)
**Title:** Electrochemical proximity assay of platelet-derived growth factor with a multi-parametric/multimodal spectroscopy apparatus and its mechanisms study
**Primary Author (and presenter):** Zhou, Lang
**Additional Authors:** Arugula, Mary; Simonian, Aleksandr
**Department:** Department of Mechanical Engineering
**College/School:** Samuel Ginn College of Engineering

**Description:** Platelet-derived growth factor (PDGF) are proteins that play an important role in the regulation of tumour growth and division. PDGF has been associated with cancer and other proliferative disease states, such as atherosclerosis and glomerulonephritis. However, as a potential cancer marker, PDGF is difficult to detect due to its trace amount in real blood sample. Recently developed Electrochemical Proximity Assay (ECPA) is an extremely flexible and sensitive technique with high potential for quantitation of a variety of proteins in clinical laboratory settings or at the point-of-care systems. Here, a newly designed Multi-Parametric/Multimodal Spectroscopy Apparatus techniques was used for PDGF sensitive detection. With the combined advantages of three surface characterization techniques such as ECPA, surface enhanced fluorescence and surface plasmon resonance spectroscopy, the sensitivity of PDGF quantification was significantly improved with potential to reach as low as fmol level. Additionally, the mechanisms of action and dynamics of sensing and/or protein recognition in the process of ECPA was studied.

Zinner, Max (UG)
Title: When church and state collide: Mormonism and polygamy in the late 19th century  
Primary Author (and presenter): Zinner, Max G.  
Department: Department of Sociology, Anthropology, and Social Work  
College/School: College of Liberal Arts  
Description: Of all the reasons that Mormonism was viewed negatively in the nineteenth century, polygamy was among the most infamous. It serves as one of the greatest examples of how the Mormon Church, also known as the Church of Jesus Christ of Latter Day Saints, tried to claim church sovereignty over a part of their lives. I argue that the United States legal system was a primary factor leading to the end of plural marriage in the LDS church. In addition to setting a legal precedent that remains in place to this day, the cases surrounding Mormonism and polygamy are an example of how the courts responded to what they saw as deviant practices during the latter half of the 19th century.

Zuromski, Kelly (G)  
Title: Do changes in insomnia precede changes in suicide ideation? A latent change model of community adults over a brief interval  
Primary Author (and presenter): Zuromski, Kelly L.  
Additional Authors: Cero, Ian; Witte, Tracy K.  
Department: Department of Psychology  
College/School: College of Liberal Arts  
Description: Over the past 50 years, most research on suicidal behavior has focused on a narrow set of risk factors (e.g., depression, hopelessness), that are, in general, weakly predictive of suicidal behavior (Franklin et al., 2014). Most existing research is also limited by use of long follow-up periods, which renders investigation of proximal suicide risk impossible. To address these limitations, the current study employs an intensive longitudinal design and sophisticated statistical methodology to study imminent risk, with focus on the predictive power of a robust, yet less studied, risk factor for suicide (i.e., insomnia; Bernert et al., 2015). Community adults with a history of suicidal behavior were recruited through Amazon’s Mechanical Turk (N = 450), and completed self-report online surveys at six time points over a 15-day period. Advanced statistical modeling (i.e., latent change modeling; Ferrer & McArdle, 2010) will be utilized to investigate whether changes in insomnia symptoms precede subsequent changes in suicide ideation, or vice versa. This technique represents cutting-edge statistical methodology for investigating longitudinal multivariate change. Unlike other commonly used statistical techniques (e.g., regression), this method allows for nuanced exploration of dynamics among variables (i.e., growth and interrelation processes) and directionality of effect. Data collection is complete, and analyses will be completed during March 2016. It is hypothesized that changes in insomnia will predict changes in suicide ideation, but not vice versa. The current study methodologically improves upon limitations in the suicidal behavior literature. Results will yield a nuanced understanding of the relationship between insomnia and suicidal behavior, which may inform improved risk assessment, and provide support for the use of clinical interventions for insomnia that could concurrently lower risk for suicidal behavior.