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Table of Contents

Division/Section	Page
Division of Agriculture, Forestry, and Wildlife	4
Division of Biological Sciences	6
Environmental Sciences Section	6
Microbiology Section	8
Molecular and Biomedical Biology Section	10
Zoology Section	13
Division of Physical Sciences	18
Chemistry Section	18
Computer Science Section	19
Materials Science and Engineering Section	22
Physics Section	24
Division of Science Education	28
Higher Education Section	28
Division of Sciences and Humanities	29
Division of Social Sciences	31
Acknowledgement	33

The following abstracts of oral and poster presentations represent those received by the Abstract Editor. Authors' affiliations are abbreviated as follows:

AFRL	Air Force Research Laboratory
AZP	Alexandria Zoological Park
BHU	Binghamton University
CPMC	Calcasieu Parish Mosquito Control
GSU	Grambling State University
LSU-A	Louisiana State University at Alexandria
LSU-E	Louisiana State University, Eunice
LSUHSC-NO	Louisiana State University Health Sciences Center-New Orleans
LSUHSC-S	Louisiana State University Health Sciences Center-Shreveport
LTU	Louisiana Tech University
LU-NO	Loyola University, New Orleans
McSU	McNeese State University
MnSU	Minot State University
NiSU	Nicholls State University
NRL-DC	Naval Research Lab, Washington, D.C.
NSU	Northwestern State University
SLU	Southeastern Louisiana University
SU-BR	Southern University, Baton Rouge
SUAMC	Southern University and A&M College
TU	Tulane University
UCLA	University of California, Los Angeles
UD	University of Dayton
UKY	University of Kentucky
ULL	University of Louisiana-Lafayette
UP	University of Poitiers
USDAFSSRS	USDA Forest Service Southern Research Station
USUHS	Uniformed Services University of the Health Sciences
UTMB	University of Texas Medical Branch

Division of Agriculture, Forestry & Wildlife

Godwin, C. SLU. **Assessment of ATV and ORV impacts on softshell turtle nests.**—Recreational vehicle use (e.g., all-terrain vehicles or ATV's) has become increasingly popular in recent years, and is particularly prevalent in the southeastern United States. Numerous studies have indicated negative effects of ATV's on the environment, especially in and around wetlands, including wetland degradation, soil erosion, destruction of vegetative communities, and direct animal mortality via impact. However, the impact of ATV's on nest success of turtles has not been documented. The beaches of the Comite River in southeastern Louisiana bring into close contact ATVs and the nesting sites for two species of softshell turtles (*Apalone mutica* and *Apalone spinifera*). The present study aims to understand the impacts of the ATVs on softshell turtle nests and thus the turtle populations. A study performed in 1993-1994, when ATVs were absent, provides a baseline for assessing the current impacts. Preliminary analyses from the first field season show that ATV's impacted 35% of nests.

Ivey, B., W. Storer, B. Chung, and C. Sherrill. McSU. **The effects of Utilize and/or Hydra-Hume on yield and plant composition of Bermuda grass.**—Utilize and Hydra-Hume are soil amendments to be used in addition to a standard fertilization program for improved production in various agronomic applications. Utilize is claimed to increase chlorophyll production and photosynthesis. The primary ingredient in Utilize is a biotic extract. Hydra-Hume is claimed to increase fertilizer uptake and improve soil retention of nitrogen and phosphorus for better nutrient availability. The primary ingredient in Hydra-Hume is humic acid. A study was performed to evaluate the effects of application of these products alone or in combination on yield and plant composition of Bermuda grass from two separate production programs. At the 30 day cutting, plots treated with Utilize showed increased crude protein percentage at both locations. Plots treated with Hydra-Hume improved crude protein percentages at the Kinder, LA, location with the combination treatment producing a synergistic effect on yield and crude protein.

Sherrill, C., W. Storer, and B. Ivey. McSU. **The effects of supplementary mineral injection on conception rate and body weight of heifers.**—An experiment was conducted to evaluate the effects of Multimin (an injectable mineral supplement for cattle) on body weight and conception rate in heifers. Yearling heifer calves participating in the McNeese Heifer Development Program were used for this study. Heifers were administered the injection 30 days prior to fixed-time artificial insemination. Individual body weight was measured at Multimin administration (d 0), insemination (d 30), and pregnancy determination (d 60). Heifers were scanned by transrectal ultrasound to determine pregnancy 30 days after artificial insemination. Multimin improved conception rate, but did not influence weight gain.

Sullivan, B. USDAFSSRS. **Identification of the sex pheromone of the baldcypress leafroller.**—The baldcypress leafroller, *Archips goyerana* Kruse (Lepidoptera: Tortricidae), is a specialist on *Taxodium distichum* (L.) Richard and has caused serious defoliation in swamps of southeastern Louisiana, accelerating decline of baldcypress forests concurrently suffering nutrient depletion, prolonged flooding, and saltwater intrusion. We investigated the composition of the sex pheromone of this species. Coupled gas chromatography–electroantennographic detection (GC-EAD) analyses indicated that male antennae were sensitive to four compounds

[(Z)-11-tetradecenyl acetate (Z11-14:OAc),(E)-11-tetradecenyl acetate (E11-14:OAc), (Z)-9-tetradecenyl acetate (Z9-14:OAc), and (Z)-11-tetradecen-1-ol (Z11-14:OH)] present in female abdominal tip extracts in an approximately 100:1.5:0.6:10 ratio. In trapping trials performed in Maurepas swamp, moths were attracted to blends of these four components presented in approximately the female-produced ratios. Elimination of Z11-14:OH had no impact on moth response. The three component blend has potential to be used in traps to detect and measure *A. goyerana* populations.

Division of Biological Sciences

Environmental Sciences Section

Ardizzone, C., W. Dees, O. Christian, J. Theriot, K. Leonards, A. Fusilier, C. Richmond, J. Byrne, T. Estrada, A. Richard, J. Dupre, and J. Woolman. McSU. J. Hightower. CPMC. M. Cochran. NSU. A. Daugereaux and S. Mopper. ULL. **Effect of botanical components and essential oils of 21 plant species on mosquitoes.**—We are investigating if components/essential oils of plants native to Louisiana alter the behavior and development of mosquitoes. Information obtained from these investigations may lead to innovative area-wide pest management methodologies as well as novel personal protective measures against these biting arthropods. We evaluated the effects of botanical components/derivatives from 21 plant species on female *Aedes aegypti*. Standard Petri dishes were used to hold mosquitoes and plant parts/essential oils. We recorded percent mortality at 24 and 48 h. Mosquitoes exposed to flowers/petals, buds, leaves, stems, seeds, and essential oils from Apiaceae, Asteraceae and Lamiaceae exhibited over 50% mortality when compared with controls. Mosquitoes exposed to cut buds of *Pycnanthemum muticum*, *P. tenuifolium*, and *Monarda fistulosa*, and crushed seeds of *M. fistulosa* exhibited 100% mortality in 24 h. Mosquitoes exposed to essential oils of *M. fistulosa* and *Eryngium yuccifolium* buds, and *Solidago gigantea* seeds exhibited 100% mortality in 24 h.

Bergeron, S. and R. Boopathy. NiSU. **Presence of antibiotic resistant bacteria in raw source water of a drinking water treatment plant in southeast Louisiana.**—The spread of antibiotic resistant bacteria (ARB) and antibiotic resistance genes (ARGs) in the environment is a major public health issue. The drinking water treatment system is designed specifically to eliminate bacteria and pathogens in drinking water. The presence of ARB and ARGs in source water and drinking water may affect public health and it is an emerging issue in drinking water industry. This study was conducted to study the presence of ARB and ARGs in the source water of a rural water treatment plant in Louisiana. The results showed the presence of several ARB in the source water including, *Enterobacter cloacae*, *Klebsiella pneumoniae*, *Escherichia coli*, *Pseudomonas*, *Enterococcus*, *Staphylococcus* and *Bacillus* spp. However, the water treatment plant effectively removed these bacteria in the treated water as none of these bacteria were found in the tap water as well as in the finished water at the water treatment plant.

Booth, A. and E. Zou. NiSU. **Impact of molt-inhibiting PBDEs on epidermal ecdysteroid signaling in *Callinectes sapidus*: An initial mechanistic look into disruption of crustacean molting.**—Polybrominated diphenyl ethers (PBDEs) are environmentally pervasive flame retardants that have been linked with endocrine disruption. In crustaceans, a molt-inhibiting effect has been demonstrated, but little is known about the mechanism of molt-inhibition. This study will examine whether the inhibitory effects arise from the disruption of hormone signaling in the epidermis using the blue crab. We first partially sequenced cDNA of N-acetyl- β -glucosaminidase (NAG), a terminal enzyme in the molting-hormone-signaling cascades. This sequence was used to create primers for evaluating NAG expression. We assessed the inducibility of NAG by exposing epidermal tissues to varying concentrations of 20-HE. Exposures of 1 μ M 20-HE were found to induce NAG at a significantly higher level than the control. Using NAG gene expression as a biomarker for ecdysteroid signaling, the effects of

PBDEs 28 and 47 will be measured. Ultimately, this study will contribute to the elucidation of mechanisms for inhibition of crustacean molting by PBDEs.

Brown, R., J. Homer, S. Bergeron, and R. Boopathy. NiSU. **Does salinity have an impact on antibiotic resistant bacteria and antibiotic resistance genes in the bayous and wetlands of southeast Louisiana?**—The main reservoir for antibiotic resistant bacteria (ARB) is the aquatic ecosystems. Culture based methods and qualitative molecular techniques were used to screen and quantify the presence of antibiotic resistance genes (ARG) and ARB in three different salinity gradients of wetland marsh in southeast Louisiana. Monthly samples were taken for a six-month period and analyzed for the presence of ARB and ARGs. Significant numbers of ARB and ARGs were found in all three salinity levels (0, 5, and 12 ppt) in the marshes of southeast Louisiana. This study indicates the presence of ARB and ARGs in the wetland habitat is a cause for concern as the potential threat of the spread of ARGs into native bacteria and into fish and wildlife exists due to human activities even under high salinity habitat.

Campos, U. and S. Tewari. LTU. **Performance evaluation of DIY gravity-fed-multistage water filter for individual households and its comparison with commercially available water filter(s).**—Water quality is still a major problem in some areas of the world. It is estimated that 780 million people simply do not have access to clean water and as a result, 6 to 8 million people die annually. In Louisiana, ground water is the source of drinking water for 61% of the State's residents and of this 61%, 12% rely on domestic wells. Groundwater is generally purer than surface water (e.g., lakes and rivers). This study focuses on households that do not have treated water supply and rely on private wells or DIY water treatment methods such as biosand filters and other commercially available filters. This project compares a DIY gravity-fed-multistage water filter with multiple filtering media to a commercially available filter (Mini Water Filtration System from Sawyer). Water from both filters is being tested for various water quality parameters and results are compared.

Yrle, F., B. Ramachandran, D. Drennan, G. Chauvin, A. Kemberling, W. Nelson, and G. LaFleur. NiSU. **Discriminating land cover types at the Isle Dernieres Barrier Islands Refuge using visible/NIR imagery.**—The barrier islands of Terrebonne Parish provide habitat for a variety of coastal organisms as well as protect the mainland against storm surge. However, we are losing fifteen square miles of coastal land every year. We present preliminary results from our characterization of the habitats occurring on Trinity Island, the largest land mass of the Isle Dernieres Barrier Islands Refuge, collected utilizing an unmanned aerial system and remote sensing techniques. So far, sixteen missions have been flown at Trinity Island, covering an area of 213 acres. During each mission, we collected an average of 1000 images in both visible and near infrared spectrum. These data were processed into high resolution mosaic images and analyzed to discriminate between water and land, as well as to classify organismal cover types such as the black mangrove, *Avicennia germinans*. This project is a collaboration between Nicholls Departments of Applied Sciences and Biology.

Microbiology Section

Belding, C., S. Begeron, and R. Boopathy. NiSU. **A survey on the presence of carbapenem resistant Enterobacteriaceae (CRE) in bayous of southeast Louisiana.**—Bacteria have developed means of becoming resistant to antibiotics due to various reasons. One such Beta-lactam, known as carbapenem, possesses potent antibiotic capabilities coupled with inhibition of bacterial enzymes. It has been a physician’s “last resort” medication to treating grave infection as well as resistant bacteria; however, in recent years, carbapenem-resistant Enterobacteriaceae (CRE) has been on the rise. Other than hospitals and contact with sick individuals, not much research has been done to address other potential reservoirs. The purpose of this experiment is to survey the waters of bayous in southeast Louisiana for the presence of CRE as a possible environmental source of these bacteria. Monthly samples were collected and tested at three sites for total fecal coliform, the presence of antibiotic resistant *Escherichia coli*, *Klebsiella pneumoniae*, and *Enterobacter cloacae*, and the presence of various carbapenemase genes within the water sample and from resistant isolates.

Deeb, S., E. Keller, C. Hennigan, W. Dees, and C. Struchtemeyer. McSU. **Examining the effluent quality of mechanical sewer systems in southwest Louisiana.**—Mechanical sewer systems are commonly used to treat residential wastewater in rural areas throughout southwest Louisiana. The effluent from these systems is routinely discharged into ditches and ravines that are either located in close proximity to or draining directly into major water bodies. Even though these systems are important and used extensively, very little is known about the microbial quality of the effluent that is produced. In this study we evaluated the microbial quality of effluent from mechanical sewer systems in southwest Louisiana by quantifying numbers of *E. coli* and fecal coliform bacteria. All of the fecal coliform concentrations and the majority of *E. coli* concentrations in the effluent samples exceeded federal and state regulations that are commonly used to evaluate the quality of treated wastewater. Therefore, it is likely that mechanical sewer systems are negatively impacting the environment and surrounding communities.

Frey, C. and W. Dees. MSU. A. Begum, J. Singh, and A. Jerse. USUHS. **Neem as an anti-microbial for prevention of gonorrhea.**—Gonorrhea is the second most frequent notifiable infection in the United States and can impact reproductive and neonatal health. Due to the emergence of antibiotic resistance in *Neisseria gonorrhoeae*, novel treatments, such as natural remedies, have become a main focus of research. We tested the effect of an extract from the neem tree (*Azadirachta indica*) that has been studied for years due to its ability to kill pathogens. We conducted in vitro and in vivo tests to determine the effect of the extract against antibiotic resistant and sensitive strains of *N. gonorrhoeae*. For in vivo tests, we administered neem, its vehicle (negative control) or nonoxynol-9 (positive control) vaginally to female BALB/c mice prior to inoculation with *N. gonorrhoeae*. Neem showed some evidence of effectiveness in that 2 of 9 neem-treated mice were culture-negative on day 1 post inoculation and the numbers of gonococci recovered were lower than that seen in mice treated with the vehicle alone.

Grabert, R., J. P. Daigle, and R. Boopathy. NiSU. **Presence of pathogenic *Vibrio* species in Louisiana seafood.**—Louisiana seafood is a multi-million dollar industry. Every year there are few *Vibrio*-associated outbreaks in oyster or crab. *Vibrio vulnificus* and *V. parahaemolyticus* are the common gastroenteritis causing pathogen in estuarine environment. Global warming

contributes to increase in water temperature, which promotes the growth of the *Vibrio* population in the Gulf of Mexico. There seems to be no continuous monitoring of various *Vibrio* species in Louisiana seafood such as crab, oyster, fish, and shrimp. This study was conducted in order to monitor *Vibrio* pathogens in Louisiana seafood. The results showed the presence of *V. vulnificus* and *V. parahaemolyticus* in oysters in every sampling period. *Vibrio cholerae* was observed on specific occasions when the water was polluted with sewage and high nutrients. *Vibrio harveyi* was present in many fish samples on different sampling events. Routine monitoring of seafood is necessary to protect public health.

Hayes, V., C. M. Ardizzone, C. E. Hennigan, W. H. Dees, and C. G. Struchtemeyer. McSU. **Examination of mosquito microbiota.**—Mosquitoes begin life in pools of water that contain bacteria. This research explores the association between the microbiota of mosquitoes (larvae and adults) and the bacteria in the aquatic environment in which the mosquitoes reside. Experiments were conducted to determine the proper procedures for sterilizing and dissecting mosquitoes, and culturing bacteria from whole mosquitoes and mosquito midguts. Two sterilization and dissection procedures were tested, and a comparison of spread plate and pour plate culturing methods was performed with varying amounts of whole mosquito and midgut homogenates. From this preliminary investigation, we conclude that homogenates from either one whole mosquito or five midguts (adults or larvae) combined with the pour plate method produce optimal colony growth. This methodology will be applied to future studies that explore an association between bacteria residing in an aquatic environment and the microbiota of mosquitoes associated with that environment.

Soileau, A. and J. Al-Dujaili. LSU-E. **The influence of citrus polyphenols on bacterial growth.**—Epidemiological studies have shown an inverse relationship between dietary flavonoid intakes and cardiovascular diseases. The aim of this study was to evaluate the potential of didymin on *E. coli* by using the agar diffusion technique to screen didymin for antimicrobial activity. One milliliter of *E. coli* was mixed with 10 mL of melted nutrient agar and set into petri dishes. Sterilized paper discs (6mm) were saturated with a 50 μ L solution containing a concentration between 25-100 μ M of didymin, 1% tetracycline and ethanol placed on the agar plates. The results of this study indicated that 25 μ M of didymin has low inhibitory effect on the growth of *E. coli*. Fifty to seventy five micromoles of didymin have moderate inhibitory effect on the growth of *E. coli*. One hundred micromoles of didymin show the highest inhibitory effect on the growth of *E. coli* as compared with 1% tetracycline and ethanol.

Trochman, R., S. Soileau, and J. Al-Dujaili. LSU-E. **Antibacterial activity of an effective sumac essential oil formulated in liquid soap against skin bacteria.**—Skin bacterial flora consisting of *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Escherichia coli* and *Pseudomonas aeruginosa* can frequently cause either skin or systemic infection including the bacterial transmission in healthcare units and household. The aims of this study were to determine susceptibility of these skin bacteria to the sumac essential oils distilled from *Rhus coriaria* (sumac) and to develop liquid soap from a sumac essential oil. The results revealed that sumac oil possessed the highest activity against all bacterial strains. Sumac oil liquid soap was effective against Gram-positive and Gram-negative bacteria by day 30. In conclusion, the developed sumac oil liquid soap was a good candidate to eradicate skin bacterial flora, especially Gram-positive bacteria. However, this preparation should be stored at room temperature with

protection from natural light to extend product shelf-life and skin irritation tests with this liquid soap should be further studied.

Molecular and Biomedical Biology Section

Beadle, E. and J. Newman. LTU. B. Bunnell. TU. **The role of MED31 in the regulation of mesenchymal stem cells.**—The Mediator Complex, composed of ~30 subunits, is a transcriptional coactivator responsible for recruiting RNA polymerase and regulating transcription in eukaryotes and has been shown to maintain pluripotency in embryonic stem cells. We hope to extend this knowledge to adult mesenchymal stem cells (MSCs) and provide insight on Mediator's role in regulating maintenance and differentiation in MSCs. Using siRNA-mediated knockdown of MED31, we will observe subsequent phenotypes pertinent to self-renewal, viability, and differentiation, all defining characteristics of stem cells. We will further investigate the role of MED31 by performing microarrays following knockdown to identify genes directly regulated by MED31. Preliminary results indicate MED31 may have a role in cell proliferation and osteocyte differentiation. MSCs transfected with MED31 siRNA showed decreased proliferation under standard growth conditions and decreased osteogenic marker expression under differentiation conditions. This project will reveal Mediator's role as a functional biomarker in the regulation of healthy MSCs.

Frey, C., M. Matz, and A. Hale. McSU. B. Slabach. UKY. **Molecular identification of damaged and dying neurons in elk.**—Kentucky is home to the largest free-ranging North American Elk population outside of the Rocky Mountains. The majority of the terrain on which the population resides is reclaimed coal mining land. It has been well documented that a parasitic nematode, *Parelaphostrongylus tenuis*, infects this population, however diagnostics in absence of adult worm identification can be tenuous. Due to the ambiguity in diagnostics many deaths are idiopathic or simply assumed to be resultant from sub-clinical *Parelaphostrongylus tenuis* infection. We hypothesize polioencephalomalacia (PEM) a degenerative neurologic disorder caused by acute sulfur toxicity primarily from water sources in the normal range of the elk population is the cause of some proportion of unexplained deaths. We are using combination of neuropathic and molecular techniques to quantify neuronal loss in *Parelaphostrongylus tenuis* negative animals. Histopathology results and analysis of brain tissue have revealed statistically significant differences in molecular layer thickness and Purkinje cell density.

Hale, A., M. Merchant, C. Frey, and M. Matz. McSU. **Structure and expression analysis of crocodilian NF- κ B in American alligators.**—We are interested in Nuclear Factor kappa B (NF- κ B), a pleiotropic transcription factor that plays a vital role in a variety of biological processes. Its regulatory role in the early phases of inflammation is critical for proper immune function. We found the NF- κ B gene in all three lineages of crocodilians, and the deduced amino acid sequences show a high degree of identity with mammalian and avian species. We identified Dimerization, Death, and Rel domains, a nuclear localization signal, a signal sequence, and ankyrin repeats. Western blot analysis showed the presence of both the 50 kDa mature protein and the 105 kDa precursor protein in the liver. Immunohistochemical analysis revealed a broad distribution of hepatic expression, as well as expression in reproductive organs and in blood.

Because the structure, processing, and expression of crocodylian NF- κ B is similar to the mammalian analog, we presume that the function is similar.

Kim, P. and R. Joseph. GSU. **What are metabolic diseases made of? Sugar and fat and everything bad.**—NAFLD is an obesity-related disorder characterized by steatosis in the absence of chronic alcohol consumption. Studies have shown the presence of ER stress and UPR activation (indicative of deranged ER proteostasis) in the liver and adipose tissues of individuals suffering from NAFLD. These findings have instigated an increasing number of studies aimed at determining whether chronic UPR activation plays a significant role in the development and progression of NAFLD. Although the inciting factors are not completely understood, numerous studies have imputed the accumulation of saturated fatty acids in the liver cell to chronic UPR activation. Still others demonstrate that chronic hyperglycemia induces UPR. Considering that an excess of both glucose and saturated fats contributes to obesity (and obesity related diseases), the present study aimed to investigate the combined and independent roles of hyperlipidemia and hyperglycemia in UPR activation in hepatocytes, and hence the development of NAFLD.

McKnight, J. GSU. M. Smith and P. Micevych. UCLA. **In vitro culturing and immune-labeling of kisspeptin-expressing neurons to investigate the classical progesterone receptor.**—The investigation will find whether classical PR is up-regulated in kisspeptin neurons. We used mHypoA51 neurons which are immortalized cells derived from adult female mouse hypothalamus. These cells model kisspeptin neurons in vivo that govern the LH surge. We stimulated these neurons with 30 minutes of estradiol (E2) and compared PR immunoreactivity to that in untreated cells. We also used antibodies directed towards membrane progesterone receptors, mPR α and mPR β , to examine potential non-classical progesterone signaling. In untreated mHypoA51 neurons, 95.2% expressed mPR α , and 86.2% expressed mPR β . Estradiol treatment did not affect PR expression (61.8% control vs. 57.3% E2-treated). Results indicate that mHypoA51 neurons are highly progesterone-responsive, as they express multiple receptors. While E2 has been shown to up-regulate classical PR, the present results suggest that this upregulation requires longer E2 exposure.

Murphy, K., O. James, L. Soileau, and O. Sullivan. McSU. **Examining the DNA-binding specificity of fungal-specific zinc cluster transcription factors.**—Invasive fungal infections (IFIs) are associated with high rates of morbidity and mortality and pose a serious health concern for severely immunocompromised patients. Fungal resistance to current drug therapies is largely due to the transcriptional upregulation of membrane associated efflux pumps. The fungal-specific zinc cluster (Zn₂Cys₆) family of transcription factors (TFs) is primarily responsible for the upregulation of these efflux pumps and thereby mediating pleiotropic drug resistance (PDR) in yeast. The aim of this study is to characterize the DNA-binding specificity of previously undescribed Zn₂Cys₆ TFs (ZCF3, ZCF14, ZCF32) from *Candida albicans*. Additionally, DNA-binding specificity data will be used to predict target genes and biological processes regulated by these TFs. In pursuit of these aims, a cloning and expression strategy involving PCR from genomic DNA, Gateway-based cloning, in vitro protein expression, and protein-binding microarray analysis will be utilized. Future studies will expand this analysis to additional TFs and related species.

Ogbonnaya, N., D. Sandel, and J. Newman. LTU. B. Bunnell. TU. **The role of Notch signaling in regulating stem cell state.**—Notch signaling is a conserved signaling pathway especially active in development. Bone marrow mesenchymal stem cells (BM-MSCs) are adult stem cells that are multipotent, self-renewing, and immunocompatible, making them useful tools in cell based therapy, regenerative medicine and organ repair. The goal of our study is to understand how Notch signaling modulates the self-renewing and multipotent characteristics of MSCs in order to better understand how this pathway can be used to optimize their therapeutic potential. We first characterized Notch expression in self-renewing and multipotent MSCs and also studied the effect of Notch inhibition. Results from our study, using a gamma secretase inhibitor, suggest that inhibition of Notch in MSCs results in increased induction of MSCs towards the bone lineage as observed by increased alizarin red stain and quantitative measurement of osteogenic marker, c-Fos. Further experiments are underway to confirm these results and to identify the specific Notch receptors that may be responsible for differentiation of MSCs.

Sandel, D., N. Ogbonnaya, and J. Newman. LTU. B. Bunnell. TU. L. Miele. LSUHSC-NO. **The role of Notch signaling in regulating stem cell state.**—Notch signaling is a developmental pathway that has been shown to be misregulated in many diseases including cancers. It is important to understand how Notch signaling regulates stem cell fate and to understand how this pathway can be used to optimize the therapeutic potential of adult stem cells. Using adipose-derived stem cells (ASCs) and bone marrow-derived mesenchymal stem cells (MSCs), we characterized the basal activity of Notch signaling. We also characterized the effect of Notch inhibition using a gamma secretase inhibitor to understand the role in the differentiation of MSCs and ASCs. Our data suggest that inhibiting Notch results in increased induction of MSCs towards the bone lineage compared to the vehicle treated cells. This suggests that Notch signaling may modulate osteogenic differentiation of MSCs. Further experiments are underway to confirm these results, determine differences between ASCs and MSCs, and to identify specific Notch receptors that are responsible for differentiation.

Spencer, P. McSU. E. Siller, J. Anderson, and J. Barral. UTMB. **Silent nucleotide substitutions affect the encoded polypeptide.**—The degeneracy of the genetic code allows most amino acids to be encoded by multiple codons. The distribution of these so-called synonymous codons among protein coding sequences is not random. One theory for the biological significance of non-uniform codon selection is certain codons allow for faster or more efficient translation, whereas the presence of others results in slower translation elongation rates. In this study, we identified rate determining factors and predicted the relative rate at which a codon will be translated. Using synonymous codons, we engineered multiple codon sequences of variable translation rates for the firefly Luciferase protein and measured in vivo translations rates in *E. coli* by pulse chase analysis. The measured translation rates of each Luciferase speed variant were consistent with our predictions. Analysis of protein solubility and luminescence of the Luciferase speed variants revealed differences in resulting proteins that are identical in amino acid sequence.

Whitehead, A., N. Patel, C. Tran, J. Newman, and M. Caldorera-Moore. LTU. **Differentiation of mouse embryonic stem cells for cardiac tissue engineering.**—The leading cause of death in the United States is heart disease. Current research is focused on stem cell-scaffold based tissue engineering to develop implantable cardiac tissue constructs. Embryonic stem cells serve as a potential cell source, or as a model for other cell types including induced pluripotent stem cells

or adult stem cells. To date, pluripotent stem cells have not produced completely functional tissue. This study focuses on optimizing the method to produce cardiomyocytes suitable for tissue engineering. Cell differentiation will be evaluated using quantitative and semi-quantitative RT-PCR. Contractility will be analyzed using phase contrast microscopy and cardiac tracking software. To study the effects of different biomimetic cues, hydrogels will be used to create a scaffold that mimics the heart's natural extracellular matrix. This study will increase the knowledgebase for stem cell-scaffold based cardiac tissue engineering, as well as serve as a foundation for future cell-substrate interaction studies.

Xu, W., A. Odoux, D. Jindal, T. C. Tamas, W. H. Lim, and D. Pollard. ULL. **Experimental and molecular dynamics studies showed the CBP KIX mutations affect the stability of CBP:c-Myb complex.**—The coactivators CBP and its paralog p300, two conserved multi-domain proteins in eukaryotic organisms, regulate gene expression by binding DNA-binding transcription factors. It was previously reported that the CBP/p300 KIX domain mutant (Y650A, A654Q and Y658A) altered c-Myb-dependent gene expression, and the mice with the mutations had reduced numbers of platelets, B, T, and red blood cells. However, it is unknown how the CBP KIX mutations structurally affect its binding to c-Myb. Our transient transfection assays demonstrated that the MEF cells containing the KIX mutations without wild-type allele of either CBP or p300, showed a decreased c-Myb-mediated transcription. We found that the KIX mutations slightly decreased stability of the CBP:c-Myb complex. More specifically, the KIX mutations affected the two salt bridges between CBP and c-Myb (CBP-R646 and c-Myb-E306; CBP-E665 and c-Myb-R294). Taken together, these analyses will improve our understanding of the exact functions of CBP and its interaction with c-Myb.

Zoology Section

Ardizzone, C., D. Johnson and W. Dees. McSU. J. Hightower. CPMC. **A five-year seasonal study of adult mosquitoes in a city park.**—A seasonal longitudinal survey of adult mosquitoes is underway at a residential 24-acre woodland park. The park is separated into two distinct areas: one is an open area with playground equipment, picnic tables, open shelters, a small conference center, exhibits, wetland ponds, and concrete walking paths with benches; the other is a preserved forest with nature trails. The mosquito survey was initiated in summer 2011. We use Centers for Disease Control and Prevention (CDC) light traps baited with CO₂ to collect mosquitoes. Mosquitoes are collected in the open area near the preserved forest in each of the four seasons: spring, summer, fall, and winter. Meteorological data are recorded during each trap night. To date, the predominant species collected (i.e. >50 in one trap night) are *Aedes atlanticus*, *Ae. taeniorhynchus*, *Ae. vexans*, *Coquillettidia perturbans*, *Culex nigripalpus*, *Cx. salinarius*, and *Psorophora columbiae*.

Beachy, C. SLU. T. Price. MnSU. **Drying and high growth accelerate metamorphosis in the ambystomatid salamander, *Ambystoma maculatum*.**—We subjected *Ambystoma maculatum* to conditions of food changes and amount of water that is available during the larval stage. One hundred sixty hatchlings were placed in individual shoeboxes with 2600 ml of water and assigned to a food and drying regime treatment group. Eighty larvae were assigned to a low food regime and 80 were assigned to a high food regime. The larvae were kept under these conditions

until day 59 when we initiated a drying regime and a food switch. One-half of the animals were subjected to a food-switch. At the same date, one-half of the larvae in each food group were subjected to a drying regime. Larvae on the high food regime metamorphosed earliest and at largest sizes. Larvae that were confronted with a reduction in water exhibited accelerated metamorphosis compared to those experienced constant water volume. Dried larvae metamorphosed at smaller sizes because of the correlated early metamorphosis.

Blair, B. and S. Bowers. LSU-A. H. Betz. AZP. **Fecal steroid analysis of the estrous cycle in the Jaguar (*Panthera onca*).**—The use of non-invasive steroid hormone assays is crucial for monitoring estrous cycles and fertility status in big cats. The objectives of the present study are to determine the most suitable method of extraction of fecal metabolites and to apply this method in determining reproductive parameters in the female jaguar. Fecal samples were collected, pooled by week, and then divided into two groups to either be dried (35°C) or remain wet for extraction. Extraction was performed for each group with methanol or ethanol and analyzed using P4, E2, E1C and hydroxyprogesterone enzyme immunoassays. The results showed that fecal metabolite concentrations were higher ($p < 0.05$) in dried feces compared to wet regardless of extraction method (methanol vs. ethanol). The next step in this study is to profile the estrous cycle using the methodology above and to determine which immunoassay will provide the best analysis for this individual jaguar.

Cahal, J. SLU. **Biogeography of North American dinosaurs.**—The Mesozoic had a rich diversity of animals that included some of the largest megafauna in Earth's history. Virtually all megafauna and much of the diversity of smaller terrestrial vertebrates from this era come from a single clade, the Dinosauria. The Mesozoic dinosaurs are one of the most heavily studied extinct organisms and persisted through a geologically dynamic part of Earth's history, the breakup of Pangea. These three factors (rich diversity, substantial amount of research, geologically dynamic history) make dinosaurs a model organism for biogeographical studies of fossil organisms. Despite this, no study has attempted to discover areas of endemism for dinosaurs, the operational taxonomic unit for biogeographical studies. Presented here will be the first study to discover North American dinosaur areas of endemism at small temporal and spatial scales. It will also assess the history of these areas using cladistic biogeography.

Clarkson, P. and R. Valverde. SLU. **Stress physiology of incidentally hooked Kemp's ridley sea turtles.**—Stress dynamics of free-ranging prepubescent juvenile Kemp's ridley sea turtles, *Lepidochelys kempii*, were examined throughout the 2015 fishing season along the coast of Mississippi. Incidental catch by hook and line is an intense stressor, sometimes causing severe injury, but rarely causing death. The objective of this study was to determine how much the activity of the hypothalamic-pituitary-adrenal (HPA) axis is altered by hooking, injury, and subsequent handling during standard rehabilitation procedures. Corticosterone, the main stress hormone of reptiles, was measured throughout the rehabilitation process. Plasma biochemistry was measured at admittance and immediately prior to release to evaluate health. Corticosterone concentrations were elevated in response to hooking, increased after hook removal, and decreased throughout the rehabilitation process to initial levels. These results indicate that hooking and handling are stressful events and that the rehabilitation process itself is stressful.

Erdmann, J. SLU. **The significance of toe movements during amphibian feeding.**—Toe vibrations associated with feeding have been observed in several amphibian groups. Hypotheses for the purpose behind this behavior range from neurological disorder to active prey luring. I will test explicit predictions of this poorly understood phenomenon with feeding trials and predator/prey movement and position tracking, using the Gulf Coast Toad (*Incilius nebulifer*) as the study predator and *Acheta domesticus* (house cricket) as the study prey. Results obtained will help in understanding the adaptive (or nonadaptive) value of this feeding behavior.

Hagen, A. and E. Zou. NiSU. **Effects of triclosan on activity of N-acetyl- β -glucosaminidase in the epidermis of the fiddler crab, *Uca pugilator*.**—Triclosan (TCS), an antimicrobial agent frequently found in aquatic environments, has recently been shown to inhibit crustacean molting. The present investigation sought to understand whether the molt-disrupting effect of TCS arises from disruption of molting hormone signaling. Because of the structural similarity of TCS to polychlorinated biphenyls (PCBs) and polybrominated diphenyl ethers (PBDEs) capable of disrupting molting hormone signaling, it was hypothesized that TCS would also act through disrupting molting hormone signaling in Crustacea. Exposure of fiddler crabs, *Uca pugilator*, to TCS at 10-250 $\mu\text{g/L}$ for six days had no effect on activity of epidermal N-acetyl- β -glucosaminidase (NAG), also known as chitinase, a biomarker for molting hormone signaling. However, TCS at 2500 $\mu\text{g/L}$ significantly increased enzymatic activity, suggesting that TCS at this environmentally unrealistic concentration is capable of enhancing ecdysteroid signaling in vivo. The underlying mechanism for this stimulating effect on epidermal NAG activity needs to be investigated.

Hinton, J., H. Meyer, and M. Klumpp. McSU. **Preliminary results of Tardigrada from the Hawaiian island of Maui.**—There has been an unpublished dissertation reporting 6 genera of terrestrial and freshwater tardigrades from the island of Maui in Hawaii. Additionally, proceedings from a non-peer-reviewed conference noted the presence of one species, *Milnesium tardigradum* and 8 other genera. We present preliminary results of a survey of terrestrial Tardigrada of Maui. Sixty-two samples of moss, lichens, and leaf litter were collected in May 2015 from 13 sites. Seventy-nine specimens were found in 10 of 29 samples, representing 6 genera and 7 species: *Macrobiotus cf. harmsworthi*, *Minibiotus cf. intermedius*, *Paramacrobiotus cf. areolatus*, *Paramacrobiotus cf. richtersi*, *Pseudechiniscus suillus*, *Milnesium shilohae*, and a *Diphyscon* sp. Prior to this survey, *Milnesium shilohae* has been found only on the island of Oahu.

Merchant, M. and A. Hale. McSU. **Crocodylian adaptation to environment: A croc of a different color.**—The ability to change skin tone or color is a very common trait across the animal kingdom. Recent results in our laboratory have revealed that some crocodylians exhibit color change in response to environment. Placement of crocodiles in white plastic tanks resulted in lighter skin tones, followed by darkening when placed in black chambers. These changes were visible to the naked eye within 10-15 minutes, with maximum change occurring at 90-120 minutes. Coverage of the eyes of crocodiles with tape resulted in darkening of the skin, demonstrating that light stimulation via the eyes is responsible for initiating the color change. Levels of melanocyte stimulating hormone in animals exposed to light were much higher than those in darker environments indicating a possible role for this peptide in color change.

Experimentation with other crocodylian species revealed that members of the Family Crocodylidae exhibited skin color change far greater than Family Alligatoridae.

Merchant, M. McSU. **Light exposure causes ventral color change in the Malaysian gharial (*Tomistoma schlegelii*).**—Exposure of *Tomistoma* to visible light resulted in a linear time-dependent darkening of the ventral surfaces of this crocodylian. This phenomenon occurred in juveniles up to 0.8 meter in length, and diminished in larger animals, suggesting that this effect might be a camouflage response. The use of spectral filters, to block specific ranges of light, indicated that the wavelength range that stimulated this response was in the lower end of the visible spectrum (350–450 nm). Mechanistic studies revealed that the light stimulation via the eyes was responsible for this biological response. Surprisingly, low light was found to stimulate a more robust change response than more intense light.

Meyer, H. McSU. **Water bears (phylum Tardigrada) from Oahu and Kauai, Hawaii.**—There are few records of water bears (Tardigrada) from Oceania. Although terrestrial tardigrades have been collected from the Hawaiian islands of Oahu, Maui and Hawaii, the tardigrade fauna of the northern most main island, Kauai, has been neglected. Samples of moss and lichen from Kauai and Oahu yielded 302 tardigrade specimens and 35 eggs. Nine genera and 10 species were collected from Kauai, six genera and 10 species from Oahu. A new species of *Milnesium* from Oahu was found. The new species, a member of the tardigradum group, has claw configuration [3-3]-[3-3]. It most closely resembles *Milnesium bohleberi*, from which it can be distinguished by its more posterior stylet support insertion point, narrower buccal tube standard width, more cylindrical buccal tube, and in having internal and anterior secondary claw spurs that are much larger than external and posterior spurs.

Partin, M., C. Beachy, and R. Valverde. SLU. **The effects of traffic noise on vocalization and stress in anurans.**—Noise pollution is an increasing concern throughout the world due to potential impacts it could have on the environment and wildlife, particularly in those species using acoustic communication. Anurans are among the organisms that have been affected, mainly by traffic noises because many ponds and temporary pools are near roads, some of which have heavy traffic. There is evidence that traffic noise causes some anurans to increase the frequency or the amplitude of their calls, and sometimes even lead frogs to cease calling. Corticosterone has been shown to increase as well, indicating that noise is stressful for these animals. Male *Hyla chrysoscelis* individuals will be collected, placed in a respirometer, and the oxygen consumption will be measured to find the energetic costs of calling. It is expected that the frogs exposed to applied noises will change their call characteristics, oxygen consumption will become elevated, and that corticosterone will increase.

Rupp, A. SLU. **Histology of salamander caudal courtship glands.**—Salamanders in the family Plethodontidae exhibit a unique tail-straddle walk during courtship that can include the use of sexually dimorphic mental glands and caudal courtship glands, which are thought to increase female receptivity. While there are many light microscopy studies of mental glands that have observed intergeneric morphological variation, only four histological studies of caudal courtship glands exist. The data available for mental gland characters can be optimized on a phylogeny to learn about their evolution, but more data on caudal courtship glands are needed before optimization would be useful. This study used light microscopy to describe the seasonal

intergeneric variation of these glands in the three salamander genera *Plethodon*, *Eurycea*, and *Desmognathus*. Results show that *Plethodon mississippi*, *Eurycea quadridigitata*, and *Desmognathus conanti* have intergeneric morphological variation of caudal courtship glands, and these glands vary seasonally within each species.

Salvador, A., M. Shalby, and M. Merchant. McSU. **Effects of bacterial infection on metabolic rate of the American Alligator (*Alligator mississippiensis*)**.—Oxygen consumption values of juvenile American alligators were measured on three consecutive days and the metabolic rate for each animal was calculated. Alligators were then randomly selected to receive one of four doses of bacteria, and then metabolic rates were calculated at 12, 24, 48, 72, and 96 hours post-injection. These metabolic rates were compared to those from untreated animals, and those which received an injection of sterile saline. Alligators receiving injections of bacteria exhibited a dose-dependent decrease in metabolic rate. Alligators that were injected with saline exhibited similar metabolisms to untreated controls, while those that received a low dose exhibited a 24% decrease in metabolic rate at 12 hours, but recovered quickly. Alligators that received intermediate doses exhibited moderate depressions (20-30% reduction) of metabolic rates throughout the four-day experiment. Alligators receiving the highest dose exhibited very depressed metabolic rates and died after two days.

Division of Physical Sciences

Chemistry Section

Ardizzone, C., N. DeVito, W. Dees, and O. Christion. McSU. J. Hightower. CPMC. **Current investigations of potential botanical insecticide compounds.**—We are investigating if components/essential oils of plants native to Louisiana alter the behavior and development of mosquitoes. Information obtained from these investigations may lead to innovative pest management methodologies and personal protective measures against these biting arthropods. We analyzed and evaluated the effects of essential oils from *Monarda fistulosa* and *Solidago gigantea* on female *Aedes aegypti*. To obtain essential oils, we hydrodistilled plant parts in a Clevenger-type apparatus, then collected the oils and performed H-NMR, C-NMR, and GC/MS analyses. Bioassays were conducted in standard glass Petri dishes. Mosquitoes exposed to essential oils of *M. fistulosa* buds and *S. gigantea* seeds exhibited 100% mortality in 24 h. Chemical analysis of the essential oils from *M. fistulosa* buds yielded six compounds, including: terpinene-4-ol, carvacrol, thymol, durenene, and caryophyllene oxide; the essential oils from *S. gigantea* seeds yielded 17 compounds. Currently, we are in the process of determining which compounds are responsible for toxicity.

Bhasker, S., A. Hassan, C. Wick, and B. R. Ramachandran. LTU. **Interfacial storage of lithium in metal oxides as lithium-ion battery anode materials.**—Efforts to improve the energy density of lithium-ion batteries for application in electric vehicles have led to the exploration of metal oxides as one of the potential anode materials owing to their high theoretical capacities compared to the commonly used graphite anode. This study is aimed at understanding the molecular mechanism of lithiation in conversion-driven transition metal oxides - MnO, CoO, NiO, CuO, and a main group metal oxide - SnO (alloying material) through density functional theory calculations. All these materials have been found to exhibit lithium capacities beyond those predicted on the basis of chemical stoichiometry. Structural analysis was carried out on computed minimum energy structures to determine the mechanism for this “extra” capacity. The results are consistent with the formation of “bulk metal” and “oxide” (Li₂O) phases during the “conversion” stages. Beyond the conversion limit, lithium atoms were found to occupy the region between these phases – interfacial storage.

Gallo, A. and J. Davis. ULL. **Selective reduction of carbonyl and nitro groups by fruits and vegetables.**—The role of biocatalysts in organic synthesis has been studied extensively over the past few decades. Freshly cut plants have been used successfully in organic transformations such as reductions, oxidations, hydroxylations, and hydrolysis reactions. These biocatalytic transformations exhibit remarkable chemo-, regio- and stereoselectivity while being environmentally friendly, inexpensive and carried out under mild reaction conditions. Since many of these biocatalytic transformations are stereoselective, they can be used as a direct pathway to chiral molecules. We examined over 30 plants as biocatalysts for reduction, oxidation and hydrolysis transformations of various functional groups. Functional groups studied include aldehydes, ketones, esters, nitro, nitrile, and alkene. The vegetables that looked most promising in reducing carbonyl groups are okra, parsley, parsnips and sunchokes whereas plantain, cantaloupe and avocado were active fruits. The experimental procedures used and results, such

as percent conversions and enantiomeric excess, from the various reduction reactions will be presented.

Godara, S., S. Gyawali, and D. Mainardi. LTU. **A computational approach to correlate CO dissociation to Fischer-Tropsch activity of the transition metals.**—In Fischer-Tropsch reactions, CO adsorption and dissociation are important steps. Pure and binary combinations of core-shell models of Pd, Pt, Ni, Ru, Fe and Co were explored using density functional theory to initially predict the catalytic activity on the basis of CO adsorption and dissociation. All studies were done using magic sized models containing 13 atoms. Ground state structures of pure clusters models are shown. After finding ground state structures, CO adsorption energies were calculated on all possible catalytic sites, and the most preferred CO adsorption sites were found in each case. On pure clusters, the predictor indicates that ruthenium is expected to be the best catalyst followed by cobalt, and is in very good agreement with the current knowledge in this field.

Junk, T. and A. Gallo. ULL. K. Martin. UP. **Development of a supercritical flow reactor and its application for biodiesel preparation.**—A laboratory scale supercritical flow reactor was assembled from off-the-shelf components and its suitability tested for the transesterification of alligator fat to biodiesel. This work represents the logical extension of a prior study, which utilized batch reactors to demonstrate that supercritical methanol offers key advantages over the traditional, base catalyzed method to convert waste fats into biodiesel. This work establishes that supercritical transesterification occurs within minutes in the absence of catalysts. Initial data indicate an exponential increase in product yields between 240°C and 420°C at reaction times of 5 and 30 minutes, respectively, with an approx. ten-fold higher yield for the latter reaction time. The resulting product mixtures are remarkably clean, consisting predominantly of the methyl esters of C16-18 carboxylic acids. This suggests that very high temperatures (≥ 420 °C) are needed and suited for the rapid conversion of alligator fat to biodiesel using supercritical methanol.

Srivastava, R. and J. Robertson. ULL. **Alcohol-driven, Mo-catalyzed deoxygenation of epoxides to alkenes.**—The conversion of renewable cellulosic biomass into hydrocarbons has attracted significant attention with a growing demand of sustainability. The combination of a catalytic amount of Molybdenum (VI)-based compounds, particularly the cheap, easily synthesized from inexpensive reagents, MoO₂(dtc) (dtc = dithiocarbamate) and 3,4-dimethyl 3-pentanol and butanol-1 as a reductant is effective for the deoxygenation of epoxides to alkenes. Butanol-1, which serves as both the solvent and reductant, also gives alkene from epoxide. The product yield ranges from moderate to excellent. The reaction proceeds regioselectively with variously substituted epoxides under neutral conditions and is compatible with various functional groups. The Mo(VI)-catalyzed deoxygenation of epoxides will be discussed.

Computer Science Section

Agee, A. and T. Bishop. LTU. **Converting a portable parallel computer into a PXE based lab network: How Little Fe became Little Susie.**—Little Fe is six node Beowulf cluster made from mini-itx motherboards. It is designed to be a low-cost portable parallel computer for educational

purposes. The Bishop Lab at Louisiana Tech reconfigured their Little Fe to model the lab's openSUSE based network in order for students to practice using and administering a local computer network without compromising lab resources. Little Susie boots each of its diskless nodes with the same openSUSE operating system installed on lab computers. All nodes utilize a common home directory that is physically attached only to the head node. Our Preboot Execution Environment (PXE) solution can install any Linux distribution on the Little Fe. The advantage over Little Fe's default Bootable Cluster CD (BCCD) operating system is that each node has a familiar and complete Linux distro installed on each node. Little Susie can thus function as six independent Linux workstations or as a Beowulf parallel computer.

Alghanmi, B., A. Albadar, and Y. Reddy. GSU. **Smart-Phone selection: GUI implementation.**—A smartphone is nothing but a cell phone that performs and operates like a small computer. Some people say smartphones and tablets are becoming more used than standard computers such as desktops and laptops. According to statistics, almost nearly two-thirds of Americans are now smartphone users, which represents a huge market share for smartphone retailers and stores. Smartphones help people in their life in many ways. For instance, users have a powerful tool in hand because they have the chance to use GPS, check email and websites, listen to music or even use it as hotspots for connecting other devices with WiFi. The research is a graphical user friendly product that helps the customer to compare and select the required phone.

Gardner, J., J. Clough, D. Williams, and Y. Reddy. GSU. **The cryptographic techniques using Python for secure transfer of data.**—The objective of radio networks technology is to utilize the unutilized spectrum by primary users and fulfill the secondary users' demands irrespective of time and location (any time and any place). Due to their flexibility, the cognitive radio networks are vulnerable to numerous threats and security problems that will affect the performance of the network. Security has adverse effects on the integration of cognitive radio networks with cloud. Therefore, we need to find the potential threats, potential attacks, likelihood of these attacks, and potential consequences of these attacks. Before the project was initiated, the group learned the basic functions and cryptographic techniques using Python. The group is currently working on research for the Public key cryptography and RSA cipher to deliver future plans of working on more complex problems related to cryptography to test encryption and decryption techniques.

Hendrix, M., D. Hill, V. Sok, D. Williams, G. Hall, and Y. Reddy. GSU. **Vex robotics and its role in line tracking.**—The objective of our project was to build a stable and functioning Vex robot. This robot will utilize line trackers and an ultrasonic rangefinder in order to navigate more efficiently. We designed the robot in the shape of a square to provide stability. There was a wheel on each side of the robot to improve its movement and balance. C++ language allowed for the addition of new function to be simple and efficient. The process was useful in debugging the flaws found during the testing phase of the project. The line tracking robot was successfully completed to detect several white lines of various shapes and sizes, follow the line, and retrieve the object at the end and return back to the starting point with the object.

Hill, D., B. Sanders, and Y. Reddy. GSU. **Retrieving a required document using Hadoop technology.**—Analyzing the Big Data using Map Reduce techniques and identifying a required document from a stream of documents is the goal of the current research. The research was conducted using Hadoop 2.6.0, JDK 7, and Python 3.4 on Dell Precision T5500 with Ubuntu

14.04 at Grambling State University. The code was developed to utilize the Hadoop's node distribution capabilities to analyze the text files. The analysis includes the number of times each word in the text file was repeated. The analysis takes three phases called mapper, shuffle and sort, and reduces. The algorithm was coded in two stages. During the first stage the reputation of the words and in the second stage the importance factor and selection of the document were coded in Python. The process did not include any data models or SQL. It is simple Hadoop cluster, Map Reduce algorithm, required keys and their importance factor.

Irfan, S. and M. Salam. SU-BR. **Enhancing authentication and access control in internet of things.**—Day by day the list of regular things which are connected to Internet is increasing drastically, many things are adding into it every day. Not only phones and laptops are connected to Internet but also things like cars, refrigerators, transformers are connected to Internet which resulted in a new concept called Internet of Things (IoT). In internet of things, physical objects with data transmissions and receiving capability are connected to Internet. The sensing component of IoT devices generates data and transmits to local hub for better performance of the equipment and the overall system. As the IoT is getting wider we need a protocol which is secure and consumes less energy in data transmission. In this research, we are proposing an enhanced protocol which will consume less energy as well as more secure. We are focusing on the authentication and access control in the IoT.

Rakam, S. and M. Salam. SU-BR. **Development of Android application for attendance tracking system.**—Attendance tracking system is an application for tracking and monitoring student attendance. It tracks the attendance information of a specific student in a particular class. The information is stored automatically and it reduces workload of faculty members. Currently, there is no such application available that provides this type of facility. It will provide facility to faculty members to enter students' attendance into the system directly in classroom sitting using their mobile devices or computers. Faculty members will have various options for entry such as present, absent, tardy, late, and others. This mobile application will replace the traditional paper method of taking attendance. The application will generate an efficient and automatic report as needed. Through this application, students will be able to view their attendance history in their own mobile devices. It will notify students about their consecutive absences from the class and their attendance habit.

Reddy, Y. GSU. **Latent fingerprint matching with deep learning.**—Object recognition using partial information is one of the important problems in current computer vision research. Computer vision has a major role in medical, robotics, economics, and crime-related subjects. Complete fingerprint or face is normally not available at a crime scene or cameras. The object or partial object in crime is latent fingerprint or partial face. The crime branch identifies the related match criminals and then exact match criminal with the help of object or partial object data. In this research, we introduce the deep learning artificial neural network model that can learn from example objects called fingerprints from a database with supervised backpropagation model and then identify the closest match object (fingerprint) for a given partial object (latent fingerprint) data.

Salam, M. SU-BR. **Network topologies for wireless sensor networks in case of node failures.**—Wireless sensor network (WSN) is composed of many unattended sensing nodes. These nodes

are deployed in various hostile environments. Sometimes node failure occurs due to severe weather conditions, energy depletion, enemy attacks on the battlefield, and many other reasons. Node failures can cause a serious impact on the functionality of the WSN. It may disconnect part of the sensor nodes from others and leave that environment unmonitored. Eventually, it will cause a serious impact on the system performance. There are many protocols that deal with these node failure scenarios. Some provide certain limits on the maximum number of node failures that could be tolerable without compromising the system performance. In this research, we will provide various types of protocols that discuss issues with node failures and provide solutions to overcome the failures.

Materials Science and Engineering Section

Gyawali, S., S. Godara, and D. Mainardi. LTU. **Catalytic behavior of transition metal nanoclusters for the Fischer Tropsch reactions.**—Density Functional Theory is used in this work to study Fischer-Tropsch reactions. The electronic and geometric structures of magic sized nanocluster of pure X_{13} and alloyed nano-cluster of Y_1X_{12} , where $X, Y = Co, Fe, Ni, Ru, Pt,$ and Pd and Y resembles substituted atom, are being studied within gradient generalized approximation. It is found that the geometrical structures corresponding to the lowest total energy states possess icosahedral structure for both pure and alloyed nanoclusters with substituent atoms occupying central or surface sites for alloyed nanocluster. Carbon monoxide adsorption and dissociation energies were calculated to anticipate potentially effective catalysts as an initial predictor for the reaction. The adsorption of CO was carried out on all possible adsorption sites (top, bridge, and hollow) to find the most preferred adsorption sites (PAS).

Hegab, R. and M. Caldorera-Moore. LTU. C. Kevil. LSUHSC-S. **Environmentally responsive hydrogels of the oral delivery of vasodilator drugs.**—As heart disease remains the leading cause of death in the United States, the need for therapeutic drugs for improving cardiovascular health is vital. The usage of gasotransmitter therapy regulates numerous physiological processes, providing numerous cardiovascular health benefits including increasing circulation, lowering cholesterol, and initiating ischemic vascular remodeling. Yet, these therapeutic agents have substantial limitations including poor oral bioavailability or stability. Therefore, novel strategies to create nanocarrier systems that will enable sustained oral bioavailability of these compounds will make them realistic drug agents for further development. The objective of this research emphasizes an innovative approach for delivery of vasodilator drugs orally using designer hydrogel carrier systems for the treatment of cardiovascular and chronic inflammatory diseases. To accomplish this, a series of pH responsive hydrogel carrier systems have been developed. These biocompatible hydrogels carrier systems can be tailored to release pre-loaded drugs orally.

Heimbuck, A., S. Campbell, and M. Caldorera-Moore. LTU. **Development of chitosan-genipin hydrogels for neutralizing pH of chronic wound environments.**—The objective of this research is the development of responsive biopolymer wound dressing capable of neutralizing the alkaline chronic wound environment. A hydrogel composed of cationic biopolymer chitosan and genipin was synthesized and the ability to absorb wound exudate over time and neutralize the media was simulated by swelling the hydrogels in different media, phosphate buffered saline (PBS) pH 7.4 and PBS 8.5 over a 24-hour period. The synthesized hydrogels showed

approximately 200% swelling in neutral simulated physiological pH, and alkaline chronic media pH solutions. A sustained pH drop of 0.5 and 1 pH unit were observed in PBS pH 7.4 and 8.5, respectively. The results demonstrate that the chitosan-genipin hydrogels neutralized the pH of the environment when placed in slightly alkaline environment, thus show potential to be used in chronic environments to neutralize pH and in turn slow down enzymatic and bacterial activity.

Islam, M., M. DeCoster, and S. Zivanovic. LTU. **Optical and electrical properties of copper biocomposites.**—Copper biocomposites derived from copper sulfate with the amino acid cysteine are highly stable in both liquid and dried form. Here we present the optical and electrical properties of the thin film formed from the copper biocomposite suspension. The thin film has also been investigated through AFM and SEM microscopy. Optical transmittance and reflectance as well as the sheet resistance of the thin film have been investigated.

Martinez, A. A. and M. Saadeh. SLU. **PID control for a wearable e-braille using a force sensing resistor.**—The objective of this research is to design a control system for a Braille-reading device with an electronic tactile display. The device is wearable on the dorsal side of the index finger. A miniature DC motor maintains the contact between the fingertip and the electronic tactile display. A force sensing resistor (FSR) is used to provide feedback sensory of the tactile force at the user's finger pad. The signal of the FSR is transmitted to a microcontroller. Because of the FSR nonlinearity, nonlinear identification techniques are used to obtain the relation between the measured voltage and actual force applied at the finger pad. The DC motor, through rack and pinion mechanism, allows the motion of the tactile display assembly to control the force on the finger pad.

Montoute, J., L. Yu, and A. Jaganathan. LTU. **Dual-channel eddy current sensor to monitor the health of high-speed rotating machines.**—High performance rotating machinery plays a crucial role in several critical industries including power generation, petrochemical, and aviation. These rotating machines are subjected to continuous cyclic loads, and are prone to fatigue induced failures to their components including gears and transmission shafts. Improving the real-time diagnostics and prognostics capabilities of sensors for a reliable health management is of significant interest to the industry. In this research, a dual channel 'self-nulling' eddy current sensor has been developed to continuously monitor critical spots on shafts and discs rotating at over 10,000 RPM. A MATLAB based signal processing algorithm was developed to automatically detect signatures of a flaw and extract its geometrical features. In this presentation, results from numerical and laboratory based experimental work carried out during this research will be presented. The proposed sensor presents an opportunity to develop machines with an integrated health monitoring system to increase their reliability.

Villermin, L., N. Patel, A. Moore, and M. Caldorera-Moore. LTU. **High surface area patterned hydrogels for drug delivery and tissue engineering applications.**—Biocompatible hydrogels can be tailored to release pre-loaded drugs in a localized area of the body. Drugs can be released in desired amounts by changing hydrogel pore size, crosslinking density, or the presence of nanofeatures. Upon the establishment of a hydrogel composition that swells and degrades at a predictable rate, a subcutaneous film could be developed to release a drug as needed. Hydrogels can also be used as scaffolds to repair damaged tissues. By increasing the surface area of a hydrogel scaffold with a dense network of nanofibers, an environment not unlike the

extracellular matrix can be simulated. It is hypothesized that with the resulting increase in surface area, these added nano-features will significantly affect hydrogel swelling, degradation rate, and therefore the release of therapeutic agents while simultaneously mimicking the extracellular matrix of cells. A hydrogel patterned with nano-features increases the surface area to volume ratio, thus allowing rapid swelling.

Zeidan, M., C. Mire, J. Licciardi, and A. Rodney. SLU. **Effects of nano-silica on recycled aggregate concrete.**—Nanotechnology is science, engineering, and technology conducted at the nanoscale. With global shifting towards sustainable construction, using nano-particles may provide a promising solution to produce greener concrete. Previous studies indicated that nano-silica can be used to strengthen the Interfacial Transition Zone (ITZ) between the paste and aggregates in concrete. On the other hand, porous and weak ITZ is one of the main problems associated with recycled concrete aggregates (RCA). This study aims to explore the potential improvement on performance of RCA concrete with the addition of nano-silica as a supplementary cementitious material. The study includes testing fresh properties and compressive strengths of concrete made with 100% RCA with adding nano-silica. The performance of these mixtures was compared to control mixtures made with regular natural aggregates. This pilot study might be considered as an initial step towards extensive investigation of microstructure and transport properties of RCA concretes containing nano-particles.

Physics Section

Bohara, B., L. Franklin, Y. Malozovsky, and D. Bagayoko. SU-BR. **Ab-initio calculations of electronic and related properties of calcium fluoride (CaF₂).**—We performed first principle, local density approximation (LDA) calculations of electronic and related properties of cubic calcium fluorite (CaF₂). Our non-relativistic computations employed the Ceperley and Alder LDA potential and the linear combination of atomic orbitals (LCAO) formalism. The implementation of the LCAO formalism followed the Bagayoko, Zhao, and Williams (BZW) method, as enhanced by Ekuma and Franklin (BZW-EF). We discuss the electronic energy bands, total and partial density of states, electron and hole effective masses, and the bulk modulus. Our indirect band gap is 12.98 eV. The calculated bulk modulus (82.89 GPA) is in excellent agreement with the experimental result of 82.0 ± 0.7 . Our predicted equilibrium lattice constant is 5.42Å. Acknowledgments: This work is funded in part by the NSF and the Louisiana Board of Regents, through LASiGMA [Award Nos. EPS-1003897, NSF (2010-15)-RII-SUBR], and NSF HRD-1002541, the US Department of Energy (NNSA) (Award No. DE-NA-0002630), LaSPACE, and LONI-SUBR.

Elumalai, D. N. and P. Derosa. LTU. **Simulation of triggered release from halloysite nanotubes.**—Encapsulation and the controlled release of active agents have long been investigated and exploited to develop efficient delivery vehicles for drugs, nutrients, and protective agents. A Monte Carlo model is used to study the effect of environment (pH and temperature) in the transport and release of dexamethasone nanoparticles (NPs) from halloysite nanotubes (HNTs) in a dielectric fluid media. HNTs are suitable for environment-triggered release and thus the effect of temperature, NP zeta potential, and pH are studied. It is observed that for temperatures that significantly differ from room temperature, the release profile changes

significantly, increasing the delivery speed at high temperature and reducing that speed at low temperature. Finally, it is observed that changes in pH between different regions may act as a trigger for delivery or as a control in the delivery rate, at lower pH the release is accelerated and at high pH it is extended.

Feldbaum, D., S. Yoshida, and K. Almashhad. SLU. **Opto-mechanical study of biological substances.**—The study of mechanical properties of biological substances is a major concern at the intersection of physics and biology. The range of topics in this area extends from the studies of physical responses of the entire human and animal organisms to the studies of the tensile stresses in DNA strands. We propose and investigate a novel method of study of optically transparent biological objects. The method combines external stressing of the objects with the non-destructive illumination by laser light. We present numerical analysis of the behavior of simple transparent objects under stress, and the effects of such stress on the propagation of optical beams within them. We further present preliminary experimental studies.

Ismael, T. and P. Derosa. GSU. B. Beach. LTU. **Effect of tip-distance on the conductivity of thiophene-functionalized cobalt-bis(dicarbollide) cages.**—Polythiophenes and metalla(bis(dicarbollide)) carboranes are known to be conductive with high chemical and thermal stability. Metalla(bis(dicarbollide)) carboranes show interesting electrical properties due to their 3-D resonant structure and have been shown to improve conductivity in thiophene chains. In this work the midpoint of the molecular wire is occupied by a cobaltabis(dicarbollide) sandwich, with each carborane cage functionalized by a single thiophene which is allowed to make contact with an Au electrode. The occupied molecular orbitals near the Fermi level are found to determine the low bias transport characteristics of the molecule. It is observed that conductivity initially increases when molecule-tip distance increases from the equilibrium distance of 1.9Å and decreases thereafter. The increase in conductivity is attributed to the shift of the conductive orbital towards the Fermi level as its population decreases. This could lead to applications such as a molecular switch or a memory bit.

Li, K. SU-BR. G. Zhao and D. Bagayoko. SUAMC. **Microwave properties of long carbon nanotubes (length ~ 100 mm, OD 8-15 nm) - epoxy composites.**—In this work, long, multi-walled carbon nanotubes (MWCNTs) with the length of ~100mm, outer diameter (OD) of ~ 8-15nm was used to fabricate epoxy composites. The loadings of the MWCNTs were controlled at 1 to 10 wt%. The reflection loss and electromagnetic interference (EMI) shielding effectiveness of the MWCNTs-epoxy composites were investigated. In addition, the surfactant (sodium dodecylbenzenesulfonate) was used to enhance the dispersion of the MWCNTs in the epoxy. The multi-layer samples were measured. The results showed that the microwave properties strongly depend on the loading of the MWCNTs in the composites and also depend on the ratio between the surfactant and MWCNT. In the multi-layer measurement, the order of the samples can change the microwave absorption properties.

Lloyd, C. and N. Simicevic. LTU. **Effectively shielding a pion detector.**—The best manner in which to shield a pion detector is of great importance when planning an experiment in a particle accelerator lab. Insuring the detector is properly shielded can determine the success of the experiment. Utilizing a computer program makes this problem much simpler. Fluka is a Linux-based program which simulates particle beams of a wide variety of energies and types of

particles. These simulations produce excellent data which can be graphed and analyzed. For the purpose of this research, an experiment was simulated using a beam of pions moving toward a series of lead shields and detectors. The number of pions in each detector was analyzed in order to determine the effectiveness of the lead shielding. This provides a relationship between lead thickness and shielding effectiveness. The detector can be shielded in the most effective way possible.

Malozovsky, Y., J. Ejemi, L. Franklin, D. Bagayoko, and G. L. Zhao. SUAMC. A. Saliev. BHU. E.C. Ekuma. NRL-DC. **Accurate DFT calculations of electronic, transport, and bulk properties of XP (X = B, Al, Ga, In).**—We present density functional theory (DFT) calculations of electronic and related properties of zinc blende XP (X=B, Al, Ga, In) phosphides. We employed a local density approximation (LDA) potential and the linear combination of atomic orbitals (LCAO) formalism. This implementation followed the Bagayoko, Zhao, and Williams method, as enhanced by Ekuma and Franklin. Our calculated, indirect band gap of 2.02 eV for BP, 2.56 eV for AlP, and of 2.29 eV for GaP, from Γ to X-point, and the direct band gap of 1.43 eV, at Γ -point for InP are in excellent agreement with experimental values. We also report calculated electron and hole effective masses, total (DOS) and partial (pDOS) densities of states, and bulk modulus as well. The work was funded in part by NSF and LaBoR through NSF HRD-1002541, U.S. D.O.E. – NNSA (Award Nos. DE-NA0001861 and DE- NA0002630), and LONI-SUBR.

Saint-Jean, D., B. Routon, L. Sawyer, N. Crews, and P. Derosa. LTU. **Simulation and optimization of a scintillating fiber hodoscope.**—For decades, researchers have studied the damage to DNA by high-energy radiation. Radiation induced damage includes DNA strand breaks, base damage and base substitution. To address these bystander effects due to irradiation, we simulated and developed a radiation detector using multi-clad plastic scintillating fibers to study the effect of radiation on gene expression changes. The efficiency of energy deposition on each of the different layers of the radiation tracking detector has been simulated using the GEANT4 toolkit and is currently being tested experimentally using the detector. The position of the ionizing radiation beam will then be determined from the intensity of the output signal from multiple orthogonal planes of the tracking detector and optimized using various algorithms. Multiple fiber arrangements have been simulated and the optimal arrangements for beam track reconstruction are reported in this work.

Stroud, A. and P. Derosa. LTU/GSU. C. Muratore. UD. R. Berry. AFRL. **Effect of impurities and lattice imperfections on the electrical properties of ultra-thin MoS₂.**—Over the past decade two dimensional materials like graphene have shown both unique electronic and mechanical properties making them attractive for applications in micro and nanoscale electronics. Transition metal dichalcogenides (TMDs), including molybdenum disulfide (MoS₂), have been considered alternative materials for transistor applications due to their unique transformation from indirect to direct bandgap semiconductors when reduced to monolayer systems. Here Density Functional Theory (DFT) in combination with Non-Equilibrium Green's Function (NEGF), as implemented in the Atomistix Toolkit (ATK) software package, is used to create a two-probe device model for nanoscale transport characterization of TMDs. The conductivity of few layer TMD devices can be examined by varying the number of grain boundaries, defects, or dopants within the central scattering region while adjusting the drain-

source bias. Information gathered from the device setup includes the density of states (DOS), transmission spectra, IV curves, optical spectrum, transport pathways, eigenstates, and electron density.

Sullivan, E., T. Tarlton, and P. Derosa. LTU. **Atomistic investigation of charge carriers' tunneling constant in simple carbon nanotube-polymer systems.**—Carbon nanotubes (CNTs) are widely known for their exceptional electrical, thermal, and mechanical properties. CNTs can be combined with polymers to create conductive composites with a variety of applications. Determining the effects of separation distance, atomic dispersion, and applied bias on the tunneling constant for charge carriers is a necessary element in studying the function and overall electrical properties of carbon nanotube-polymer composites. In this work, these effects were studied using atomistic models of simple CNT-polymer systems implemented with Atomistix Toolkit (ATK). Different basis sets and separation distances were examined, and the effects of varying dispersion correction methods were compared.

Touchet, B. and D. Genov. LTU. **On the polarizable vacuum.**—The electron self-energy paradox states that the energy required to build an electron is infinite, however, assuming an arbitrary dielectric, polarizable vacuum resolves the paradox. This effective medium can be viewed as emergent particle-antiparticle pairs (dipoles) from the vacuum. Here, we demonstrate how the vacuum polarizability can be used to derive a “quantum” correction to the classical Coulomb potential. Our result asymptotically reduces to the Coulomb potential for large distances. For small distances, however, the potential energy is no longer singular, but is twice the rest mass of the electron. Using the polarized vacuum potential, we solve for the energy levels in the positronium atom. Our results show that first order corrections are related to the so-called Darwin term in relativistic quantum mechanics, but comparison with high precision radiation spectra from positronium, not yet available, are required to validate the proposed model.

Vinnakota, R. and D. Genov. LTU. **Optoelectronic switching in mid-infrared.**—Confinement and enhancement of light in the field of plasmonics provide a large variety of new physical effects and applications. Surface plasmon polaritons, i.e. the coupled oscillations of electromagnetic waves with the electrons at the interface of a metal/semiconductor and a dielectric, have the potential to bridge the gap between electronic and photonic devices, provided a fast switching mechanism is identified. We present a semiconductor based optoelectronic switch termed as surface plasmon-polariton diode (SPPD) that can operate at exceedingly large signal modulation rates of 98% and depending on the doping and applied voltage we can achieve switching rates of up to 1THz. The SPPD composition includes heavily doped p-n junctions where surface plasmon polaritons are guided at the interface between n and p-type GaAs and can be switched by an external voltage. The proposed switch is compatible with the current semiconductor fabrication techniques and could lead to nanoscale semiconductor-based optoelectronics.

Division of Science Education

Higher Education Section

Dees, W., C. Struchtemeyer, C. Hennigan, C. Ardizzzone, and J. Woolman. McSU. **An interdisciplinary, multi-institutional approach to student engagement in the ecological and microbiological sciences.**—The Microbes to Mosquitoes (MtM) Project is a three-pronged interdisciplinary, multi-institutional approach to student immersion into the agricultural, biological, chemical, environmental, and mathematical sciences, including the principles of innovation. This experiential learning project provides undergraduate students the opportunity to: 1) participate in undergraduate research, 2) visit facilities supporting scientific operations and to hear presentations about opportunities in a variety of science fields/disciplines, and 3) participate in local-global networking opportunities through attendance and participation at local, state and regional scientific and entrepreneur-based conferences. Through the MtM Project, we recruit freshman/sophomore level science majors and provide them opportunities to serve as field/laboratory research assistants and to participate in a variety of professional scientific engagements (e.g., seminars, presentations by science professionals outside academe, and off-campus tours). We are in the second semester of this year-long project. Preliminary analysis of student participation, projects undertaken and outcomes will be presented.

Division of Sciences and Humanities

Alexander, R. and R. Giguette. NiSU. **From nowhere to nothing: The value of “being cognition” for the sciences and humanities.**—The point of higher education increasingly appears to be about preparation for more advanced and practical work—a reasonable goal, no doubt, but one that may inhibit us from considering more fruitful possibilities with regard to engaging students more effectively in general education and lower-level coursework. We advocate structuring introductory courses in both the sciences and humanities in ways that stress what Abraham Maslow characterizes as “Being Cognition”—a mode of thinking that promotes the exploration of the kind of large, metaphysical questions that have gripped and perplexed many paradigm-shattering thinkers. Such questions may appear impractical because they do not lead directly to measurable outcomes, but they may also be the catalyst for the degree of engagement that can lead the novice student to approach a discipline with a fresh, earnest perspective—one driven by passion instead of need.

Doucet, J. NiSU. **Illuminating the outer rime – a reading of science poetry.**—American poet Yvor Winters wrote the sonnet “The Invaders” in the post-Hiroshima world that rose around him at Stanford University. First collected in 1960, “The Invaders” comments on the drive of scientists who have “won out at last and laid us bare,” rendering all as victims of “the naked passion of the human mind” which “as a locomotive plunges through/distance that has no meaning and no bound” and has been “stripped of colors of an earth ...lit with motion only of some inner rime.” The emphasis of Winters’ poetry and criticism on rejecting mysticism and accepting formalism, controlled association, and clarity, however, has more in common with how scientists work and communicate than he was likely willing to acknowledge in that time. This presentation will be a reading of original poetry not with Winters’ “subatomic roar of Time on Time” but rather infused with timely supra-atomic science analogies and concepts.

LaFleur, G., S. Bergeron, A. Booth, S. Hicks, A. Kuhn, E. G. McNeese, M. Mire, and S. Rehage. NiSU. **Considering long-term priorities in managing the Mississippi River.**—To establish a predictable hydrologic restraint over the Mississippi River, the US Congress authorized the construction of the Old River Control Project in 1954. This structure was designed to stabilize the amount of water flowing through the watershed to ensure that 70% was transported down the Mississippi toward New Orleans, and 30% was directed down the Atchafalaya toward Morgan City. We suggest that the original decision to stabilize a system characterized by historic fluctuations in flow and route may warrant re-evaluation. Here we present a set of alternative priorities that might be taken into consideration for future river management including 1) conserving water in preparation for droughts, 2) utilizing flow for energy production, 3) re-establishing the annual flood pulse for ecological restoration, 4) creating a long-term cycle that incorporates shifting delta lobe formation, and 5) managing the entire basin from Vermilion Bay to Chandeleur Sound as a single hydrologic unit.

Yehya, R. SU-BR. **Impact of globalization on higher education.**—This work examines the effects of globalization on the institution of higher education worldwide, including the internationalization of higher education. Special attention is paid to (1) assumptions underlying the internationalization of higher education, (2) aspects of globalization impacting higher

education, (3) challenges facing cross-national education, and (4) pros and cons of cross-national education for both developed and developing countries.

Division of Social Sciences

Liechty, A. and C. Nichols. LU-NO. **Relations between extrinsic and intrinsic values and pro-green versus pro-growth attitudes in college students.**—The purpose of this study is to determine if extrinsic or intrinsic values lead an individual to choose between the conflicting goals of conserving the environment and growing the economy. Participants will take the Aspiration Index before they are randomly assigned to one of two conditions. The condition will present them with a story about an individual with success framed in extrinsic or intrinsic outcome and will answer questions to the story followed by a multitude of items from various questionnaires to assess the tradeoff in attitudes on economic growth and attitudes on environmental protection. Correlational analysis, t-tests, and moderated multiple regression will be used. It is hypothesized that in addition to replicating the previously discovered positive correlation between participants' relative intrinsic value orientation and support for the natural environment, a participant's value orientation will also moderate the effect of the primes upon their responses to the environmental attitude variables.

Ricardo, S. and E. Zucker. LU-NO. **The effects of self-esteem and level of exercise on risky behaviors in college students.**—Risky behaviors generally manifest themselves first during adolescence, affecting later health and development. This study examines how self-esteem and exercise might interact in the expression of risky behaviors. Undergraduates (N=150) will complete, via Survey Monkey, the Rosenberg Self-Esteem Scale, the Rapid Assessment of Physical Activity, questions adapted from the CORE Survey and the Youth Risk Behavior Survey. Participants will be grouped according to their level of exercise (high, moderate, low/none) and self-esteem (high, low), forming a 3 X 2 design, with participation in risky behaviors the dependent variables. A main effect for Exercise and Self-Esteem are expected, with risky behaviors less prevalent in those with higher levels of exercise and higher self-esteem. However, an interaction effect also is expected, with more risky behaviors reported by those with high levels of exercise and low self-esteem, and thus, fewer risky behaviors by those with low levels of exercise and high self-esteem.

Sanagala, S. and K. Yurgil. LU-NO. **The effects of academic concentration and self-righteousness on confidence in complex reasoning.**—Decisions in life are guided by many different factors, internal and external to the individual. The purpose of this study is to assess how confidence in one's own opinions may be influenced by academic concentration and personality traits, particularly self-righteousness. One hundred college students ages 18 years or older will be recruited across different academic colleges through university emails to participate in an online study about personality, complex reasoning and confidence. Participants will complete a demographics questionnaire, a scale measuring self-righteousness which has been validated previously (Falbo, 1985), and a modified moral reasoning survey. After the data collection, a mixed model ANOVA will be used to test the effects of the first independent variable, self-righteousness score, and the second independent variable, college concentration, on the dependent variable, confidence level in complex reasoning. It is hypothesized that participants from different concentrations at different self-righteousness levels will have significantly different confidence levels.

Sundt, K. and E. Dupuis. LU-NO. **The short-term effect of objectifying media exposure on women's perceptions of cat-calling.**—The purpose of this study is to investigate the effect of exposure to objectifying media on women's immediate perceptions of cat-calling. Eighty Loyola University New Orleans undergraduate students will participate in a mixed design study. Participants will complete an affect scale and will then be immersed in a virtual street scene using the Oculus Rift, in which participants will be exposed to an advertisement that depicts women in either a non-objectifying or an objectifying way. After the immersion, participants will again complete the affect scale. Participants will be immersed in another street scene using the Oculus Rift, which will either include sounds of cat-calling or not. Participants will be administered the affect scale after the immersion, with a survey about their perceptions of the cat-calling. Results will be analyzed using ANOVA. It is hypothesized that participants who have recently been exposed to objectifying media will react more positively to cat-calling.

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