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

BRMHS	Baton Rouge Magnet High School
CPMC	Calcasieu Parish Mosquito Control
EBRCO	East Baton Rouge Coroner's Office
GCC	Gaylord Chemical Company, Bogalusa, LA
GSU	Grambling State University
LNPI	Louisiana Native Plant Initiative, Alexandria, LA
LSMSA	Louisiana School for Math, Science and the Arts, Natchitoches, LA
LSU-A	Louisiana State University, Alexandria
LSU-BR	Louisiana State University, Baton Rouge
LSU-E	Louisiana State University, Eunice
LSUHSC-NO	Louisiana State University Health Sciences Center, New Orleans
LSU-S	Louisiana State University, Shreveport
LTU	Louisiana Tech University
McSU	McNeese State University
NiSU	Nicholls State University
NSU	Northwestern State University
PU	Purdue University
QQNA	QinetiQ North America
RPCC	River Parish Community College, Sorrento, LA
SLU	Southeastern Louisiana University
SNA	Sasol North America, Westlake, LA
SU	Salisbury University
SU-BR	Southern University, Baton Rouge
SU-NO	Southern University, New Orleans
TU	Tulane University
TUSM	Temple University School of Medicine, Philadelphia, PA
TUSM-NO	Tulane University School of Medicine, New Orleans
UBC	University of British Columbia
ULL	University of Louisiana, Lafayette
ULM	University of Louisiana, Monroe
UM	University of Michigan
UN-LV	University of Nevada, Las Vegas
UNO	University of New Orleans
USDA-NRCS	United States Department of Agriculture-Natural Resources Conservation Service
USUHS	Uniformed Services University of the Health Sciences, Bethesda, MD
UT-B	University of Texas, Brownsville
WU	Wittenberg University
XU	Xavier University

Division of Agriculture, Forestry and Wildlife

Adkisson, K., A. Ferrara, Q. Fontenot, S. Burke and O. Smith. NiSU. **Effects of Hurricanes Gustav and Ike on zebra mussels in Bayou Lafourche, Louisiana**.—During 2007 and 2008, we sampled invasive freshwater mussel populations in Bayou Lafourche, a former distributary of the Mississippi River. Mississippi River water is pumped into Bayou Lafourche, providing a veliger source of the invasive zebra mussel, *Dreissena polymorpha*. We assessed seasonal mussel populations using a ponar sampler in the main channel and a post-hole digger at the edges of the bayou. Additionally, settlement cages and bridge scrapings were used to determine the extent of zebra mussel colonization in Bayou Lafourche. High summer water temperatures are believed to prevent the establishment of populations in Bayou Lafourche; however, live zebra mussels were found on 26 June 2008, at 28.2˚C. In September 2008, Hurricanes Gustav and Ike severely altered water conditions in southern Louisiana. Low flow rates and warm water temperatures (>28˚C) combined with decomposing organic matter, reduced dissolved oxygen levels to less than 1.0 mg/L, resulting in fish kills. Post hurricane sampling collected live zebra mussels that survived hypoxic conditions (dissolved oxygen <2mg/L). The survival of zebra mussels in high temperature and low oxygen environments with high sediment loads suggests a shift in zebra mussel tolerance in their extreme southern range.

Bonvillain, C.P., D.A. Rutherford, W.E. Kelso and C.C. Green. LSU-BR. **Validation and use of handheld protein and lactate tools for quantifying physiological condition in red swamp crayfish, *Procambarus clarkia***.—Hypoxia (dissolved oxygen <2 mg/L) in crayfish aquaculture ponds and natural systems can have sublethal, yet detrimental effects on crayfish populations. The purpose of our study is to develop quick and inexpensive tools for determining physiological condition of crayfish. Hemolymph was collected by pericardial puncture from adult red swamp crayfish, *Procambarus clarkia*, in three treatment groups: air, aerated water, and hypoxic water. Hemolymph samples were allowed to clot, broken up gently, and centrifuged to extract the serum. Serum protein concentration was determined with a refractometer and serum lactate concentration was determined with a handheld lactate meter. Serum samples were also analyzed spectrophotometrically for protein and lactate to validate the refractometer (R^2=0.9543) and lactate meter (R^2=0.9406). Crayfish hemolymph lactate concentrations were significantly higher ($P<0.0001$) in stressed crayfish from hypoxic water (x=15.97 mmol/L) than from aerated water (x=3.61 mmol/L) and air (x=1.02 mmol/L). Crayfish hemolymph protein concentrations did not differ among treatments. The use of a handheld lactate meter offers a simple and inexpensive method for determining crayfish stress level after a hypoxic event that can be used on site by commercial crayfish farmers or monitoring agencies.

Brown, G., J. L. Delabbio and S. W. Gabrey. NSU. **Physical characteristics and summer diet of alligator gar (*Atractosteus spatula*) in central Louisiana**.—The NSU Aquaculture Research Center is investigating the commercial fish-farming of alligator gar (*Atractosteus spatula*). One of the essential requisites in the culture of an animal is an understanding of its dietary needs. Thus, it is important to characterize the food and food habits of wild gar. Conservation and restoration of this species has also become significant in certain areas of the US, and this information will contribute to better understanding the ecological role and habitat needs of the species. The goal of the study was to quantify the physical characteristics and summer diet of

alligator gar in central Louisiana between May and August 2008. Data were collected from 43 gar (21 female, 22 male). Results indicate that female fish were longer, heavier, and had greater gonad development than males. Stomach contents consisted primarily of crayfish and fish. Frequency of occurrence and mean volume of both crayfish and fish did not differ between sexes. Aggregate volume of crayfish was much greater for males (65% of total sample volume) than for females (28%); aggregate volume of fish was higher for females (70%) than for males (27%). There will be further collection of data in summer 2009.

Clay, T.A., M.D. Suchy, W.J. Lorio, A.M. Ferrara and Q.C. Fontenot. NiSU. **Aquaculture of alligator gar *Atractosteus spatula* in recirculating systems**.—Juvenile alligator gar, *Atractosteus spatula*, were exposed to four trials: (1) fluctuating ambient temperatures (28.7±1.5^{o}C) and fed 4% body weight split equally among three daily feedings; (2) controlled average temperature (27.5±0.5^{o}C) and fed 4% body weight split equally among three daily feedings; (3) fluctuating temperatures (28.4±2.6^{o}C) and fed 4% body weight split between two daily feedings; (4) feed amounts of 1, 2, 4, 8% body weight per day split equally among three daily feedings. All gar were fed extruded floating pellets (45% protein/16% lipid). All gar were stocked at 0.5 fish/l in 95 l tanks with 60 l of water at salinities of 4 ppt. Total biomass was not different (α=0.05) between the ambient and fluctuating temperatures or between different feeding frequencies. Fish fed 8% body weight were larger (36.8 g) than fish fed lower amounts. Survival was not different among any treatments. Condition was not different among temperature and feeding frequency trials. Gar fed 4% feed had the highest condition (0.40) and lowest feed conversion rates (2.15). Increasing feed amounts resulted in increased total-ammonia-N and decreased DO levels. The results of this study suggest juvenile alligator gar should be fed three times a day at 4% body weight.

Mack, J., M. Gibson, G. Grozidts and B. Strimbu. LTU. S. Strimbu. UBC. **Development and use of a simple fiber length measurement system**.—Fiber length, particle size, distribution and the shape of the particles in bulk material used for composite materials (e.g., cement) in paper are important and sometimes controlling parameters in manufacturing. At The School of Forestry, Louisiana Tech University, Ruston, LA, we developed a simple inexpensive computerize system for paper fiber length measurements for our pulp and paper technology projects. The system uses simple software to digitize images of fibers and particles and calculates average fiber and particle sizes and shapes and their distribution. The software produces from these digital images a one page quality control report along with the images of the particles or fibers measured. The digitized images are obtained with a fair resolution digital camera from microscope slides of smeared material and stored in the computer. Digital cameras and low resolution projecting microscopes are readily available in school laboratories and the software, which we call "FLATech" software, is available from School of Forestry, Louisiana Tech University or from Nano Pulp and Paper LLC, both at Ruston, LA. This system was developed in conjunction with the Louisiana Tech Nano Pulp and Paper Initiative.

Raynor, E.J. and A.R. Pierce. NiSU. C. Leumas and F.C. Rowher. LSU-BR. **Breeding waterbird use and hatching success of three colonial seabirds on Louisiana's barrier islands**.—Barrier islands provide critical breeding habitat for several species of colonial waterbirds that are of conservation concern. However, this habitat is subject to degradation,

especially from high-energy storms. In response to this degradation, there has been considerable restoration efforts focused on barrier islands, but there has been little evaluation of their use by avian species. Since 1994, Louisiana's Isle Dernieres Barrier Island Refuge has been augmented via breakwater structures and dredge fill material. To determine the breeding waterbird use of the refuge we conducted boat/ground surveys during May and June 2008, to determine breeding species and estimate population sizes. We observed 20 species and approximately 45,000 pairs breeding on the refuge. We also monitored the hatching success of three species of conservation concern, Sandwich Tern (*Thalasseus sandvicensis*), Royal Tern (*Thalasseus maxima*), and Black Skimmer (*Rynchops niger*). We monitored 7 colonies of Sandwich Tern (N=320 nests) and Royal Tern (N=538 nests) and 8 colonies of Black Skimmer (N=265 nests) to assess their hatching success. Hatching success was variable among islands, but overall hatching success was 82.5% for Sandwich Terns, 86.2% for Royal Terns, and 58.1% for Black Skimmers. Future work will focus on identifying important habitat characteristics for these breeding waterbirds.

Strimbu, B., D. Long, W. Palmer, D. Brown, C. Smith, R. McCoy and M. Dillon. LTU. **Mapping the future landscape for two southwestern Louisiana parishes**.—Hurricanes are the main landscape disturbance in southwestern Louisiana. The present research aims in identifying the landscape structure that is best prepared for hurricane mitigation and recovery. Elements of the landscape that would be considered as playing a significant role in landscape protection would be identified using satellite images taken before and after Hurricanes Danny (1985) and Rita (2005). The arrangement of the attributes defining the desired landscape structure was determined using the results of principal component analysis as input for discriminant analysis. The results supplied by this approach were compared with the results provided by the Land Change Modeler, an image processing module for GIS produced by Clark Labs. The results were a set of maps describing the temporal evolution of the landscape toward a structure prepared for the winds and precipitation associated with a hurricane.

Weatherspoon, J. SU-BR. **The effect of crayfish waste meal as a comparison piglet feed.—Louisiana is** the world's largest producer of crayfish with an average annual harvest exceeding 100 million pounds. Along with edible crayfish tail meat, about 85 million pounds of peeling waste is generated in Louisiana landfills annually (LSU AgCenter, 2008). The objective of the study was to determine if crayfish waste could be converted to crayfish waste meal (CWM) and used as a protein supplement in pig feed for Crossbred Yorkshire/Hampshire grower pigs. The cost of CWM is significantly less than the cost of soybean oil meal (SBOM). In addition, crayfish takes several months to decompose and the smell is unpleasant. The waste also is being dumped back into the Atchafalaya River, which causes pollution to the environment. Utilization of crayfish as nutrition supplement for grower pigs is cost effective and reduces the environmental burden. It is hypothesized that grower pigs will have a greater increase in weight gain when given 50% crayfish waste than when given standard pig feed. Using a two group pre-test, post-test experimental design, seven grower pigs were randomly assigned to a control group and eight grower pigs were assigned to the experimental group. Grower pigs in the experimental group were fed the SBOM diet. At measurement interval 1, grower pigs were given the standard pig feed and weight gain exceeded weight gain of grower pigs assigned to the experimental group.

Webb, K.A. LNPI. D.D. Kee. McSU. C. Richmond and S. Edwards. USDA-NRCS. R**attlesnake master (*Eryngium yuccifolium*) seed variability and yield response to collection date**.**—** Rattlesnake Master is a unique plant that is native to the plains and prairies of southwest Louisiana. The need for high quality seed to re-establish this plant into the Chenier Plains is great; however, the amount of information on the plant is limited. Data were collected from ongoing seed production endeavors to determine the effect of seed harvest period on seed yield and seed size. Individual seed size was greatest in mid September and mid October. However, yield and total seed numbers were greatest in October 2008 with 25 kilograms of the 32 kilograms of pure seed collected occurring in this month. Harvested seed numbers and yield were highly correlated to harvested seed heads (R^2>0.9).

Wilkerson, D. and A. Brown. SU-BR. **The economic implications of climate change: On agricultural finance, forestry and wildlife**.**—**The economic implications of climate change are massive and wide spread throughout the state of Louisiana; however, we present an overview of the local economic implications of an increase in temperatures throughout the Baton Rouge Metro and Rural areas. We begin our study by examining the financial vulnerability of local farmers. While consumers benefit from low prices, local farmers suffer not only from profit loss but crop loss as well. In addition, the current financial crisis has led to an increase in the number of farm foreclosures and bank liens. Moreover, the local farmer not only suffers financially but morally. Hence, the local farmer must choose between saving the family farm, which provides food for their neighboring communities and generating ample income to provide the necessities for their individual family. Future recommendations for our research include an assessment of the impact of climate change on United States agriculture production from 1999-2009 (spanning 10 years). We will use Geographic Information Systems including mapping to measure the retreat of local water/ irrigation systems. We also will examine the role local lawmaker's play in influencing climate change policy.

Division of Biological Sciences

Botany Section

Lasseigne, A. NiSU. **Damage to the Morganza to the Gulf Hurricane Protection Levee by Hurricanes Gustav and Ike**.—A wetland delineation was performed on a 5.4 mile stretch of levee in the vicinity of the present Morganza to the Gulf Hurricane Protection Levee. The delineation was done in preparation for the permitting of the heightening and widening of the present small levee. Field data were collected and photographs taken before and after Hurricanes Gustav and Ike. Methods used in the delineation will be discussed along with results and conclusions, and damage caused to the vegetation and to the levee itself will be presented.

Nolan, C.B. ULM. K.L. Hunter, R.B. Hunter, A. Noyes and A. Bennett. SU. **Phylogenetic analysis and genetic variability with the genus, *Amaranthus*, using ISSRs**.—The genus *Amaranthus* (Amaranthaceae) is globally distributed and comprised of weedy and grain varieties. Previous attempts to elucidate phylogenetic relationships within the genus have paid little attention to the federally-threatened coastal species *Amaranthus pumilus* (endemic to Eastern U.S. barrier islands). Single primer ISSRs were employed to measure genetic variation and resolve systematic confusion of *A. pumilus*. Samples were collected from wild populations on Fenwick Island, DE, and wild and propagated populations on Assateague Island, MD. Genetic diversity was detected among and within *A. pumilus* populations, though variability was low. Fenwick Island populations exhibited the highest variability (h = 0.1016) and the wild *A. pumilus* population on Assateague Island was higher than the propagated population on the same island (0.0185 and 0.0340, respectively). Genetic variation among *A. pumilus* also was compared to *A. hypochondriacus* and *A. cruentus*. Genetic diversity of both species was higher than *A. pumilus* (0.2263 and 0.2947, respectively). Phylogenetic analyses (parsimonious and Bayesian) included 41 accessions and represented 32 species. Phylogenetic signal was detected in the data matrix, though tree resolutions were low. *A. pumilus* consistently grouped with coastal species *A. arenicola*, which is the first postulated relationship of this pair.

Sasek, T.W. ULM. L. Urbatsch. LSU-BR. S. Darwin. TU. R. Miller. SLU. A. Lasseigne. NiSU. **CyberFlora Louisiana: A virtual herbarium for Louisiana**.—All 1.1 million plant specimens in the 15 Louisiana herbaria will be imaged during a three-year project supported by the National Science Foundation Biological Resource Collections program. Collection information will be extracted from the labels with software tools to develop electronic databases. The digitized images and data will be freely available online through a central website called CyberFlora Louisiana. It will offer fast data sorting and filtering, rapid delivery of zoomable images, mapping of specimen locations, and checklists of plants for particular locations. The website will be supplemented with digital images of live plants, plant parts, and identifying features for species found in Louisiana. Imaging, data basing, and geo-referencing all the state's collections will significantly increase the value and utilization of these important resources, especially for local, state, and federal agencies that need to consult the herbaria regularly. As one of the first statewide projects in the nation, it will serve as a model for other state networks. An online collection of plant information will increase appreciation of the importance of Louisiana's plants

and their conservation. For schools, museums, wildlife refuges, and parks, the availability of live plant images, keys, and useful information also will stimulate more interest in plants.

Stiller, V. SLU. **Drought and salinity affect wood density and vulnerability to xylem cavitation of bald cypress (*Taxodium distichum*) seedlings**.—We investigated the role of hydraulic conductivity, wood density, and xylem cavitation in the response of bald cypress (*Taxodium distichum*) seedlings to increased soil salinity and drought. 1-yr old, greenhouse-grown seedlings were irrigated daily with a 100 mM (≈ 6 ‰) salt solution or once per week with fresh water (drought). Controls were irrigated daily with fresh water. Gas exchange rates of stressed plants were reduced by approximately 50% (salt) and 70% (drought), resulting in a 50-60% reduction in diameter growth for both treatments. Stem-specific hydraulic conductivity (KS native) of stressed plants was 33% (salt) and 66% (drought) lower than controls and we observed a strong positive correlation between KS native and gas exchange. Lower KS native of stressed plants was associated with increased wood density and the plants vulnerability to xylem cavitation. Xylem pressures causing 50% loss of hydraulic conductivity (P_{50}) were strongly correlated with wood density and KS native. The results of the present study indicate that stressed plants partitioned their biomass in a way that strengthened their xylem and reduced vulnerability to xylem cavitation. Hence, these seedlings could be better suited to be planted in environments with elevated soil salinity.

Environmental Sciences Section

Boone, F.B. and G.S. Zumwalt. LTU. **Efficacy of ozone sparging for the remediation of gasoline free product**.—Gasoline surface spills and leaking underground gasoline storage tanks represent serious environmental dilemmas, which are both challenging and time consuming for current remediation technologies. Air sparging and dual-phase extraction techniques have recently become standard practices to address sub-surface contamination from leaking underground storage tanks (LUST). Surface spills are cleaned with containment rings and siphon systems. Both methods for gasoline remediation are costly and time consuming. We have investigated the potential of ozone sparging for remediating both surface spill and LUST free product. We bubbled ozone through a layer of gasoline that was floated on water. The degradation reaction when subjected to high O_3 concentration (8.0 mg/l) was so violent that it could not be contained in the reaction vessel. Trials with lower concentrations of ozone (1.12 mg/l) conducted in a larger reaction vessel resulted in the rapid degradation of free product. 85% of 100 ml gasoline was removed in 70 minutes. When compared to trials using 90% oxygen, ozone proved significantly more effective. Both residual products from the oxygen and ozone treatments will be analyzed via gas chromatography to define constituent lists for the remaining contaminants.

Clark, R.L. and J.L. Bossart. SLU. **Developments of an index of biological integrity for Louisiana's cypress swamps.—**We are developing a rapid bioassessment tool for forested wetlands in southeastern Louisiana. Benthic macroinvertebrates are being sampled from multiple sites that span a gradient of swamp condition, from intact to highly degraded. Site-specific

community data are being used to develop an Index of Biological Integrity for readily assessing swamp health.

Haymore, W. and W.C. Dorsey. GSU. **Mitogen-activated protein kinase pathway implicated by the expression of c-fos gene protein in AML 12 mouse hepatocytes exposed to penta-chlorophenol**.—Pentachlorophenol (PCP) is primarily a wood preservative with organochlorine chemical properties. It has been widely used as a biocide in several industrial, agricultural and domestic applications. Several experimental studies have shown that PCP has the ability to induce systemic toxicity and carcinogenesis. The literature is vague regarding PCP toxic mechanisms of action at the cellular and molecular levels. Previous investigations in our laboratory have shown that PCP induces cytotoxicity and transcriptionally activates an array of stress gene proteins in human liver carcinoma (HepG2) cells. Our laboratory has also demonstrated the ability of PCP to trigger mitogenic and endocrine-disruption activities in catfish hepatocytes and mitogenic activity in AML 12 mouse hepatocytes. In this study, we hypothesized that AML 12 mouse hepatocytes exposed to PCP will transactivate a stress gene protein in response to mitogenic activity. To test this hypothesis, we exposed varying concentrations of PCP to in vitro cultures of AML 12 mouse hepatocytes, and performed the Western Blot Analysis to assess c-fos expression. The mitogenic activity of PCP was supported by Western Blot expression and densitometric analysis showing a potential activation of c-fos gene protein in AML 12 mouse hepatocytes at 1.95 PCP µg/mL and 31.2 PCP µg/mL with 90,000 and 70,000 c-fos relative abundance, respectively. Our results strongly suggest that the c-fos oncogene may be responsible for the downstream signaling of mitogen-activated protein kinase.

Laborde, J. and J. Allen. LSU-A. **Monitoring of pH and temperature with seasonal changes of an isolated pond**.—From autumn of 2007 to spring of 2008, the temperature and pH of water samples were measured at several sites of the human-made pond behind the Science Building on the grounds of Louisiana State University at Alexandria to determine seasonal trends. In addition to measuring these parameters at variable sites of the pond, depth studies were conducted at 0.25 meter intervals from the top of the water to the bottom (approximately 1.50 meters) using the YSI Probe with the 556 Multiprobe System on 1 liter samples collected by the JT-1 Lamotte Water Sampler. The results presented indicate the seasonal variations in temperature as well as variation in pH. The depth profile for the temperature and pH also had variations.

Millicent, A. and J. Sothirajah. SU-BR. **Municipal solid waste in Louisiana: Management, policy initiatives and regulations**.—In 2007, each person in the US discarded 4.62 pounds of trash per day while the entire US generated about 254 million tons of municipal solid waste (MSW). The large quantity of MSW is an environmental problem. Landfill leachate causes land degradation, contaminates groundwater, compromises air quality and affects human health. Lack of space for new landfills, increasing population, industrialization and consumption has increased the quantity of MSW and the cost of its disposal. Exporting MSW across state lines as well as internationally is not a sustainable solution. Louisiana exports most of its MSW to Texas, Mississippi and Arkansas. This practice is not economically viable. Solutions for handling MSW in Louisiana include source reduction, recycling and composting, combustion with energy recovery and disposal. The management of MSW in Louisiana, policy initiatives and regulations

such as Resource Conservations and Recovery Act (solid waste disposal act), National Emission Standards for Hazardous Air Pollutants and National Emission Standards for Municipal Solid Waste Landfills will be discussed. The authors gratefully acknowledge support from the Sustainable Futures IGERT Project sponsored by the US National Science Foundation (under Grant No. DGE 0333401).

Morton, D.A. and G.S. Zumwalt. LTU. **Effects of ozone sparging on soil populations at a BTEX contaminated site**.—Given the complexity of bacterial communities, characterizing their population diversity is challenging. To date, the obstacles associated with this descriptive enterprise have limited the value of microbial community characterization in petroleum contamination assessment and remediation efforts. One potential solution to address these challenges is by the recognition that sub sampling an overall community provides a preliminarily description of an overall bacterial consortium. This study examined how a consortium responds to ozone sparging from a benzene, toluene, ethylbenzene, and xylene (BTEX)-contaminated site. Presently, studies concerning the effects of ozone sparging on soil-borne communities have not been investigated. Polymerase Chain Reaction (PCR) was used to assess the diversity of bacteria in soil samples across a range of contamination levels. Multiple PCR markers were amplified to assess the genetic composition of the soil pre and mid-ozone treatment. Soil samples were taken from three contaminated and one uncontaminated well across a gradient of the spill site. Genic primers were used for screening the soil before ozone sparging began and again 6 weeks after startup. This study provides baseline data on how a soil-borne community responds to ozone sparging. Supported by PPM Consultants Inc., LTU, and LDEQ.

Reed, C.L., F. Boone and G. Zumwalt. LTU. **Efficacy of sparged ozone in the remediation of *Microcystis* (blue green algae)**.—While blue green algae are important in aquatic systems they may become a problem in high concentrations at specific sites. Problems that may occur with high concentrations include off flavor in catfish, high total particulate solids, and aesthetic problems in scenic ponds. Historical remediation techniques have developed negative long term environmental effects. We examined how dissolved ozone would impact blue green algae. We have tested the effect of ozone sparging on the blue green algae *Microcystis aeruginosa* UTEX LB 2063. A healthy culture of *Microcystis* lost 50% of light absorption at wavelength 663nm in 15 minutes of treatment with 1mg/L sparged ozone. Short, low level treatments of dissolved ozone appear to remediate high concentrations of *Microcystis*. The largest advantage of ozone treatment is that ozone has a very short half life (30 minutes); therefore, it should not have any long term residual effects on the environment. Ozone is toxic to aquatic organisms and further research is needed to define toxicity on vertebrate and invertebrate fauna. Ozone sparging may prove to be a cost effective method of remediation where concentrations of algae are a problem.

Thomas-Porch, C. SU-BR. **Identification of protein biomarkers in prostate cancer cells using 2-dimensional analysis**.—This study seeks to examine the effects of two very different compounds on cancerous cells. The first compound, butanediepoxide (BDO_2) is a cancer causing agent to which humans are extensively exposed. Our aim, with respect to this compound, is to identify a protein secreted by cells that have been exposed to this compound as a biomarker. This biomarker would indicate that BDO_2 is the cause of the cancer found in that organ. The second compound is an extract of bizzy nut. This nut is a natural product that has been observed to have

cytotoxic properties in cancerous cells. We are attempting to find a protein biomarker that would indicate that this compound is exhibiting its chemopreventive properties. The cell line used was LNCaP cells. One population of these cells was induced with BDO_2, another population with the bizzy nut extract, and a third population went untreated. Protein secreted from each population of cells was separated on a pH strip by isoelectric focusing. These samples were then separated by molecular weight using polyacrylamide gel electrophoresis (PAGE). When compared to the gels of proteins secreted from uninduced cells, the gels of protein secretions in response to both BDO_2 and bizzy nut showed synthesis of new protein as well as alterations in proteins previously seen. High performance liquid chromatography to separate proteins by ion exchange chromatography was practiced but not performed on the protein samples.

Vijayaraghavan, M. TU. **Environmental education through service learning in an introductory biology course**.—'Environmental literacy' of youth and general public is of major importance in contemporary society. This paper summarizes the results of service learning in an introductory biology course to freshman biology students at Tulane University, as part of an EPA-sponsored Environmental Education Grant. The students tested water quality of water bodies in and around New Orleans on a weekly basis and reflected on their data. Their data also were entered into the Louisiana Universities Marine Consortium (LUMCON) website for access by all the water monitoring centers and schools that collaborated with the consortium. In addition, they demonstrated the techniques employed during the testing and explained the importance of water testing to junior high school students.

Young, B., F. Boone and G. S. Zumwalt. LTU. **Remediation of *Microcystis aeruginosa* (cyanobacterium) using ozone sparging technology**.—Cyanobacteria, found naturally within many bodies of water, is usually harmless. Species, however, can grow very quickly, become highly concentrated, and form algal blooms when environmental conditions permit. Large concentrations of cyanobacteria are responsible for off-flavor within the catfish industry and aesthetic difficulties in scenic areas. Broad-spectrum algicides have been utilized for remediation, but their use has yielded several negative environmental effects. This experiment attempts to define the minimum concentration of ozone per unit time required to eradicate *Microcystis aeruginosa* UTEX 2063 from a concentrated culture. Cultures were exposed to varying concentrations of ozone (12.5 mg O3/L to 0.78125 mg O3/L). To verify the impact, samples were taken from the treated cultures at various times, and cell counts were conducted using a hemacytometer and a spectrophotometer. Because ozone has a short half-life, no long term environmental consequences are anticipated if used for remediation purposes. Further research is needed, however, to determine any effects that ozone may have on other cyanobacteria and non-problematic aquatic organisms. The data obtained may also prove useful in the design of ozone flow systems and batch treatment systems.

Microbiology Section

Broussard, K. A. and S. K. Sullivan. LSU-A. **Inhibition of bacterial growth by a *Sporolactobacillus* isolate**.—A bacterium was isolated from Attine (leaf cutter) ants, which showed inhibitory qualities against other bacterial species. The bacterium, named A2-1, was identified as

belonging to the genus *Sporolactobacillus*. Analyses demonstrated inhibition of growth was demonstrated in diverse bacteria including those of the genera *Bacillus*, *Klebsiella*, and *Staphylococcus*. Initial quantitative analyses indicated at least a 10,000 fold inhibition of *Bacillus megaterium* growth. Presented here is data showing that a microtiter plate reader can be used for simplified quantitative analyses of additional inhibitory interactions.

Childers, G.W. and C.J. Schulz. SLU. **Long term trends of fecal pollution loading in Tangipahoa River, LA**.—The Tangipahoa River in southeast Louisiana is a scenic waterway that is heavily utilized for recreation. This river drains the majority of Tangipahoa Parish and receives both domestic and agricultural runoff. Fecal pollution routinely exceeds the EPA standard for primary contact and raises the possibility for public health concerns. Due to the short hydraulic retention time and rapid response to precipitation, this river is an ideal case study to develop a hydraulic model for forecasting fecal pollution levels based on readily available USGS stream flow data. Fecal coliform counts were monitored weekly in the Tangipahoa River for over eight years and used with stream flow data to construct a non-parametric multiplicative model for predicting water quality. The long term data set provides additional insights into trends not detected by short term monitoring investigations. The ability to predict water quality (fecal pollution loading to potentially hazardous levels) may allow for an early warning system that can serve the public.

Elder, E. D. and J. M. Lyons. LSU-A. **Interactions of *Pseudomonas aeruginosa* and *Candida albicans* in biofilm formation**.—In order to monitor the interactions of *Pseudomonas aeruginosa* and *Candida albicans* in biofilm formation, stainless steel disks were exposed to spectrophotometrically calibrated inocula. The biofilms developed differed in the initial organism applied, the subsequent organism applied, the length of time between applications of the organisms, and the total time of biofilm development. The disks were rinsed to remove planktonic organisms then scraped to remove sessile organisms. The fluids surrounding the disks and the scrapings from the disks were serially diluted and spread plated for quantification. Both organisms were consistently retrieved from the fluid samples indicating supportive growth conditions. Initial applications of *C. albicans* were found to decrease the attachment of *P. aeruginosa* while the reverse application process did not alter biofilm formation. The time between applications of the organisms did not impact biofilm formation for the durations studied. Spread plates of the calibrated inocula confirmed an antagonistic relationship between the organisms. Future studies will focus on the impact of the inocula preparations, increased times between the applications, increased durations of biofilm formation, and identification of the antagonist.

Ferguson, B.J. and W.H. Dees. McSU. M. Packiam, B.T. Mocca and A.E. Jerse. USUHS. **Sequence-specific inhibition: Using phosphorothioate-oligonucleotides to decrease antibiotic resistance in *Neisseria gonorrhoeae***.—*Neisseria gonorrhoeae*, like all Gram-negative bacteria, has an inner and an outer membrane enclosing a thin layer of peptidoglycan. Spanning these membranes is an energy-dependent mtr (multiple transferable resistances) efflux pump. Encoded by the mtrCDE operon, the efflux pump is responsible for expelling host-specific antimicrobial agents, detergents and antibiotics. mtrC is the first gene of the mtrCDE operon and it is translated to form the periplasmic stabilizer of the membrane-bound efflux

pump. We report that binding a 19 base-pair phosphorothioate oligonucleotide (PS-ODN) antisense to the Shine-Dalgarno sequence and the start codon of the mtrC transcript in wild type *N. gonorrhoeae* strain FA19 can significantly decrease the level of resistance to antibiotic treatment ($p<0.05$). This effect was assessed through a regimen of gonococcal viability assays that demonstrated the effectiveness of various concentrations of PS-ODNs cultured with strain FA19 under the pressure of various concentrations of antibiotics and detergents (e.g., erythromycin and Triton X-100, respectively). The future direction of this research includes comparing the MtrC protein levels in gonococci treated with specific PS-ODNs to those treated with scrambled (non-specific) PS-ODNs. In addition, further comparison of mtrC transcript levels and unrelated RNA levels would confirm the mechanism of decreased bacterial viability.

Isaac, J., C.J. Schulz and G.W. Childers. SLU. **Examination of methanotrophic diversity using pmoA before and after domestic wastewater addition in a Louisiana freshwater marsh**.—Methanotrophic bacteria are ecologically and technologically important because they are major players in the global carbon cycle and act as nitrogen fixers and ammonia oxidizers as well as degraders of numerous organic contaminants. Methanotrophs reduce the methane flux from anaerobic environments to the atmosphere by using methane as both the sole carbon and energy source. The Joyce Wildlife Management Area (JWMA) marsh is the recipient of several million gallons of treated wastewater daily, which has the potential to impact the methanotroph populations in this environment. Sediment samples were collected to investigate the methanotrophic communities before and after the addition of wastewater. Clone libraries were constructed using the pmoA gene, which encodes the α-subunit of the particulate methane monooxygenase. Nutrient levels in wastewater also were monitored. This study serves as a base for future studies to link methanotrophic community function and activity in relation to changing environmental conditions.

Jandegian, C.M. and G. Zumwalt. LTU. **Ozone sparging to remediate *Chlorella vulgaris* (green algae)**.—Unicellular algae play a very important role in our environment as the foundation of food chains within the ecosystem. Unfortunately, in great abundance, algae can also be harmful to the environment. We chose to examine the efficiency of ozone remediation on the unicellular green algae, *Chlorella vulgaris* UTEX 26. Unlike previous remediation efforts such as copper sulfate, which has long term deleterious effects, ozone has a very short half life (less than 30 minutes) and therefore should not have any long term effects on the environment. The procedure involves bubbling ozone through *Chlorella* maintaining 1mg/L throughout the entire study. In a 600ml sample, higher concentrations of ozone (8mg/L) will clarify a deep green culture of *Chlorella* in less than 3 minutes. Lower concentrations of ozone appear to attack the chlorophyll over time. In a 1mg/L dilution, 50% of chlorophyll can be destroyed in less than 20 minutes. Microscopic examination, after 20 minutes, shows that all algal cells have been lysed. The use of ozone sparging for remediation is a very different method that can kill large numbers of algae in short periods without deleterious long term effects.

Johnson, J., E. Talley, G.T. Howard and E.J. Watson. SLU. **Survey of the forensic potential of soil microbes**.—No data currently exist on the genetics of soil microorganisms associated with above-ground carcasses for revealing biodiversity and successional data. The use of microorganisms in forensic science for postmortem estimation is currently limited to buried

remains, adipocere formation, and soil solutions containing volatile fatty acids, anions and cations. The forensic potential of soil microbes such as Group I lipases is tremendous. In particular, soil microorganisms may prove to be a reliable estimator of postmortem for remains recovered weeks or months after death. The main objective of this study was to generate preliminary data on the genetics of soil microorganisms associated with two adult swine carcasses placed in a grassland habitat in Hammond, LA, during the fall 2008 and winter 2009 seasons. Soil cores were sampled from beneath the carcasses throughout decomposition and analyzed for microbial diversity and succession patterns. Twelve colony forming units (CFU/mg soil) have been determined over time using the pour plate technique, as well as notable trends in total numbers of lipolytic+ and proteolytic+ organisms throughout decomposition. DNA isolation was performed using a Power Soil Kit, followed by PCR with 16S universal primers, DGGE analysis, and submission of selected bands for DNA sequence analysis.

Leonard, K., L. Martinez, T. Rachel, A. Corbin and R. Nathaniel. NiSU. **Susceptibility patterns of coagulase positive *Staphylococcus* in healthy dogs.—***Staphylococcus aureus* and *Staphylococcus intermedius* have been previously described as clinically significant pathogens. In 2005, Devriese et al. identified a new species of animal pathogenic *Staphylococcus pseudintermedius*. This organism has since been recognized as a zoonotic pathogen and poses the risk of being misidentified as the human pathogen *S. aureus* or the zoonotic pathogen *S. intermedius*. According to Van Hoovels et al., speciation may be accomplished by using intrinsic susceptibility patterns to the Polymixin antimicrobials (Poly B and Poly E). We selected a pool of 21 previously isolated coagulase positive *Staphylococcus* (CPS) collected from healthy dogs at local veterinarian clinics. We then determined the presumptive identification using intrinsic susceptibility patterns. Kirby Bauer antibiogram patterns for antimicrobials used to treat human infections with CPS resulted as follows: *Staphylococcus aureus* (N=4) – Cefozatin,100%; Clindamycin, 100%; Erythromycin, 100%, Oxacillin, 100%; *Staphylococcus intermedius* (N=10) – Cefozatin,100%; Clindamycin, 91.7%; Erythromycin, 83.3%, Oxacillin, 100%; and *Staphylococcus pseudintermedius* (N=7) – Cefozatin,100%; Clindamycin, 57.1%; Erythromycin, 42.9%, Oxacillin, 71.4%. In this study, *Staphylococcus pseudintermedius* showed the highest rate of antimicrobial resistance.

Maccha, V. and M. Merchant. McSU. **Isolation and N-terminal sequence of a mannan-binding protein from serum of the American alligator (*Alligator mississippiensis*).—**Lectins are proteins that recognize and bind specific carbohydrates. Soluble serum lectins act as part of an innate immune mechanism, enabling a host organism to recognize potential pathogens as non-self. The primary focus of our research is crocodilian immunology. In an attempt to isolate and characterize lectins from the American alligator, fresh serum was filtered over a mannan agarose column. The column was washed with approximately 30 volumes of buffer, and then the mannan-bound proteins were eluted with buffer containing 10 mM EDTA. The eluted proteins were resolved by SDS-PAGE, transferred to a PVDF membrane, and stained with Coomassie blue. Several proteins in the 30-90 kDa range were noted on the membrane. Attempts to conduct N-terminal sequencing of three of the peptides revealed that these proteins contained an N-terminal block, and thus could not be sequenced by conventional Edman degradation chemistry. However, the N-terminal sequence of a 60-65 kDa protein, after comparison to the NCBI protein

database, was determined to represent a novel sequence that did not match any reported protein sequence. This protein may represent a new class of mannan-binding lectin-type proteins.

Minyard, M. and R. Boopathy. NiSU. **Antimicrobial activity of Cajun spices**.—Spices come from various woody shrubs and vines, aromatic lichens, roots, flowers, and fruits and herbaceous plants. Spices are defined as any aromatic vegetable substances used for the seasoning of food. For thousands of years, spices have been valued for their many uses including food preparation and preservation. Recently, the consumers' demand for foods that contain minimum amounts of added synthetic chemicals had generated an interest for more research in the antimicrobial properties of spices in food industry. The phyto-chemicals in the spices protect the plant against pathogens including bacteria. If spices were to kill bacteria or inhibit their growth, the use of spices might reduce foodborne illnesses and food poisoning. Food is a very important part of Cajun culture. Cajun foods have distinct flavor and contain lot of spices. In this study, we tested the antimicrobial properties of selected Cajun spices and sauces including garlic, cayenne pepper, jalapeno pepper, Tabasco sauce, Louisiana Hot sauce, Crab boil, and vinegar on various enteric bacteria. The results indicated that Tabasco sauce, Louisiana Hot sauce, and vinegar were more effective in inhibiting the growth of *E. coli*, *Salmonella typhimurium*, *Serratia marcescans*, *Streptococcus pyogenes*, *Klebsiella pneumoniae*, *Proteus vulgaris*, and *Staphylococcus aureus* compared to other spices.

Paine, D.N. and J.L. Comeaux. McSU. **Prevalence of antibiotic-resistant microorganisms in lakes of Calcasieu Parish**.—The current increase in the frequency of antibiotic resistant (AR) microorganisms is a major public health issue. We have been investigating the prevalence of potentially pathogenic AR microorganisms in lakes of Calcasieu Parish to determine if health risks associated with recreational waters exist. Water samples were collected at Prien Lake and Lake Charles. Subsamples were cultured on nutrient agar (NA), NA amended with streptomycin (8 μg/ml), NA amended with penicillin G (10 μg/ml), NA amended with tetracycline (15 μg/ml), and mannitol salts agar amended with methicillin (4 μg/ml). Substantial percentages of the microbial populations from these waters were found to be resistant to each of the antibiotics tested.

Roy, D. and R. Boopathy. NiSU. **Nitrogen removal in shrimp aquaculture wastewater using sequencing batch reactor**.—Over the last two decades there has been an increase in consumer demand for shrimp, which resulted in worldwide aquaculture production of shrimp. In the United States and around the world, the stringent enforcement of environmental regulations encourages shrimp farmers to develop new technology such as recirculating raceway system. This is a zero-water exchange system capable of producing high-density shrimp yields. The system also produces wastewater characterized by high levels of ammonia, nitrite, nitrate, phosphorous, and organic carbon, which make waste management cost prohibitive. Shrimp farmers have a great need for a waste management method that is effective and economical. One such method is the sequencing batch reactor (SBR). A SBR is a variation of the activated sludge biological treatment process. This process uses multiple steps in the same tank to take the place of multiple tanks in a conventional treatment system. The SBR accomplishes equalization, aeration, and clarification in a timed sequence, in a single reactor basin. This is achieved in a simple tank, through sequencing stages, which includes fill, react, settle, decant, and idle. A laboratory scale

SBR was successfully operated using shrimp aquaculture wastewater. The wastewater contained high concentration of nitrogen. By operating the reactor sequentially, viz. aerobic and anaerobic modes, nitrification and denitrification were achieved. Ammonia in the wastewater was nitrified within four days. The denitrification of nitrate was achieved by the anaerobic process and 100% removal of nitrate and nitrite was observed within 35 days.

Schulz, C.J. and G.W. Childers. SLU. **Compositional changes of relative bacteroidetes 16S rDNA marker abundance under varying environmental conditions**.—Fecal pollution has negative impacts on the environmental health, economic and social value, and public health risks of natural waters. Determining the presence of fecal pollution is a relatively easy task, but determining the source(s) is considerably more difficult. Molecular methods based on the identification of 16S rDNA markers of fecal Bacteroidetes have been used to delineate animal fecal sources based upon differences of host species intestinal populations. This method has subsequently been applied to natural waters in an effort to determine sources of fecal pollution (ruminant vs. human, etc.). The application of these markers to assess fecal pollution is not without problems. In particular, the relative survival characteristics of different source markers have been a complete unknown. In this study, a mixture of ruminant and sewage waste was incubated at various combinations of temperature and salinity for 336 hours to assess the selected environmental effects on Bacteroidetes composition using 16S rDNA surveys. The results of this study indicate Bacteroidetes markers have differing survival characteristics related to environmental conditions. The implication of this study is that fecal pollution tracking methods using Bacteroidetes can be misleading without proper controls.

Spangler, J.R. and G.W. Childers. SLU. **Presence of denitrification genes in relation to environmental conditions found in a wastewater treatment plant**.—Denitrifying bacteria (DNB) play an important role in wastewater treatment by removing nitrogen in the form of dinitrogen gas. Denitrifying bacteria are dependent on ammonia-oxidizing bacteria (AOB) as well as nitrite-oxidizing bacteria (NOB) to transform ammonia to nitrite and nitrate, as well as the presence of electron donors (in the form of organic electron donors). AOB and NOB have shown chaotic behavior in response to low retention times, but little is known about how this affects DNB communities. Before being able to quantify the expression of denitrification genes in the system (NOS, NXR, NIR), an accurate survey of the present denitrifier communities must be done. PCR-based surveys of the aforementioned genes were used to identify the denitrifiers potentially active in a wastewater treatment plant. Additional insights were obtained by microcosm studies using varying amounts of aeration, as well as concentrations of added carbon. These results suggested that this wastewater was carbon-limited for optimal denitrification. This study is observing both microcosm and full-scale effects, in that the wastewater treatment system itself is undergoing changes to increase the retention time.

Walker, N. and R. Boopathy. NiSU. **Bio-ethanol production from post-harvest agricultural residues**.—Agricultural residues are produced in large quantities throughout the world. Approximately, one kg of residue is produced for each kilogram of grains harvested. This ratio of grain/residue translates into an excess of 40 billion ton of crop residue produced each year in the USA. These residues are renewable resources that could be used to produce ethanol and many other value added products. In this study, we demonstrate that the post-harvest sugar cane

residue could be used to produce fuel grade ethanol. A chemical pre-treatment process using alkaline peroxide or acid hydrolysis was applied to remove lignin, which acts as a physical barrier to cellulolytic enzymes. Yeast, *Saccharomyces cerevisiae* (ATCC strain 765), was used in the experiment. The pre-treatment process effectively removed lignin. Ethanol production in the culture sample was monitored using high performance liquid chromatography. The results indicate that the acid pretreatment removed most lignin. The sugarcane bagasse with acid treatment using 1.2 M H_2SO_4, fermenting for 15 days produced more ethanol than any other treatment combinations. Fermentation for more than 15 days did not increase ethanol production. The actual ethanol yield in the best pretreatment of 1.2 M H_2SO_4 was 696 mg/L.

Wright, P. M. and J.L. Comeaux. McSU. **Presence of antibiotic-resistant microorganisms in waters of Calcasieu Parish, LA**.—Due to the extensive use of the public water systems, the increase of antibiotic-resistant microorganisms (ARM) can pose a potentially dangerous health threat. Because of the possibility of exposure to ARMs due to recreational use of the waters, samples from area rivers and bayous were acquired and tested for the presence of ARMs. Subsamples were cultured on nutrient agar (NA), NA amended with streptomycin (8 μg/ml), NA amended with penicillin G (10 μg/ml), NA amended with tetracycline (15 μg/ml), and mannitol salts agar amended with methicillin (4 μg/ml). Significant numbers of ARMs resistant to the antibiotics used were detected in waters used for recreational purposes.

Molecular and Biomedical Biology Section

Altius, S.C. and H. Cheng. GSU. **A study of transient receptor potential melastatin type 7 in pancreatic beta-cells**.—TRPM7 is an ubiquitously expressed and constitutively active divalent cation channel, whose basal activity is regulated by intracellular levels of Mg^{2+} and Mg-ATP. This channel permeates both Mg^{2+} and Ca^{2+}; however, it has a central role in Mg^{2+} regulation, and it should be noted that the ability for this channel to permeate Mg^{2+} is essential for cell growth and survival. There is no information regarding TRPM7 expression and function in pancreatic beta-cells. In this study, we examined TRMP7 in the pancreatic cell line betaTC-3 using RT-PCR and patch clamp analysis, and identified transcripts as well as current typical TRPM7 channels. These findings suggest that TRPM7 may play a crucial role in the survival of insulin secreting cells.

Antwi, J. and J. Bossart. SLU. **Influences of forest fragmentation on the genetic diversity of nymphalid butterflies.—**We are quantifying the effects of forest fragmentation on genetic diversity in three Afrotropical butterfly species. Genetic structure of populations from seven fragments has been assessed using a 710 bp region of COI. Results are discussed in the context of species' differential vagility and fidelity to forest habitat.

Bachawal, S.V., V.B. Wali and P.W. Sylvester. ULM. **Enhanced antiproliferative response to combined gamma-tocotrienol and erlotinib or gefitinib treatment in mammary tumor cells**.—Clinical use of HER/ErbB receptor tyrosine kinase inhibitors has shown limited success in breast cancer patients because of the coexpression and heterodimer cooperation of multiple HER/ErbB receptors. Gamma-tocotrienol is a rare form of vitamin E that inhibits EGF-

dependent growth of +SA mammary tumor cells by decreasing ErbB3 receptor activation. Studies were conducted to investigate the intracellular signaling mechanisms mediating the antiproliferative effects of combined gamma-tocotrienol with erlotinib or gefitinib. Combined treatment with subeffective doses of erlotinib (0.25 uM) or gefitinib (0.5 uM) with subeffective doses of gamma-tocotrienol (0-3 uM) inhibited growth of +SA cells in a dose-dependent manner, and resulted in a relatively large decrease in phospho-Stat3, phospho-PDK1, and phospho-Akt, but not phospho-Erk1/2, phospho-Src or phospho-IRS-1 levels in these cells. Suppression of Akt activation was not associated with an increase in PTEN or PP2A phosphatase activity. These findings show that combined treatment of gamma-tocotrienol with erlotinib or gefitinib is mediated through suppression in ErbB3-dependent Akt and STAT3 mitogenic signaling, and suggests that combination therapy may improve therapeutic responsiveness in the treatment of breast cancer in women. Supported by grants from NIH (CA86833).

Becnel, M.L. and E. Zou. NiSU. **Is the molting hormone involved in regulation of glucose homeostasis in the fiddler crab, *Uca pugilator*?—**It is well known that in vertebrates blood glucose is regulated by multiple, functionally antagonistic hormones with insulin decreasing and glucagon increasing glucose concentration in the blood. In Crustacea, the crustacean hyperglycemic hormone (CHH), a neuropeptide from the X-organ-sinus gland complex in the eyestalk, is responsible for elevating blood glucose level. However, whether there exists a hormone capable of lowering blood glucose in crustaceans remains unknown. Given the recent reports that the ecdysteroid molting hormone is capable of decreasing glucose concentrations in vertebrates, we hypothesized that the molting hormone 20-hydroxyecdysone can produce hypoglycemic effects in crustaceans. This hypothesis was tested on the model crustacean, *Uca pugilator*. It was found that injection of the exogenous 20-hydroxyecdysone at a dose of 1.0 mg/g wet weight alone resulted in hyperglycemic effects in crabs with normal glucose levels, but when 20-hydroxyecdysone at 1.0 mg/g wet weight was injected together with glucose hypoglycemic effects are produced. How hyperglycemia and high concentration of 20-hydroxyecdysone trigger a rapid decrease in glucose concentration in the hemolymph of *Uca pugilator* needs to be further investigated.

Bedadala, G.R., R. Pinnoji, J. Palem and V. Hsia. ULM. **Herpes simplex virus type-1 lytic infection induces the expression of transcription factor early growth response-1 (Egr-1)**.**—** Herpes simplex virus type-1 lytic infections range from simple cold sores to dangerous keratitis and encephalitis. The interaction between virus and host cellular factors during lytic infection is being investigated extensively by many laboratories. Here, for the first time we showed that HSV-1 can induce the expression of multifunctional transcriptional factor early growth response-1 (Egr-1) during lytic infection. In this study, we used Vero and SIRC (rabbit corneal fibroblast) cells and both are well established cell culture models for HSV-1 lytic infection. Western blot analyses showed that Egr-1 protein was detected starting from 24 hours post infection (hpi) and were directly proportional to the amount of virus. Infection of Vero and SIRC cells with recombinant virus expressing EGFP followed by immunostaining indicated that Egr1 was expressed only within the infected cells. Furthermore, reverse transcriptase polymerase chain reaction (RT-PCR) analyses showed that Egr-1 mRNA was transcribed as early as 1 hpi. Our previous studies using transient cotransfection showed that Egr-1 can regulate HSV-1 infected cell protein 22 (ICP22) and infected cell protein 4 (ICP4). Collectively, these results suggest that

Egr-1 is induced during HSV-1 lytic infection and may play a key role in viral replication and disease progression.

Broadway, L., A. Engelsen, G. Hogan, J. Harmson, C. Gissendanner and A. M. Findley. ULM. **Isolation and characterization of novel mycobacteriophages from northeast Louisiana soil samples**.—The University of Louisiana at Monroe was selected by HHMI's Science Education Alliance (SEA) as one of twelve institutions from across the country to join the National Genomic Research Initiative (NGRI). During the fall 2008 semester, twenty-two ULM freshmen biology students successfully isolated fifteen distinct bacteriophages via conventional soil processing or enrichment regimes. Isolates were subjected to spot test analysis, repetitive phage purification plating, and an empirical testing protocol that led to a ten-plate infection and harvesting of high titer lysates (109-1010 pfu/ml) for each phage isolate. Lysates were processed for transmission electron microscopy with negative staining. DNA was isolated from each phage and characterized using restriction digestion analysis using the BamHI, ClaI, EcoRI, HaeIII, and HindIII endonucleases. Mycobacteria sp. Peaches was submitted for library construction and genome sequencing at the DOE Joint Genome Institute, Los Alamos National Laboratory. The initial phase of sequencing generated 3 contigs and 1 scaffold. During the spring 2009 semester, the SEA-NGRI freshmen class will annotate the Peaches genome. This annotation process includes a finishing analysis of the draft sequence, gene calling, and assignment of predicted gene functions. Supported by the HHMI SEA-NGRI program.

Brown, C. and K.A. Jackson. McSU. **Corticosterone regulation of the hypothalmic-pituitary axis in *Xenopus laevis***.—Corticosterone is an adrenal hormone whose levels rise during periods of long-term stress and is responsible for some of the symptoms associated with this condition. We have recently performed experiments to determine the effects of corticosterone exposure on the hypothalmic-pituitary axis in *Xenopus laevis*. Adult *Xenopus laevis* received daily injections of corticosterone or vehicle every day for a week. Brain tissue was then isolated and tested for ACTH, CRF, CRF receptor 1 and CRF receptor 2 expression by RT-PCR. Results suggest that ACTH levels dramatically decrease following corticosterone exposure while CRF levels double. Furthermore, there is a 1.5 fold increase in CRF receptor 1 levels and a 10 fold increase in CRF receptor 2 levels after corticosterone treatment. These data suggest that exogenously administered corticosterone has major effects on regulation of genes associated with the expression of hormones released from the adrenal cortex.

Cherion, A.J. and K.P. Briski. ULM. **Hindbrain A2 noradrenergic neurons exhibit gender differences in substrate transporter and metabolic transducer gene habituation to hypoglycemia**.—The critical substrate fuel, glucose, is monitored in the brain, but the identity of metabolic chemosensory neurons remains unclear. We have found, based upon single-cell quantitative RT-PCR multi-transcriptional profiling of caudal hindbrain A2 noradrenergic neurons, that these cells express molecular markers for characterized metabolic transducers, including the glucose sensor, glucokinase (GCK), and the energy-dependent potassium channel, KATP, and that these gene profiles are sensitive to hypoglycemia. In light of clinical and experimental data demonstrating gender disparities in behavioral and physiological responses to hypoglycemia, including adaptation to this metabolic stress, we investigated the effects of single versus repeated hypoglycemia on catecholamine biosynthetic enzyme, substrate transporter,

GCK, and sulfonylurea-1 mRNA expression in immunocytochemically-characterized, laser-microdissected A2 neurons from male versus female rats. Our multi-transcriptional profiling data provide novel evidence for sex-specific patterns of transcriptional reactivity and habituation to glucoprivation by A2 neurons, and support the view that divergent CNS-mediated responses to hypoglycemia in males and females may reflect, in part, dissimilar chemosensory detection and signaling of this substrate fuel deficit by hindbrain chemosensory neurons.

Doucett, A. and K.A. Jackson. McSU. **Corticosterone effects on the blood system of *Xenopus laevis***.—Corticosterone is an adrenal hormone whose levels rise during periods of long-term stress and is responsible for some of the symptoms associated with this condition. We have recently performed experiments to determine the effects of corticosterone exposure on the blood system in *Xenopus laevis*. Adult *Xenopus laevis* received daily injections of corticosterone or vehicle every day for a week. Animals were weighed before and after the experiment to determine weight changes. In addition, blood was isolated to determine total blood count, and spleen was isolated and tested for FasL and IL-1β expression by RT-PCR. Frogs treated with corticosterone had a two-fold difference in weight loss as compared to controls ($p=0.015$). Furthermore, corticosterone treated frogs had a 3-fold decrease in total blood cell count as compared to controls ($p=0.001$). Finally, corticosterone caused a dramatic decrease in both FasL and IL-1β expression. These data suggest that exogenously administered corticosterone has major effects on the weight and blood system in frogs.

Genabai, N.K., and K.P. Briski. ULM. **Effects of intracerebroventricular administration of the nonsteroidal glucocorticoid receptor antagonist, CP-472555, on recurrent insulin induced hypoglycemia-associated MCT2, GLUT3, GLUT4, GCK, and s**.—Glucocorticoid receptor (GR) stimulation is implicated in counterregulatory dysfunction during recurrent insulin-induced hypoglycemia (RIIH). The selective type II GR antagonist, CP-472555, reverses effects of RIIH on hypoglycemia, counterregulatory hormone secretion, and CNS neuronal transcriptional activation. This work investigated whether GR blockade during antecedent hypoglycemia prevents habituation of neuronal monocarboxylate (MCT2) and glucose (GLUT3, GLUT4) transporter and metabolic transducer (glucokinase; KATP) gene profiles in hypothalamic chemosensory structures to RIIH. Rats were injected with one or four doses of the intermediate-acting insulin, Humulin NPH. Pretreatment involved icv administration of CP472555 or vehicle before insulin administration on days 1-3. GR antagonism prevented RIIH-associated decreases in MCT2 or increases in GLUT4 gene profiles in the lateral hypothalamic area (LHA) and ventromedial hypothalamic nucleus (VMH). RIIH-associated reductions in LHA, but not VMH GLUT3 mRNA were reversed by GR blockade. LHA glucokinase and sulfonylurea-1 transcripts were not modified by drug pretreatment, but expression was respectively increased or decreased in the VMH by CP472555. The data show that precedent CNS GR activation underlies RIIH-associated downregulation of VMH and LHA MCT2 and VMH GCK gene expression, but is a positive stimulus for GLUT4 gene expression in both sites.

Gissendanner, C.R. ULM. **The nematode spermatheca: A new model system for investigating the genetic regulation of organogenesis**.—The formation of animal organs is a multi-step process that involves the coordination of cell specification, proliferation, differentiation, and morphogenesis. Research in my lab over the past 5 years has involved the

development of the *C. elegans* spermatheca as an organogenesis model system. The *C. elegans* spermatheca system is composed of 30 cells yet exhibits functional and structural complexity. The spermatheca is involved in the processes that regulate the ovulation of oocytes and is also the site of sperm storage. Two valve systems of the organ are important in ensuring that gametogenesis, ovulation, and fertilization are properly coordinated. My lab has identified a gene, nhr-6, that is necessary for spermatheca development. Nhr-6 encodes a nuclear receptor transcription factor that is required for cell proliferation, differentiation, and patterning of the spermatheca. My lab has been testing the hypothesis that nhr-6 regulates distinct pathways, both spatially and temporally, that promote formation and patterning of the various regions of the organ. There are several features of the spermatheca that make it a unique organ system in the nematode, and the discovery of nhr-6 regulatory pathways will be valuable in understanding the formation of complex organ systems at the molecular and cellular level.

Gupta, V., G. Patwardhan, R. Pinnoji, K. Bhinge, V.S. Hsia and Y.Y. Liu. ULM. Y. Zhao. LSU-S. S.M. Jazwinski. TU. **Glucosylceramide synthase regulates MDR1 gene expression through the association of globotriaosylceramide (Gb3) and histone acetylation**.—MDR1 gene frequently is over expressed in drug-resistant tumors, and encodes a large amount of P-glycoprotein protecting cells from cytotoxins. Glucosylceramide synthase (GCS) converting ceramide into glucosylceramide initiates glycosphingolipid (GSL) synthesis and defaults drug-induced apoptosis. It is poorly understood whether GCS has an epigenetic effect on MDR1 upregulation and contributes to drug resistance in cancer. In this study, we report that MDR1 and GCS are co-over expressed in drug-resistant cells and GCS upregulates MDR1 expression. We found that drug-resistant cells over express MDR1 and GCS; blocking GCS repressed MDR1 expression and sensitized these cells. Introduction of GCS gene into cells significantly enhanced MDR1 expression and paclitaxel efflux; suppression of GCS by using antisense oligo dramatically repressed MDR1 expression and cellular efflux. Promoter and Chip assays indicated GSLs modulated MDR1 transcription process. Further evidences on siRNA gene knockdown for Gb3 synthase and GD3 ganglioside synthase, and inhibition of histone deacetylase (HDAC) with trichostatin (TSA) pinpointed the epigenetic effect of GCS on MDR1 relied on Gb3 and histone acetylation (H3, H4). The present study demonstrated the role for ceramide glycosylation by GCS in regulating MDR1 expression. This work is supported by NIH grant (P20 RR16456).

Henry, W. GSU. J. Galan, H. Zhang and W.A. Tao. PU. **Identification and quantification of low abundant serum proteome**.—The development of innovative methods and analytical techniques is pivotal in biomarker discovery based proteomics. Researchers are interested in the quantification and identification of low abundant proteins (LAPs) in serum as it has been hypothesized that changes in these proteins can be important indicators for a particular disease. The overall aim of this investigation is to compare the LAPs in a Metabolic Syndrome induced Ossabaw swine to a controlled Ossabaw swine. To achieve this, an appropriate quantitative method must be developed to measure relative amounts of LAPs. The aim of this project is to characterize a set of novel labeling reagents to label two different protein samples in early sample preparations. This research project focuses on the effects of NHS labeling agent on chromatographic behavior using standard proteins. These proteins were labeled with primary amine-specific agents and isolated by chromatography. The protein fractions were then digested with trypsin, and analyzed by mass spectrometry. The two types of labeling agents used were

pyridine NHS derivative and commercial sulfo-NHS acetate. The labeled proteins were suspended in various buffer systems and run on two different HPLC columns – mixed bed ion exchange and reverse-phase C8 column. The labeling procedures may have strong effects on the behaviors of proteins or the labeling condition may prevent proteins from isolation on the chromatographies. Once the correct conditions have been achieved, a mixture of light and heavy labeled proteins could then be analyzed at the same time by mass spectrometry. The methodology will be extended to the quantification and identification of LAPs serum proteome.

Hill, J.D., K.N. Chiles, C.C. Lightbourne and P. Barrett. XU. **Integration of extra-chromosomal arrays in *Caenorhabditis elegans* by ultraviolet light mutagenesis**.**—** *Caenorhabditis elegans* is a small nematode worm that is very useful for conducting experiments in genetics and molecular biology, due to its relatively short generation time, simple anatomy, and easy maintenance. The purpose of our experiments was to generate integrated transgenic lines of this organism using ultraviolet light (UV) mutagenesis, both for the goal of having these lines integrated, as well as for the pedagogical purpose of determining whether a mutagenesis experiment could be incorporated into the Xavier University Department of Biology Genetics Laboratory course. In the worm, transgenic DNA arrays are normally carried extrachromosomally, but can be integrated into a chromosome by any of a number of mutagens, including UV irradiation. We chose UV because of its common availability and ease of use, and also its relative safety as a mutagen. Once integrated into a chromosome, transgenic arrays are easily identified by having 100% transmission. We will present data suggesting that existing protocols for integration with UV can be improved, that UV can work consistently as a mutagen and at higher efficiency than has been previously reported, and that the mutagenesis protocol can easily be adapted to become part of a Genetics Laboratory curriculum.

Keaton, N.G., T. Do and C.R. Gissendanner. ULM. ***A C. elegans* anillin is required for post-embryonic cytokinesis and cell morphology**.**—**Anillins are actin-interacting proteins that are important in cytoskeletal organization and stabilization. Studies in invertebrate and vertebrate systems have determined that anillins are important for the actin-mediated processes of cytokinesis. However, much less is known regarding other functions of the anillins, such as roles in cytoskeletal-mediated changes in cell morphology. We performed an RNA interference-based screen for genes that function during morphogenesis of the *C. elegans* spermatheca, a reproductive organ important for ovulation and oocyte fertilization. One of the identified genes, ani-1, encodes an anillin. Ani-1 loss of function animals are sterile or exhibit severe brood size reductions. Further analysis of ani-1 loss of function animals revealed an incompletely penetrant cytokinesis defect in the spermatheca (and likely, other cell types as well). This was an unexpected finding since previous genetic analyses had determined that ani-1 was not required for cytokinesis during embryonic development. In addition to the cytokinesis defect, ani-1 loss of function animals exhibit cell morphology defects that are not associated with cytokinesis failure. We are further characterizing these cell morphology phenotypes using molecular markers to assess cytoskeletal structure. Results of these studies will be presented.

Lewis, S. GSU. M. Cavalier, Y.S. Yim and Y.H. Lee. LSU-BR. **A novel target of future cancer chemotherapy 6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase 3 (PFKFB3)**. **—**The cancer isoform 6-phosphofructo-2-kinase/fructose-2,6-bisphophatase (PFKFB3) of

PFKFB causes a rapid increase in fructose-2,6-bisphosphate, the most potent glycolysis-promoting allosteric regulator, and results in the Warburg effect, the cancer-specific elevated glycolysis. Compared to the proteins involved in DNA-replication or signal transduction, which have been the popular targets of conventional cancer chemotherapies, PFKFB3 may serve as a novel therapeutic target with improved selectivity. To test this intriguing possibility, we attempted to find compounds that can inhibit PFKFB3 and, ultimately, suppress the Warburg effect. To find the lead compounds, virtual screening was carried out using the 1990 database molecules obtained from the National Cancer Institute Diversity set against the crystal structure of PFKFB3. Among these, s12 (nsc45582), s13 (nsc45583), s22 (nsc88915) and s30 (nsc170008) were determined to be good inhibitors. s22 (nsc88915) was known to exhibit anticancer properties according to previous studies performed by the NCI. Further functional screening was conducted on a set of 36 small molecules using Linase Assays. Results showed that the small molecules referred by the NCI showed partial properties of an anticancer drug. These inhibitors will undergo further biological screening using human cancer cells.

Mathis, K.W. and P.E. Molina. LSUHSC-NO. **Acetylcholinesterase inhibitor improves survival from hemorrhage in rodents**.—Decreased tissue perfusion leading to end organ injury remains a cause of high mortality in hemorrhagic shock (HS) victims. We have demonstrated that intracerebroventricular (ICV) administration of neostigmine, an acetylcholinesterase inhibitor, reverses hypotension following 50% blood loss. We hypothesized that systemic administration of the anti-cholinesterase physostigmine would act via central cholinergic receptors, enhance sympathetic outflow and improve the pressor response to HS. Intravenous (IV) physostigmine (100 μg/kg) increased plasma epinephrine (358%) and norepinephrine (105%), mean arterial pressure (MAP; 12%; p=0.003) and heart rate (21%; p=0.003) within 5 min in conscious male Sprague-Dawley rats (225-275g). Mecamylamine (nicotinic antagonist; 50μg, ICV), but not atropine sulfate (muscarinic antagonist; 10μg, ICV), diminished the pressor response to physostigmine. HS (40% blood loss) decreased MAP (50%) resulting in 36% mortality 4d post-HS. Physostigmine enhanced the HS-induced rise in plasma epinephrine (159%), reversed hypotension, and improved survival (100% at 4d). These results suggest that physostigmine increases central acetylcholine availability, which activates central nicotinic receptors, increases SNS outflow, and in turn improves MAP recovery and survival post-HS. Supported by DOD-PR-054196, BoR-110350057A, NIAAA-7577, and APS Porter Physiology Development Award.

Moore, T.J., A. Saraf and K.A. Jackson. McSU. **Corticosterone effects on glucose regulation in *Xenopus laevis***.—Corticosterone is an adrenal hormone whose levels rise during periods of long-term stress and is responsible for some of the symptoms associated with this condition. Long-term stress has been shown to be a risk factor for Type II diabetes. Therefore, we have recently performed experiments to determine the effects of corticosterone exposure on the expression of genes that play a role in glucose uptake. Adult *Xenopus laevis* received daily injections of corticosterone or vehicle every day for a week. The pancreas, skeletal muscle, and brain were then isolated and tested for somatostatin and insulin receptor expression by RT-PCR. Results suggest that somatostatin levels remain relatively unchanged following corticosterone exposure. In contrast, insulin receptor levels in both the skeletal muscle and brain are dramatically decreased following corticosterone treatment. These data suggest that high levels of

corticosterone may be responsible for insulin resistance by down-regulating expression of the insulin receptor.

O'Reilly, J.P., P.E. Shockett and J.H. Chancey. SLU. **Structure-function analysis of slow inactivation in voltage-gated Na^+ channels.—**Our objective is to understand the relationship between molecular structure and physiological function in voltage-gated Na^+ channels (Navs) found in excitable tissues (heart, brain, skeletal muscle). Understanding this relationship will provide insight into abnormal Nav function in diseases resulting from heritable mutations in these channels (channelopathies). We focus on an important kinetic process in Navs called slow inactivation (SI), critical for normal functioning of excitable tissues. Using site-directed mutagenesis, electrophysiological recordings from Navs expressed in HEK cells, and the substituted-cysteine accessibility method (SCAM), we examine the functional role of the inner pore region in Nav SI. We find that a single amino acid substitution at a specific site (V930) in domain 2-segment 6 (D2-S6) of the human heart Nav isoform hNav1.5 produces dramatic effects on SI. In addition, this effect is residue-specific (different amino acid substitutions produce different or no effects) and site-specific (substitutions at nearby sites do not produce the same effect). Interestingly, SCAM studies demonstrate that this site undergoes molecular rearrangement during SI. We conclude that V930 in the inner pore region of D2-S6 in hNav1.5 is an important molecular determinant of SI in Navs, which may be regulated by other isoform-specific determinants of SI phenotype. Supported by NHLBI 1-R15-HL080009-01.

Palem, J.R., R.C. Pinnoji, G.R. Bedadala and S.C.V. Hsia. ULM. **Regulation of HSV-1 thymidine kinase, LAT, and ICP0 by thyroid hormone receptor in neuronal cells.—** Various factors were suggested to control HSV-1 latency and reactivation. We identified thyroid hormone response element (TRE), the binding site for the thyroid hormone receptor (TR), in the promoters of HSV-1 TK and LAT. TRs are transcription factors whose activity is dependent on the ligand thyroid hormone (T3). A neuroblastoma cell line constitutively expressing the TR isoform beta (N2aTRbeta) was used for investigation. Transfection and viral infection assays were used to analyze gene regulation. Chromatin immunoprecipitation (ChIP) was performed to investigate in vivo protein-DNA interaction and histone modification. We demonstrated that liganded TR repressed TK promoter activity but activated LAT transcription. TRs were recruited to TK and LAT TREs independently of T3 and hyperacetylated H4 was associated with promoters that were transcriptionally active. A repressive mono methylated histone H3 was enriched in TK promoter. T3-treated N2aTRbeta cells were suppressive to TK expression and virus release. However, the TK expression was enhanced and the release of infectious viruses was increased when the T3 was removed. These results, for the first time, suggested that T3 could regulate the HSV-1 gene expression through its receptor via histone modification and chromatin remodeling. Supported by NCRR/NIH Grant P20RR016456.

Patwardhan, G.A., D. Yin, V. Gupta and Y.Y. Liu. ULM. Q. Zhang and J.R. Bao. LSU-S. S.M. Jazwinski. TUSM–NO. **Targeting glucosylceramide synthase reverses drug resistance through ceramide-induced apoptosis in vivo.—**Drug resistance causes chemotherapy failure; targeting drug resistant gene is the effective way to improve treatment. Glucosylceramide synthase (GCS) that glycosylazes ceramide is over expressed in drug-resistant cancer cells and is a reason for cellular resistance. We used gene-silencing strategy to determine whether GCS is a

novel target for cancer treatment. MBO-asGCS (mixed backbone oligonucleotide) was designed to knockdown human GCS gene. MBO-asGCS selectively increased doxorubicin sensitivity in drug-resistant human (MCF-7-AdrR) and murine (EMT6/AR1) breast cancer cells by 83-fold and 43-fold, respectively, due to silencing GCS over expression. We found that MBO-asGCS significantly inhibited tumor growth and sensitizes tumors to chemotherapy. The administration of MBO-asGCS (1 mg/kg/3-day, 42 days) inhibited tumor growth more that 64% (356 vs. 983 mm^3, N=10) and increased doxorubicin-sensitivity by 58% (187 vs. 432 mm^3, N=10), compared to MBO-scrambled alone and the combination of MBO-scrambled with doxorubicin (2 mg/kg/week), respectively. Further assessments of GCS gene expression, ceramide glycosylation, and apoptosis demonstrated that the effects of MBO-asGCS in vivo rely on the suppression of GCS over expression and the enhancement of ceramide-induced apoptosis. These evidences demonstrate that GCS is a novel target for the reversal of drug resistance and MBO-asGCS has therapeutic potential to improve cancer chemotherapy.

Preyan, L.C., C.D. Taylor, L.R. McElrath, S. DiMaggio and P. Barrett. XU. **Gene targeting in *Caenorhabditis elegans* using functionalized PAMAM dendrimers**.—*Caenorhabditis elegans* (*C. elegans*), a nematode approximately 1mm in length, is commonly used for studies in genetics, neurobiology, and development. These worms are transparent under the microscope, easy to culture, and have tractable genetics with a sequenced genome. We are interested in novel gene targeting and gene therapy approaches, and have begun to examine the use of dendrimers for this purpose in the worm. Dendrimers are small, highly branched polymers, to which functional molecules can be attached, and have therefore been used in gene therapy and as gene transfer agents. We are performing experiments with dendrimers to determine: 1) whether worms will eat them, 2) whether they are endocytosed by the worm's intestinal cells, 3) their subcellular localization, and 4) whether they will traffic from the intestine to the gonad, as is the case for certain other types of molecules. In pilot experiments, we have used FITC- and TRITC-conjugated dendrimers to visualize their movement through the body of the worm, and have observed that they are indeed taken into the worm's intestinal cells. Through follow-up experiments with functionally-conjugated dendrimers, we will test the efficacy of dendrimers as gene targeting agents in the worm.

Sadaiappen, R.R., A.M. Augillard, C.C. Lightbourne and P. Barrett. XU. **Giving worms a headache**.—*Caenorhabditis elegans* is a free-living nematode commonly used as a model organism for research in genetics and development. With a completely sequenced genome and a well-characterized yet simple nervous system—for which complete connectivity has been determined—*C. elegans* is an especially good model for studies in neuroscience and behavior. We have chosen the worm as a model system to study nociception (sensation of noxious stimuli), and are particularly interested in the role of neuropeptides and opioids on the nociceptive response, but also for that of other analgesics (pain relievers). For example, the analgesic mechanism of action of Tylenol (acetaminophen) is still not completely understood. Using the worm as a model system, we have been able to evaluate the effects of various analgesic agents on the nociceptive response. To test nociception, we expose the worms to a solution of each analgesic, and assess their response to adverse stimuli, such as heat or acid. Our expectation is that *C. elegans* exposed to an analgesic will have a delayed or absent response to the various

noxious stimuli. We believe that *C. elegans* is a promising model for nociception, and for determining the mechanisms of analgesic action.

Shirode, A.B. and P.W. Sylvester. ULM. **Synergistic antiproliferative effects of tocotrienol and celecoxib on mammary tumor cells is associated with suppression in Akt and NFκB signaling**.—Selective cyclooxygenase-2 (COX-2) inhibitors and gamma-tocotrienol (a rare form of vitamin E) both display potent anticancer activity. However, clinical use of selective COX-2 inhibitors has been limited by high dose gastrointestinal and cardiovascular toxicity. Studies were conducted to characterize the effects of combined low dose COX-2 inhibitor, celecoxib, and gamma-tocotrienol treatment on +SA mammary tumor cells. Treatment with 3-4 uM gamma-tocotrienol or 7.5-10 uM celecoxib alone significantly decreased cell growth. Combined treatment with subeffective doses of these agents resulted in a synergistic dose-responsive decrease in +SA cell growth. Treatment with 2.5 uM celecoxib or 0.25 uM gamma-tocotrienol alone resulted in a slight decrease, whereas combined treatment resulted in a large decrease in PGE2 synthesis. Monotherapy with these agents had little effect, whereas combined treatment caused a large decrease in COX-2, phospho-Akt (active) and phospho-NFκB (active) levels. These results demonstrate that the synergistic antiproliferative effects of celecoxib and gamma-tocotrienol is associated with a large suppression in COX-2, Akt and NFκB activity, and that combined treatment may provide significant health benefits, while avoiding high dose toxicity in breast cancer patients. This study was supported by grants from NIH (CA86833).

Tawah, F.C. GSU. D.M. Karnak and M.J. Wishart. UM. **Role for STYX in MAPK signaling and nuclear transport during germ cell maturation**.—Eukaryotic cells have developed diverse mechanisms to respond to extracellular stimuli. Kinases and phosphatases are two classes of enzymes that control responses to extracellular signals. The Mitogen-Activated Protein Kinase (MAPK) superfamily of proteins plays a major role in regulating cellular processes such as growth and differentiation. STYX has been identified as a member of the Protein Tyrosine Phosphatase (PTP) superfamily, many of which down regulate kinase activity via dephosphorylation. Via the interplay of kinases and phosphatases, signal transduction cascades can be tightly controlled. In contrast to active PTPs, STYX contains an endogenous substitution of a catalytically essential residue, making it inactive as a phosphatase. STYX contains a glycine in place of the catalytic cysteine. The knockout of STYX function in mice, renders them infertile, thus STYX plays an essential role in the differentiation of mice germ cells. Although STYX lacks phosphatase activity, it is thought to function as a protein-protein adaptor that recognizes the phosphorylated cellular substrates of PTPs. Interestingly, previous work has shown that STYX is a predominantly nuclear protein. The goal of this project is to determine how STYX interaction with MAPK and nuclear transport factors affects cellular differentiation. Preliminary results from immunoblots have shown that STYX expression in mammalian cell culture reduces growth factor mediated MAPK phosphorylation. In addition, pull-down experiments confirmed an interaction of STYX with karyopherin beta 3 (KB3), a nuclear import adaptor. Thus, we hypothesize that STYX and KB3 may cooperate in regulating the nucleo-cytoplasmic transport of MAPKs. This work was supported by the Department of Obstetrics and Gynecology (to MJW) and the Summer Research Opportunity Program (to FCT) at the University of Michigan.

Udofa, A.B. BRMHS. S.C. Cosenza and E.P. Reddy. TUSM. **Further analysis of the biological effect of FRI-178, a cancer cell growth inhibitor, in its disruption of chromosomal attachment to microtubules**.—Previous research concluded that FRI-178 was a tubulin polymerizer; however, the chromosome attachment was disrupted. This research will further investigate FRI-178, concerning inducement of apoptosis and its interference with the mitotic spindle checkpoint. HELA cells were used in all experiments. Flow cytometry was done to see if cells entered an apoptotic cell death. A Caspase Assay would determine which apoptotic pathway cells underwent. Western blots were utilized to view if the spindle checkpoint was proceeding properly. Cell stainings also were carried out to see if the localization of kinetochores was disrupted. The FACS Analysis showed that the cancer cells underwent apoptosis. The Western blots showed that apoptosis was induced and that the spindle checkpoint was proceeding properly. The Caspase Assay illustrated quantitatively that the intrinsic pathway was activated. Microscopy showed that FRI-178 disrupted the localization of BUBR-1 with chromosomes. These results supported our hypotheses; the cells underwent apoptosis via the intrinsic pathway. FRI-178 was found to interfere with the kinetochore attachment through BUBR-1. In the future, more research will be done to extend the microscopy and Western blot data to assure that there was proper progression of the spindle checkpoint.

Wali, V.B., S.V. Bachawal and P.W. Sylvester. ULM. **Gamma-tocotrienol-induced apoptosis involves the PERK/eIF2alpha/CHOP endoplasmic reticulum stress pathway in mammary tumor cells**.—Gamma-tocotrienol, a rare form of vitamin E, induces apoptosis unrelated to mitochondrial stress or death receptor-mediated signaling in mammary tumor cells. Studies were conducted to determine the effects of gamma-tocotrienol on the endoplasmic reticulum (ER)-mediated apoptotic signaling pathway in +SA mammary tumor cells. Treatment with 0-40 uM gamma-tocotrienol significantly decreased cell viability in a dose- and time-dependent manner. Western blot analyses showed that these treatments resulted in a large induction of C/EBP homologous protein (CHOP), the key component of ER stress-mediated apoptosis pathway, as well as, cleavage of caspase12 (ER-resident caspase) and poly (ADP-ribose) polymerase (PARP). Tocotrienol treatment had no effect on intracellular levels of ER chaperone protein Bip/GRP78, but did cause a marked increase in the phosphorylation of ER transmembrane protein, PERK, and its downstream effector, eIF2alpha. Tocotrienol treatment also caused a dose-dependent increase in expression of ATF4, a transcription factor that is modulated by eIF2alpha and can increase CHOP expression. These studies demonstrate the role of ER stress pathways in mediating gamma-tocotrienol induced apoptosis in mammary tumor cells and suggest that tocotrienol may have potential therapeutic benefit in breast cancers resistant to death receptor signaling. Supported by grants from NIH (CA86833).

Zoology Section

Canning, L.D., B.M. Clark, E.M. Leighton, R.W. Hopes, and W.H. Dees. McSU. **Field evaluation of colored lights as attractants for mosquitoes**.—Field studies were conducted in Moss Bluff, Louisiana, on the attractiveness of different colored lights to flying mosquitoes. Centers for Disease Control mosquito light traps were employed using different colored light covers over 6.3V incandescent miniature lamps. Traps with no lamps (blanks) and uncovered

lamps also were used. Blue, green, red, orange, yellow, and white colored covers were tested. All traps collected mosquitoes. Fourteen different species were collected in the traps. Males were collected only in traps with light. Of three different tests of colored lamps, yellow and orange attracted the most mosquitoes. When compared with covered lamps, uncovered lamps attracted the most mosquitoes. Different colored lamps attracted different species. Data showing differences in color attractiveness will be presented.

Coombs, A., D. Owens and J. Akin. NSU. **Fates of *Ambystomatid* eggs and larvae in Louisiana vernal pools**.—*Ambystomatid* salamanders, such as *Ambystoma maculatum* and *A. talpoideum* share use of vernal pools for depositing egg masses. In this study, we isolated egg masses from each species in situ and quantified both time to hatching and hatching success. We then compared developmental rate and hatching success among masses within the same pond to the same measures from egg masses from different ponds. Both abiotic factors, such as turbidity and depth, plus biotic factors, such as predator and symbiont presence, affected hatching and, subsequently, larval survival. These findings from the field suggest potential ecological tradeoffs for *Ambystoma* that may be important in determining when and where to lay eggs.

Dees, W.H., T.L. Sylvester, L.D. Canning, B.M. Clark and R.W. Hopes. McSU. **An innovative trap for studying mosquito attractants and repellents**.—A simple trap designed for testing attractants and repellents against biting insects is described. The trap uses a standard Centers for Disease Control light trap modified for variable release of test chemicals. Test chemicals and other test materials can be added and removed easily without spills or cross-contamination. Trap modifications cost less than $2.00/trap. Preliminary experiments using attractants to evaluate the efficacy of these novel traps are presented.

Duplantis, T.A., E.M. Leighton and W.H. Dees. McSU. J. Hightower. CPMC. **Does West Nile virus howl at the moon?—**The association between the different phases of the moon and the flight of mosquitoes infected with West Nile virus (WNv) was investigated. Our study included mosquito trap data from the years 2002 to 2007. Mosquitoes were collected by various methods: standard light traps, CO_2-baited traps and gravid traps. Collected mosquitoes were pooled and forwarded to the Louisiana State University Arbovirus Laboratory (Baton Rouge, LA) for virus isolation. Data on mosquitoes collected at different moon phases (new, first quarter, full and last quarter) were examined to determine any trends in infected mosquito populations. Pools of *Culex quinquefasciatus* and *Cx. salinarius* collected from CO_2-baited traps were found positive during all four phases of the moon. In these traps, slightly more mosquito species were collected during new and full moon phases than during the quarter moons. Standard light traps collected fewer species during the full moon. No association between the moon phases and infected mosquito activity could be determined. However, data from gravid trap collections show greater percent positive *Aedes* species than *Culex* species, indicating the need for further investigation of *Aedes* mosquitoes in virus transmission.

Falconi, R., C. Monroe and M. Merchant. McSU. **Characterization of dipeptidyl peptidase IV enzyme activity in the serum of the American alligator (*Alligator mississippiensis*)**.— Dipeptidyl peptidase IV (DPP IV) is a serum protease that has been linked to immune function. It has been implicated in T-cell activation, proliferation, and migration. This protein recognizes

and cleaves Ala-Pro amino acid sequences in proteins. We employed Ala-Pro-AFC as a fluorescent probe to measure DPP IV activity in alligators. Incubation of various volumes of alligator serum with Ala-Pro-AFC resulted in a concentration-dependent increase in fluorescent intensity, indicating cleavage of the AFC away from the Ala-Pro dipeptide. Incubation of alligator serum with the Ala-Pro-AFC probe at different temperatures resulted in temperature-dependent DPP IV activity, with increased activity at higher temperatures. Incubation of alligator serum with the Ala-Pro-AFC probe in the presence of different concentrations of Iso-Pro-Iso, a specific DPP IV enzyme inhibitor, resulted in a concentration-dependent decrease in activity. These results strongly suggest that the enzyme activities observed are due to the presence of DPP IV. To our knowledge, this study represents the first description of DPP IV activity in any reptilian species.

Font, W.F. SLU. **Strange bedfellows: Differences in the host-parasite relationships among native and exotic fishes infected with the roundworm *Camallanus cotti* in Hawaiian streams**.—The roundworm parasite *Camallanus cotti* was introduced into Hawaiian streams with the introduction of exotic fish hosts such as mosquito fish, guppies, green swordtails, and short fin mollies. This parasite is broadly host specific, but it has a different host-parasite relationship with each of the five native Hawaiian gobioid stream fishes. Four of the five native gobioids are capable of hosting this exotic roundworm. Only *Sicyopterus stimsoni* remains uninfected because it does not eat copepods that are intermediate hosts for *C. cotti*. Female roundworms can occasionally produce live juvenile offspring in *Stenogobius hawaiiensis* but data suggest that most worms die prior to forming gametes in this fish host. Heaviest infections occur in the sleeper, *Eleotris sandwicensis*. However, the roundworm is incapable of reproducing in this fish host, which can, therefore, be considered an ecological sink for this parasite. Upon returning from their planktonic phase in the ocean, both postlarval *Awaous guamensis* and *Lentipes concolor* briefly occur syntopically near stream mouths, but only *A. guamensis* becomes infected at that site; *L. concolor* remains uninfected until migrating to stream headwaters.

Freeborn, L.F. and D.M. Sever. SLU. **Reproductive morphology of colubroid snakes**.—Past studies indicate that interspecific and seasonal variations occur within the accessory ducts and glands of male snakes. These accessory ducts and glands include the proximal efferent ducts, the ductus deferentis, ampulla ductus deferentis, and the renal sexual segment. Many past studies have been conducted at the light microscopy level and far fewer have been completed at the ultrastructural level. However, more recent ultrastructural studies have uncovered new and surprising variations. In this study, the male accessory ducts and glands of snakes within the group Colubroidea have been examined using both light and electron microscopy. Variations found within this group have revealed morphological characters that can be mapped over existing phylogenetic hypotheses of Colubroidea. This in turn will be useful in elucidating the evolution of reproductive characters in colubroid snakes.

Heard, K., J. McFatter, A. Mishra and M. Merchant. McSU. **Effects of Hurricane Ike storm surge on alligators in coastal marshes**.—Hurricane Ike made landfall near Galveston, Texas on September 13, 2008. The receding storm surge washed alligators far out (at least 40 miles) into the Gulf of Mexico. Some alligators took several weeks to reach land, spending weeks in the saltwater without eating or a chance for thermoregulation. We collected blood from alligators

along the beach in Louisiana (Holly Beach/Johnson Bayou) and Texas (McFaddin Beach) to determine the amount of stress and dehydration experienced by these animals. Soon after the storm passed, alligators in the Gulf of Mexico began navigating their way back to the beach. Alligators captured from the McFaddin Beach and Holly Beach areas, 1-6 weeks after the storm, exhibited whole blood heterophil/lymphocyte ratios substantially higher ($p<0.01$) than those from captive alligators in a semi-natural environment. Examination of innate immune function, via a sheep red blood cell hemolysis assay, showed that these alligators had reduced immune function ($p<0.01$). In addition, analyses of serum Na^+ and Cl^- in alligators from both locations revealed that these alligators' serum electrolyte concentrations were much higher ($p<0.01$) than the control alligators, indicating severe dehydration. The results from serum osmolality and corticosteroid hormone levels are pending.

Hinton, J.G., H.A. Meyer, A.C. Duplechin, D.M. Theriot and M.N. Bertrand. McSU. **A comparison of tardigrade diversity in the Big Thicket and the Smoky Mountains**.—An All Taxa Biodiversity Inventory (ATBI) in the Smoky Mountains recorded 73 species of tardigrades in 2007. In the Big Thicket, we have reported 10 species as of December 2008. Of our 10 species, only *Echiniscus tamus* is not reported in the Smoky Mountains. To date, no aquatic species have been found in the samples. It appears that the diversity of the Big Thicket is substantially lower than that of the Smoky Mountains.

Hodge, M.A. LSMSA. S.W. Gabrey and A. Semerena. NSULA. **Spiders as ecological indicators: The effects of forest management practices on spider diversity.—Spiders are** sensitive to relatively small changes in habitat structure and as such respond to natural and anthropogenic disturbance. Several studies have documented that spider abundance and diversity are strongly influenced by forest management practices. The goal of this study was to use spider species diversity as a measure of the effects of two forest regeneration practices (planted vs. natural regeneration) in northwest Louisiana. We used standard sampling protocols for spider and habitat data collection at Bayou Pierre Wildlife Management Area (Desoto Parish) during February through December 2008. We used the free software estimates to calculate species diversity and species accumulation curves. Combining all four plots, we estimate at least 150 species occur at Bayou Pierre WMA. We expected to find similar spider diversity within management practices. Instead, we found higher species diversity indices in one planted and one naturally regenerated plot. These two plots had more complex understory vegetation than the two plots with lower diversity measures. The two high diversity plots are adjacent to one another. Therefore, we suggest that the differences in spider diversity may be more related to geographic proximity and habitat structure rather than to management history.

Hollis, J. and J. Akin. NSU. **Behavioral physiology in the ground skink**.—Signaling theory states that honest signals should indicate truly the condition and/or intention of an actor in a behavioral interaction. In the ground skink, *Scincella lateralis*, some males engage in an apparent endurance contest, called parallel writhing, in which males that perform the behavior longer win the contest. In this study, we use respirometry to measure physiological changes associated between writhing lizards engaged in contests. The effects of tail length and regeneration status on respiration rate also were examined.

Kersten, C.A., M.K. Hutton and K.A. Jackson. McSU. **Histology of *Xenopus laevis* testes following atrazine exposure**.—Atrazine is an herbicide commonly found as an environmental pollutant in rivers and land surrounding areas of agricultural farming. Early studies have shown that environmental pollutants, such as Atrazine, are responsible for increases in deformities and feminization of the testes in frogs. Early studies have shown that Atrazine levels as low as 0.1 ppb can induce feminization of frog testes when animals are exposed during the larval stage. We have recently performed experiments to determine the effects of Atrazine exposure on testes feminization in adult frogs. Adult *Xenopus laevis* were exposed to 5ppb Atrazine for 3 weeks, while control animals were exposed to solvent alone. Testes from control and treatment frogs were prepared for histology and examined for occurrence of intersex and/or differences in relative presence of developing sperm cells. There was no evidence of sex reversal of adult males exposed to Atrazine. Further, there appeared to be no qualitative difference in the presence of spermatogonia, spermatocytes, spermatids, or spermatozoa. These results suggest that feminization of frog testes due to Atrazine exposure is more likely if frogs are exposed prior to adulthood.

Leighton, E.M., T.A. Duplantis and W.H. Dees. McSU. J. Hightower. CPMC. **Effect of meteorological factors on the activity of mosquitoes positive for West Nile virus in Calcasieu Parish, Louisiana: 2002-2007**.—Periods of activity of mosquitoes positive for West Nile virus (WNv) were compared with temperature and precipitation data from National Weather Service-Lake Charles Regional Airport. Data from 2002-2007 were used in this study. The most commonly collected mosquitoes tested for WNv included: *Culex quinquefasciatus*, *Culex salinarius*, *Coquillettidia perturbans*, and *Aedes albopictus*; nine other mosquitoes also were collected and will be discussed. By comparing WNv-positive mosquitoes to temperature and precipitation data, we show yearly trends in WNv activity. West Nile virus positive mosquitoes were collected at lower temperatures than mosquitoes negative for the virus (<5˚C). Mosquitoes positive for the virus also were active after small amounts of rainfall (<1cm). Our study showed no relationship between mosquitoes positive for WNv and temperature and precipitation; hence no specific meteorological factors affecting WNv activity in mosquitoes could be determined.

Lewis, E.M., B.S. Netherland and R.L. Minton. ULM. **Plastic springs: Abiotic effects on freshwater snail shell shape**.—Many authors have described a pattern of morphological variation in freshwater mollusks where shells taken from lentic and lotic environments, or headwaters and main stem reaches, appear to exhibit phenotypic gradients in size and shape. In snails, this plasticity has been shown in large river species in single and across multiple drainages. Here we present evidence of similar patterns in short stretches of a spring run in Arkansas. We additionally correlate abiotic factors to the observed variation. Environmental conditions in the springs generate shell plasticity consistent with that observed in other taxa, except over a spatial scale of tens of meters instead of hundreds of river miles.

Ly, V.H. and E. Zou. NiSU. **Carbonic anhydrase activity in the epidermis of the fiddler crab, *Uca pugilator*, during the molting cycle**.—Crustacean growth is limited by its confining exoskeleton that must be shed periodically. Degradation of the exoskeleton, which is made up of chitin, proteins and inorganic compounds, takes place in premolt stage of the molting cycle. Previous studies with the fiddler crab, *Uca pugilator*, have shown that activities of the

chitinolytic enzyme, chitobiase, and proteolytic collagenase in the epidermis peak in the premolt stage and are controlled by the molting hormone. Breakdown of inorganic compounds requires an acidic environment. In biological systems, a major source of hydrogen ions is from the dissociation of carbonic acid formed through carbon dioxide hydration, a reaction catalyzed by carbonic anhydrase. We hypothesized that dissolution of exoskeletal inorganics is attributed to epidermal carbonic anhydrase activity. Utilizing a fluorospectrophotometric method adapted for our purpose, we investigated epidermal carbonic anhydrase activity in the fiddler crab during the molting cycle. Results indicate epidermal carbonic anhydrase activity does vary with molt stages of *Uca pugilator*—the lowest activity occurring in postmolt stage and climactic activity occurring in premolt stage. This pattern of enzymatic activity correlates with the molting hormone titers in the hemolymph during the molting cycle, suggesting epidermal carbonic anhydrase activity may be controlled by the molting hormone.

Maccha, V. and M. Merchant. McSU. **Isolation and N-terminal sequence of a mannan-binding protein from serum of the American alligator (*Alligator mississippiensis*).—**Lectins are proteins that recognize and bind specific carbohydrates. Soluble serum lectins act as part of an innate immune mechanism, enabling a host organism to recognize potential pathogens as non-self. The primary focus of our research is crocodilian immunology. In an attempt to isolate and characterize lectins from the American alligator, fresh serum was filtered over a mannan agarose column. The column was washed with approximately 30 volumes of buffer, and then the mannan-bound proteins were eluted with buffer containing 10 mM EDTA. The eluted proteins were resolved by SDS-PAGE, transferred to a PVDF membrane, and stained with Coomassie blue. Several proteins in the 30-90 kDa range were noted on the membrane. Attempts to conduct N-terminal sequencing of three of the peptides revealed that these proteins contained an N-terminal block, and thus could not be sequenced by conventional Edman degradation chemistry. However, the N-terminal sequence of a 60-65 kDa protein, after comparison to the NCBI protein database, was determined to represent a novel sequence that did not match any reported protein sequence. This protein may represent a new class of mannan-binding lectin-type proteins.

Marshall, S. NSU. **Microhabitat of burrowing wolf spiders**.—Burrowing wolf spiders in the genus *Geolycosa* have an intimate association with soil conditions. Species in the eastern U.S. exhibit either one of two ecological types: Those that will only live in sand barrens and those that will burrow in sandy soils covered in dead leaves. The spiders in the latter group construct an elaborate chimney at the burrow mouth using silk and bits of vegetation. I tested four different *Geolycosa* species' (*G. xera*, *G. hubbelli*, *G. patellonigra*, *G. escambiensis*) habitat preference in field enclosures at three sites in Florida. I found a strong evidence of active choice of predicted microhabitats. In the laboratory, I tested for burrow construction behavior in controlled conditions for the same species and found that the spiders will construct species-typical burrows under controlled conditions.

Martin, K. and S. Marshall. NSU. **Evidence for molecular and morphological polyphyly in single species population of *Geolycosa xera*, wolf spiders**.—The wolf spider, *Geolycosa xera*, is endemic to the fossil dune complex in central Florida. Phylogenetic analyses of mtDNA sequence data (COI) have revealed an unexpectedly complex set of species population relationships in the genus across Florida. These complexities include polyphyletic groupings.

Our initial hypothesis to explain this pattern is that hybridization has occurred in the past, allowing mtDNA to cross species lines. We set out to address this question in the present study. We focused on *G. xera* from a single site in eastern Highlands County, Florida, for further examination. This population of *G. xera* is unique in having individuals placed in three different locations in the current phylogeny for the genus. We measured 16 different morphological features on 10 individuals from the site in question and subjected the measurements to cluster analysis. This produced a highly-structured dendrogram that reflects the grouping pattern seen in the molecular phylogeny.

Mayon, M. N., and J. Bossart. SLU. **Beetle assemblages of Louisiana's rare saline prairies**.**—** Louisiana is home to rare and sensitive saline prairie habitats. We used pitfall and flight-intercept traps to sample and characterize the coleopteran community at three saline prairie sites and surrounding forests. Trap sample data reveal species unique to each habitat, and associated alpha and beta diversity. This research is supported by LDWF.

Meyer, H.A. and J.G. Hinton. McSU. **The tardigrades of KwaZulu-Natal and Lesotho in southern Africa**.**—**Fifty-nine species of water bear (Phylum Tardigrada) have been reported from southern Africa. Almost all collections have been from mosses, lichens, and soil. New data on the distribution of tardigrades in Lesotho and South Africa are provided. Nine species of tardigrade were found in moss and lichen samples; two were present in Lesotho and all nine in KwaZulu-Natal, South Africa. Six species were previously known to be part of the southern African fauna. *Echiniscus duboisi* in South Africa differs in some details from the original description in Java. *Macrobiotus iharosi* has not been reported before from the region. One species, *Macrobiotus* cf. *echinogenitus*, could not be identified beyond species complex. One South African species is new to science.

Meyer, H.A. McSU. **Water bears of the Caribbean**.**—**There are approximately 1,000 known species of water bear (Phylum Tardigrada), of which about 200 terrestrial and freshwater species are found in North America and 200 in Central and South America. The Caribbean is one of many regions of the globe that have received scant attention from tardigrade researchers. Seven published papers have reported a total of 26 species on Caribbean islands – Dominican Republic (16 species), Puerto Rico (7), Cuba (1), Curaçao (2), Isla de Conejo (2), and St. Lucia (4). In January 2009 I collected ten samples of moss, lichen, and leaf litter from Barbados, the easternmost island of the Lesser Antilles. These samples contain two tardigrade species, *Milnesium tardigradum* and *Macrobiotus richtersi*, both of which are cosmopolitan and have been found on other Caribbean islands.

Murray, C.M. SLU. **Can reproductive allometry assess population marginality in crocodilians? A comparative analysis of American alligator (*Alligator mississipiensis*) populations in south Florida and coastal Louisiana**.**—**This project will assess the use of reproductive allometry to infer crocodilian population marginality based on conformation to advantageous life-history strategies. Does reproductive allometry vary between intraspecific populations? Does this variation reflect population stability based on size, temporal exploitation, habitat fragmentation, and presence of social hierarchy? Which morphometric comparisons are accurate predictors of population marginality? In the proposed study reproductive allometry will

be used comparatively among three populations of *Alligator mississipiensis* in southern Florida and coastal Louisiana. This study will test the hypothesis that allometric correlations are strongest in core populations. If the allometric correlations are stronger in more core populations, than this methodology may be an effective way to comparatively analyze crocodilian populations (within all 23 species).

Rheubert, J.R. and D.M. Sever. SLU. E.H. Poldemann and K.M. Gribbins. WU. M.E. Eckstut. UN-LV. **The temporal germ cell development strategy during mixed spermatogenesis within the male Mediterranean gecko, *Hemidactylus turcicus* (Reptilia: Gekkonidae).—**Testicular tissue from *Hemidactylus turcicus* was collected from Hammond, Louisiana, throughout the calendar year, cut into small transverse sections, dehydrated through a graded series of ethanol, embedded in Spurr's plastic, sectioned with an ultramicrotome, stained with toluidine blue/basic fuschin, and analyzed with a compound light microscope to determine the testicular organization and the germ cell development strategy of *H. turcicus*. The testes are composed of seminiferous tubules lined with continuous germinal epithelia in which multiple germ cell morphologies can be found during active months of sperm development. Spermatogenesis is quiescent during September with only spermatogonia A and spermatogonia B present in the seminiferous epithelia and minimal mitotic activity is observed. Recrudescence begins in October, spermatogenesis progresses through November, the onset of spermiation is observed in December, and continues through August with the heaviest spermatozoa release occurring in June and July. Multiple stages of late elongate spermatids also are found in association with early mitotic and meiotic cells during the months of December-August that is reminiscent of an amniotic sperm development in which germ cell populations progress through the stages of spermatogenesis collectively. This reptilian temporal germ cell development within a structurally amniotic testis leads to two hypotheses in character evolution.

Stumpf, C.F. LSU-A. **Toxicity and repellency of 2-undecanone against German cockroaches**.**—**Formulations of 2-undecanone are currently being sold as insect repellents under the trade name BioUD. This novel repellent has been shown to be comparable to DEET in its activity against mosquitoes. In my research, I tested the repellency and toxicity of 2-Undecanone and different formulations of BioUD against German cockroaches.

Suchy M.D., T.A. Clay, W.J. Lorio, A.M. Ferrara and Q.C. Fontenot. NiSU. **Effects of salinity on growth and plasma osmolality of juvenile alligator gar, *Atractosteus spatula*.—**Juvenile *Atractosteus spatula* were exposed to various salinities to determine the effects on growth and plasma osmolality. After acclimated to treatment salinity levels (0, 4, 8, or 12 ppt), fish were stocked at 5 fish/L in 60 L recirculating systems and reared in a greenhouse. Fish were fed floating feed daily either 10% body or 5% body weight. Growth was greater (α=0.05) at 4 and 8 than 0 and 12 ppt. To determine the ability of juvenile alligator gar to maintain plasma osmolality, we exposed fish to salinities ranging from 0 to 37 ppt with or without an acclimation period. Plasma osmolality was measured for three non-acclimated fish after 24 hr exposure to various salinity levels. Compared to the 0 ppt treatment (305±9.8), plasma osmolality levels were elevated for the 16 ppt (337±17.0) and higher treatments with one mortality at 28 ppt and two at 32 ppt. Plasma osmolality levels were elevated by the end of the study (37 ppt: 372.3). Un-

acclimated fish had higher plasma osmolality levels at 8 ppt and greater salinities. Alligator gars are euryhaline and grow faster at 4 and 8 than 0 and 12 ppt.

Tatum, L.D. and W.H. Dees. McSU. **Using bacteria to express naturally-occurring insect hormones to control insect pests**.—There is a global health burden brought about by insects that destroy agriculture and insect vectors transmitting often fatal disease pathogens. Diseases, such as malaria, yellow fever, and dengue, claim the lives of millions of people annually. Countries with agriculture affected by insects and endemic for human diseases experience difficult economic problems such as loss of productivity and a lack of economic development. Currently, there is a need for new effective control methods due to an increase in insecticide and drug resistance. One particular field in need of more research is the use of naturally-occurring bacteria as a delivery system for insect control. Strains of bacteria that naturally occur in an insects' environment could be used to introduce or expose chemicals to insects that would alter insect development and ultimately reduce the size of insect populations. The chemicals suggested in this presentation include naturally-occurring insect growth hormones necessary for development.

Troxler, C. and D.L. Schultz. NiSU. **The impact of the Davis Pond diversion on fish communities of the upper Barataria Basin**.—The Davis Pond diversion project introduces freshwater into the Barataria Basin along the northwestern shore of Lake Catouatche in St. Charles Parish, Louisiana. The diversion has reduced salinity, increased water clarity and increased the abundance of freshwater vegetation in Lake Catouatche. In 2003-2005, before the diversion began regular operation, an inventory of fish species in the Barataria Preserve of Jean Lafitte National Park was conducted. In 2006-2008, a second study was conducted to document the impact of the diversion project on the fish of the park and the upper Barataria Basin. Fish were sampled by electro-fishing at 98 stations (36 in 2003-2005, and 62 in 2006-2008) in and around Lake Catouatche, Lake Salvador, and Lake Des Allemands. 12,866 fish of 51 species were sampled. In areas directly impacted by the diversion several fish species have increased in abundance including bluegill sunfish, largemouth bass, and striped mullet. One species, warmouth sunfish, decreased in abundance. Lake Des Allemands does not directly receive water from the diversion and fish populations there appear to have not changed. The diversion has had a local impact by increasing the extent of the preferred habitat of some species. This project was funded by the NPS.

VandenBroek, N.P. SLU. **Microhabitat use of herpetofauna in bottomland hardwood forest of the Atchafalaya National Wildlife Refuge**.—Habitat structure, in particular microhabitats, influences distributions of organisms. Microhabitats allow for understanding of species composition, diversity, and structure within a broader habitat type. Bottomland hardwood forests are excellent examples of variation in microhabitats. This riverine forest system is uniquely characterized by its interface between wet and dry habitats. Inundation by water is frequent and continually creates an ever changing shift from dry to wet habitats. Herpetofauna are excellent model organisms to understand microhabitat use in bottomland hardwood forests, as many species are adept at coping with aquatic and terrestrial habitats. Drift fence arrays consisting of pitfall traps, funnel traps, and PVC tubing will be placed along three 450m transects spaced 300m apart. Data will be collected from January 2009 to January 2010. This project aims: 1) to

characterize the herpetofaunal community of bottomland hardwood forests and 2) to understand relationships between herpetofauna and microhabitat use in bottomland hardwood forests in Louisiana.

Vidrine, M.F., J.E. Cordes, D.M. Jariel, M. Bastian-Stanford, S.R. Hazelton-Robichaux, J.A. Hamlin, J. Al-Dujaili and C. E. Vidrine. LSU-E. **The status of the genus *Unionicola* Haldeman 1842 (Acari: Unionicolidae: Unionicolinae)**.—The genus *Unionicola* Haldeman 1842 (Acari: Unionicolidae: Unionicolinae) currently contains 235 named species divided among 56 subgenera. These water mites occur on all the continents except Antarctica and are commonly associated with freshwater mussels, snails and/or sponges. In the last decade, 7 new subgenera were described, and 27 new species were described. The type subgenus was reassigned based upon a re-evaluation of the literature. In addition, the first parasites of freshwater mussels in sub-Saharan Africa were described (6 species in 4 subgenera). In Australia, 3 new subgenera and 8 new species were described. Six new species from China and a single new species from North America also were described. Six additional species were described from varied parts of the world, and in each case, assignment of subgeneric position remains uncertain (details of the anatomy remain vague or intermediate and/or adult specimens were not described). From a different perspective, the mtDNA of *Unionicola foili* Edwards and Vidrine was sequenced (Ernsting and Edwards, pers. comm.). We continue our effort to discover and describe new species, and the re-evaluation of these taxa using data obtained from mtDNA analyses is a major goal. Supported by LSUE Division of Sciences Research Fund.

Williams, A.A. and J. Trahan III. LSU-E. **Faunistics of a restored tall grass prairie**.—To determine the faunistics of the small ground dwelling vertebrates of a restored tall grass prairie community, drift fences and pitfall traps were used to monitor the habitat usage of these animals from February through July 2008 on the campus of LSU-Eunice. Traps were surveyed four times per week, and captured animals were identified and released. Trapping results at the end of 6 months included a total of 61 amphibians, 4 mammals, and 0 reptiles. Amphibians were captured each month although the greatest number per month (n=24) was in April when the prairie height was 0.53-0.73 m. Mammals hesitated to appear until the prairie height measured 0.76-0.91 m in May. Thereafter, the numbers of amphibians captured decreased dramatically from 16 in May to 1 in June, and 1 in July. The decrease in amphibians could be attributed to the increased usage of the prairie by the mammals at that time. The mammals examined in this study are known to be opportunistic omnivores that may include small vertebrate species in their diet; however, further investigation is necessary to determine if they are indeed utilizing amphibians in the prairie as a food resource.

Division of Physical Sciences

Chemistry Section

Balamurugan, S.S. and P.S. Russo. LSU-BR. **Preparation and characterization of multifunctional colloidal particles**.—This work explains the preparation of multifunctional colloidal particles having a superparamagnetic core and fluorescent silica shell. The surface of these particles was then grafted with α-helical polypeptides. A sol-gel approach was used to coat the magnetic core with silica shells. Fluorescent dye molecule was incorporated in one of the silica layers by covalently attaching FITC molecules to the network of silica. The outer layer of silica not only prevents the bleaching of dye, but also provides a surface for further functionalization and attachment of polymers or biomolecules to these particles. We have functionalized the surface of these particles with amine groups, which were then used for the growth of different α-helical polypeptides by ring opening polymerization. An analysis and structure of the grafted polypeptides and the properties of these colloidal particles has been undertaken. Preparation of these new hybrid materials containing organic and inorganic building blocks is an important expanding field that bridges various scientific disciplines. Assembling different building blocks in one material can provide multifunctionality that may lead to new applications.

Battle, C.H., R.S. Srivastava and A.A. Gallo. ULL. **Studies in the synthesis and NMR characterization of 6-methyl-2-nitrosopyridine**.—Although work has been done with the hetero-Diels-Alder reaction involving addition of a dienophile to the nitrogen-oxygen double bond of nitrosobenzene, relatively little has been done with the same reactions involving a nitroso-substituted heteroaromatic compound such as nitrosopyridine. One drawback to such work is the tendency of such compounds to form azodioxy dimers, preventing the reaction. By using copper catalysts to destabilize the dimer, the reaction can proceed. Alkyl substitution of the pyridine ring, as well as the use of chiral ligands on the catalyst, has been studied as methods of increasing the enantioselectivity of the reaction. Synthesis of alkyl-substituted nitrosopyridines involves the oxidation of alkyl-substituted aminopyridines, using a sulfilimine intermediate to direct the oxidation to the exocyclic nitrogen. It is our goal to synthesize 6-methyl-2-nitrosopyridine with this method, and react it with $[Cu(C_2H_3N)_4]PF_6$ as a catalyst. In addition to the normal characterization of organic compounds by H-NMR spectroscopy, VT (Variable Temperature) NMR can be used to gather additional information about complex structures or combinations of structures. This presentation will focus on the use of VT H-NMR to characterize 6-methyl-2-nitrosopyridine in solution with its E- and Z-azodioxy dimmers.

Bertrand III, R and R. Srivastava. ULL. **Ligand assisted Cu (I)-catalyzed allylic amination**.—The direct synthesis of organonitrogen compounds from inexpensive hydrocarbons is an attractive goal. The allylic N-functionalization of unsaturated hydrocarbons presents a desirable route to functionalized amines. We and others have described allylic aminations catalyzed by Mo (VI), Fe (II, III) and Cu (I, II) salts and complexes, using arylhydroxylamines as aminating agents. More recently, nitroarene- and aminoarene-based, metal-catalyzed allylic aminations have also been developed. Results of our recent studies on the ligand assisted Cu (I)-catalyzed allylic amination will be presented.

Bursavich, B.J., G.M. Clement and J. Chou. SLU. **Characterization of contaminant oyster shells by x-ray fluorescence and scanning electron microscopy**.—Environmental awareness of contaminants, such as high lead concentrations, is crucial to maintaining a clean and safe environment. The characterization of toxic metals such as lead and arsenic in New Orleans has gained an important priority in environmental research due to the recent disasters (e.g., Hurricane Katrina). We applied portable x-ray fluorescence (XRF) to monitor lead and arsenic in soils throughout New Orleans. Surprisingly oyster shells were found to be contaminated by high levels of lead in a location in New Orleans. Being that New Orleans is famous for seafood where oyster shells are everywhere, this has become a major environmental concern. Oyster shells with lead contamination were characterized by the portable XRF that provides instant results immediately after its measurement. Lead levels on oyster shells were found not homogenous and varied on different shells. The highest lead concentration on oyster shells was determined around 6474±1963 ppm. Clean oyster shells were characterized by the XRF and were compared with contaminant shells. The lead contamination of oyster shells was also characterized by scanning electron microscope (SEM) and energy dispersion spectra (EDS) were taken during the imaging process. Results from SEM-EDS further confirmed the lead contamination of oyster shells and was in good agreement with data obtained by the XRF.

Clement, G.M., B.J. Bursavich, J. Chou, D. Elbers, W. Zhang and K. Yang. SLU. **In situ monitoring and assessment of metal contamination around New Orleans by handheld XRF following Hurricanes Katrina and Gustav**.—Concentrations of toxic metals such as lead and arsenic increased in soil samples in the New Orleans area following Hurricane Katrina. Some of these detected concentrations exceeded Environmental Protection Agency standards. We will present updated data on environmental assessment and identification of environmental contaminants from toxic metals, such as lead and arsenic, throughout New Orleans by an in situ monitoring method following Hurricane Gustav. A portable X-ray fluorescence (XRF) was used to analyze toxic metals in soils directly without soil treatment. The XRF is a unique elemental analyzer in the sense that it provided fast and accurate soil analysis results within a minute. These attributes facilitated the data collection process and allowed for many areas surrounding New Orleans to be tested for toxic metals in the soil. The worst flooded areas of New Orleans were concentrated on as soil test sites. For comparison, several surrounding sites also were monitored. Very high levels of lead were detected in the locations from flooded areas, industrial discharge areas, and near the lakefront area. A spatial map to display the distribution of toxic metal contaminations will be presented.

Collins, M.E. and P.R. Russo. LSU-BR. **Phase behavior studies of silica-polypeptide composite particles combined with untethered polypeptides**.—Silica-polypeptide composite particles (Silica-PCPs) are core-shell colloids. To prepare them, a silica core synthesized by the classical Stöber method is functionalized with amino groups, which initiate the growth of N-carboxyanhydride peptide monomers. The work to be presented primarily concerns the interaction of Silica-PCPs with untethered polypeptides in dispersions. In principle, the added untethered polypeptides do not interact enthalpically with those on the surface of the particles, but contribute to the stability of the system only through entropic considerations--i.e., the well-known depletion effect first discussed by Asakura (J. Chem. Phys. 1954, 22:1255-1256). Silica-PCPs/untethered polymer/solvent systems are studied to determine the phase behavior in a non-

aqueous environment, free from complications arising from electrostatic effects. The tendency of poly gamma-benzyl-L-glutamate to form liquid crystalline phases on its own is affected by the presence of Silica-PCPs. Less is known concerning the effect of the untethered polypeptide on the phases formed by the Silica-PCPs.

Commander, J., L. Pengyan and J. Chou. SLU. **Assessment and monitoring of the 2008 Bonnet Carré Spillway opening on organic contaminants in Lake Pontchartrain**.—Lake Pontchartrain has become an area of environmental concern after Hurricane Katrina. Early last year, the Bonnet Carré Spillway was opened for the first time since 1997 to prevent the Mississippi River from spilling water into surrounding areas. Since the Mississippi River is often polluted with agricultural runoff, the opening of the spillway could bring some organic contaminations such as environmental estrogen into Lake Pontchartrain and ultimately affect the water quality and sediment chemistry. To experiment our hypothesis we applied solid phase micro extraction (SPME) to extract organic compounds from water samples that we collected in Lake Pontchartrain and then analyzed them by gas chromatography–mass spectroscopy (GC-MS). Water samples were collected at the Bonnet Carré Spillway as well as central areas of Lake Pontchartrain before and after the opening of the spillway. Our results indicate that after the opening of the spillway organic contamination increased in comparison to data before the opening of the spillway. The organic contaminations in the Bonnet Carré spillway and central areas varied with locations and quantity changes. The most abundant organic contaminant compounds found in the lake are 2-propenoic acid, 3-[4-methoxyphenyl] and its isomers, diisobutylphthalate (DIBP), dibutylphthalate (DBP), di-n-octylphthalate (DNOP), butylbenzyl-phthalate(BBP). Among these compounds, DBP, DNOP, BBP are on the list of hazardous compounds to human health and the environment by the U.S. Environmental Protection Agency. Detailed results will be discussed and presented.

Dinser, J.A., M.L. Lanier, R. Rucker and D.D. Dolliver. SLU. A.S. McKim. GCC. **Synthesis of O-alkylarylhydroximoyl azides**.—A single O-alkylarylhydroximoyl azide has been reported in the literature, and its only characterization was by infrared spectroscopy. We report the first general synthesis for O-alkylarylhydroximoyl azides and their full characterization. This synthesis results in a single geometric isomer. The stability of these compounds and their reactivity in intramolecular cyclization reactions, Schmidt-type rearrangements, and 1,3-dipolar addition reactions will be discussed.

Gentry, P.D. and D. Norwood. SLU. **Electronic waste**.—The SEAL (Student Entrepreneurs as Active Leaders) program allows students to do scientific research in conjunction with Louisiana industry while under the supervision of a faculty supervisor. Under this program, we have attempted to: 1) determine the profitability of locating facilities that collect electronics and reuse materials in the plastics, 2) determine if the plastics contain valuable resource chemicals, and 3) find companies that recycle these plastics to collect the resources. In this effort, landfills were visited and contacted by phone. Samples of electronics taken from landfills were analyzed using a portable x-ray fluorescence device. Recyclers also were contacted to find out how electronics are dealt with at the end of their life. Methods were devised to estimate electronic sales in Louisiana, and how much electronics is in Louisiana landfills. In the presentation, the results from these methods will be discussed.

Gonzalez, C., X. Wu and R. Srivastava. ULL. F. Fronczek. LSU-BR. **Design and development of ruthenium(III) complexes in search of new anticancer agents**.—The discovery of new metal-based antitumor drugs, whether cisplatin derivatives or those based on other metals, has been largely based on cell viability assays (IC_{50} values) and compounds that bind to DNA. The Pt (II) compounds are currently the most widely used anticancer drugs. Today, there is hardly any clinical regimen or combination of chemotherapy that does not contain either cisplatin or carboplatin. Cisplatin is one of the three most widely utilized anticancer drugs in the world and has annual sales of approximately $500 million. This drug administered by intravenous injection for the treatment of testicular cancer, when diagnosed early, cures testicular cancer in more than 90% of cases. Despite the resounding success of cisplatin, the drug exhibits several side effects. This has led researchers to develop anticancer drugs utilizing other metals. We have recently developed several Ru (II) and Ru (III) complexes for the same purpose. The synthesis and biological assay of these complexes will be discussed.

Green, L. and J. Chou. SLU. **Simultaneous determination of homovanillyl alcohol and dopamine by electrochemical method**.—Queen bees emit natural pheromones to maintain control of the hive. It was reported that HVA influences brain chemistry by preventing the ability to remember bad experiences, thus it is very important to detect HVA released in queen bees in order to understand more functions of HVA in the bee's brain system. HVA can be isolated from queen bees and analyzed by spectroscopy methods; however, there is no report on detecting HVA by electrochemical methods. Since electrochemical sensors can be fabricated to extremely small dimensions or needle type, thus electrochemical sensors can be used for in situ measurement released from biological samples. An electrochemical sensor is developed to directly detect HVA in buffer solutions by both cyclic voltammetry and differential pulse voltammetry. HVA exists in a system that also contains dopamine (DA), which is a neurotransmitter released in a number of regions of the brain. HVA and DA are both present in a system and have similar redox potentials. We will present our preliminary results on testing both HVA and DA by electrochemical methods. Cyclic voltammetry curves of HVA and DA indicate that HVA and DA have distinctively different oxidation and reduction peaks when tested separately in a neutral buffer solution. Further testing has shown that in a mixture solution, HVA and DA retain their distinctive peaks, thus they can be identified and detected by cyclic voltammetry simultaneously.

Jin, Y and M.R. Mitchell. SLU. **Purification of higher fullerene isomers**.—The photophysical properties of higher fullerenes has been extensively studied. The long-lived triplet excited states of fullerene isomers suggest several applications such as electron acceptors in molecular solar cell devices, generators of singlet oxygen for photodynamic therapy (PDT), and absorbers for optical limiting. C_{84} is the third most abundant fullerene after C_{60} and C_{70}. Symmetrically, a total of 24 isomers of C_{84} satisfy the isolated pentagon rule. The wide range of triplet excited state lifetimes among three found C_{84} isomers D_2(IV), D_{2d}(II), and C_s(a) have been compared, which illustrates that structurally similar isomers can exhibit significantly different photophysical properties. Isomeric resolution is needed to study the photophysics of higher fullerenes. Because the high performance liquid chromatography (HPLC) retention times of C_{84} isomers are very close, it is a challenge to separate these isomers thoroughly. In order to create usable separation of isomeric peaks, recycling-HPLC could be used, with two Cosmosil 5PYE (pyrenylethyl group

bonded) columns connected together. In this way, the time differences between isomers could be increased. The goal of this project is to separate C_{84} into its isomeric constituents using rHPLC techniques. The isomers obtained will be further studied to characterize the photophysical properties.

Junk, T., J.C. Lewis and N.C. McMullen. ULM. **Aminoarenetelluroles as versatile synthetic intermediates.—**The organic chemistry of tellurium, in contrast to that of sulfur, remains largely unexplored. Significant progress has been made in the development of synthetic access routes to organotellurium heterocycles. The title compounds, 2-aminoarenetelluroles, are versatile intermediates in the preparation of arenotellurazoles, telluraoxazolium salts, tellurazines, as well as of hypervalent organotellurium compounds with strong intramolecular coordination. This presentation will discuss synthetic strategies to prepare 2-aminoarenetellurazoles, their properties, and their conversion to heterocyclic target compounds. Potential applications of organotellurium compounds include their use as redox catalysts, in dyes, and as ligands for the reversible complexation of metals.

Lanier, M.L., J. Dinser, R. Weber, T. Sommerfeld, D. Dolliver. SLU. A. McKim. GCC. **Reactions of O-alkylarylhydroximoyl azides in electrophilic media.—**Reports of the reactions of imidoyl azides in electrophilic media have shown conflicting and inconclusive results with some investigators reporting a Schmidt-type rearrangement and others reporting an intramolecular cyclization. Therefore, the reactions of a new class of imidoyl azides (O-alkylarylhydroximoyl azides) in acidic and electrophilic media have been investigated, and the results have been compared and contrasted with that of prior workers. It has been demonstrated that, when treated with a Brønsted acid, these compounds primarily produce the Schmidt-type rearrangement product with only a small amount of the intramolecular cyclization product being generated. When treated with a Lewis acid, the primary product formed is the cyclization product. The effect of solvent polarity on this product distribution will be reported and will be compared to computational studies of the reaction pathways.

Lee, C., J. Sun and P. Russo. LSU-BR. **Self-assembly of two-directional arborols in water: Kinetics and control of their growth.—**Two-directional arborols are dumbbell-like amphiphiles, in which 9 hydroxyl groups at each end are connected by an alkyl chain of 10 or 12 methylene groups. They have attracted much attention, because arborols self-assemble to form long fibrils due to hydrophobic interactions between the alkyl groups. It is of special interest to study the kinetics of the growth of the fibrils and to control their growth. Our interest further extends into growing arborols inside confined structures including tubes or disks. The size of growing fibrils will be characterized by dynamic light scattering (DLS), which provides hydrodynamic radius (Rh) of the self-assembled arborols as a function of time. The formation of rod-like fibrils can be confirmed by studying their morphologies by freeze-fracture transmission electron microscopy. Controlling this self-assembly may provide a novel approach to study human afflictions such as Alzheimer's disease, which occurs when fibrillar structures are formed from beta-amyloid, a 4 kD protein fragment.

Li, Y.N., B. Kiranmai, R. Darbeau and B. Kiran. McSU. **Experimental and computational investigation of the reaction of N-carbobenzoxy-O-carbobenzoxyhydroxylamine with**

dimethyl sulfoxide to form S,S-dimethyl-N-[(phenylmethoxy)carbonyl] sulfoximine.—N-carbobenzoxy-O-carbobenzoxyhydroxylamine (1a) undergoes a thermally-induced reaction in DMSO in which there is net N-α-eliminative oxidation with tandem oxidative incorporation of DMSO to yield S,S-dimethyl-N-[(phenylmethoxy)carbonyl] sulfoximine. Several mechanistic pathways are possible that hinge upon the rate-determining role of DMSO in the reaction. Thus DMSO may function as the nucleophile and decarboxylate via a thiaziridinyl intermediate or it may serve as the electrophile from which it decarboxylates either from an acyclic precursor or 1,4-dioxathaizinolidin-5-one to yield a product. However, computations reveal a third mechanism in which deprotonation of 1a by DMSO is the rate-determining step. The proton transfer is then succeeded by nucleophilic attack by the conjugate base of 1a on the activated, protonated DMSO. In this poster, our experimental and computational results will be presented.

Lissy, E., J. LeJeune and D. Spivak. LSU-BR. **Making fuels green using molecularly imprinted polymers**.—Polymerization in the presence of a template molecule creates a molecularly imprinted polymer (MIP) with selective binding toward the template molecule. This is accomplished by first forming a template-monomer complex using noncovalent (or covalent) interactions, then copolymerized with a cross linking monomer to produce a highly cross linked network polymer. Upon extraction of the template, the cross linked polymer exhibits sites with molecular recognition for the template, useful for applications requiring separation of that compound from a mixture. In this project, the polymer is imprinted with a specific sulfur containing molecule (either dibenzothiophene or dibenzothiophene sulfone) which is an impurity in natural petrochemical feed stocks. Current purification methods are unable to remove these compounds, resulting in large amounts of sulfur released into the environment. The released sulfur damages land and water ecosystems by lowering crop production and increasing the pH of acid rain. Fuel standards increasingly require sulfur to be extracted from fossil fuels. Potentially, the MIP would be able to clean fuels of these unwanted compounds and protect the environment. HPLC results are reported to compare the binding potential of the imprinted polymers and estimate the ability of the MIPs to remove these compounds from a complex mixture.

Mitchell, M.R. and Y. Jin. SLU. **Purification of higher fullerene isomers**.—Fullerenes were discovered in 1985, and they are of great interest to photophysicists. Since fullerenes are π-conjugated species, they are expected to display pump-probe accessible triplet states. Triplet states can be described as electronically excited states that energy can become trapped in for a period of time. The energy levels of the triplet states represent important applications. Low triplet energy allows a fullerene to serve as an antioxidant. High triplet energy offers the service of a fullerene as a single oxygen generator in photodynamic cancer treatment. Mathematical calculations indicate these higher fullerenes should have multiple isomers of differing point-group symmetries. The calculations have been verified experimentally, i.e., C_{84} has seven different point group isomers. In order to study the photophysical properties of specific isomers, the higher fullerenes must be separated from one another. Resolving a specific mass fullerene, such as C84, into its isomeric constituents requires rHPLC techniques. In order to create usable separation of isomeric peaks, a multi-pass arrangement is utilized. This is made possible by using multiple, identical columns in series. By applying the rHPLC technique, C_{84} isomers can be separated, and the photophysical properties can be characterized.

Regmi, A. and B. Kiran. McSU. **Density functional studies on $(Au_2S)_n$ (n=1-6) oligomers**.—Intense research is going on in the area of thiolate-protected gold nanoparticles due to their potential applications in catalysis, as sensors, in biolabeling and in molecular electronics just to name a few. Despite these efforts the atomic structure of these gold-nanoparticles is largely unknown. Recent experimental and theoretical studies have identified that thiolates form linear RS-Au-SR and bent Au-RS-Au units (called "staple" motifs) to decorate around an atomic gold core. A complementary approach to create stable ligand protected gold clusters is to build-up the nanoclusters from bottom up starting with small stochiometric clusters. In this presentation, we present such an approach, using the computational modeling based on density functional theory, on the clusters of $(SAu_2)_n$ (n=1-6). The oligomers $(SAu_2)_n$ (n=2-6) form very stable clusters, as judged by their high HOMO-LUMO gaps, and adopt strikingly different structures compared to the thiolate-gold clusters. For example, the hexamer $(SAu_2)_6$ forms three layers with six atoms in each layer and has an extremely large HOMO-LUMO gap (1.86 eV).

Rosu, C., W.H. Daly, I.I. Negulescu, P.S. Russo and R. Laine. LSU-BR. **A comparative study on hydroxyl-protected and unprotected glylons**.—Glylons, the hydroxylated polyamides derived from sugar, have been studied by Fourier Transform Infrared Spectroscopy (FT-IR), Matrix-Assisted Laser Desorption/Ionization Time of Flight (MALDI-TOF) and visual observation. The protection of hydroxyl groups highly influences the molecular weights, and the solubility of the glylons. The protected glylons are soluble in a wide range of solvents when compared with the unprotected counterparts. The MALDI-TOF spectroscopy shows the variation in glylons' molecular weights when different ratios of monomers are used for the synthesis. It is concluded that the low molecular weights result from polycyclic species formed during condensation and are related to the ratio of the monomers used.

Ruibal, A.L., A.J. Holt, J. Dinser, M. Lanier and D. Norwood. SLU. A. McKim. GCC. **Investigation of cleaning abilities of various solvents**.—Two projects were completed at the request of Gaylord Chemical of Bogalusa, Louisiana. The first involved the ability of neat solvents to dissolve a thin polymeric coating (photoresist) that has been deposited on the surface of a silicon wafer. This was done to identify useful co-solvents for later formulation development. The second involved the ability of different ratios of four solvents to clean a lens. The purpose of this was to find a mixture of solvents that are less hazardous than a previous formulation, and also to find a ratio of solvents that could be effective with higher water concentrations. The methods, along with the results of these projects, will be discussed.

Scott, S.D. and J. Sneddon. McSU. G. Russell. SNA. **Effects of nitrate on microbial activity in an industrial activated sludge unit**.—The petrochemical production facility of Sasol North America in Lake Charles, LA, employs an Activated Sludge Unit (ASU) that treats wastewater from various production processes from within the facility and from neighboring facilities. There is an interest in improving the efficiency of the ASU, as well as reducing or eliminating the production of hydrogen sulfide gas. Through the use of a self-designed pilot plant, alternative designs, water treatment chemicals, and various process conditions were evaluated to find the optimum working parameters. The area of concern, the equalization tank, is in an anoxic state and it is extremely biologically active. The dominant population is sulfate reducing bacteria (SRB), which is not favored. The SRBs are responsible for the production of hydrogen sulfide

gas. This gas is the source of an offensive odor present at the ASU. Consequently, calcium nitrate has been continuously added in the experimental equalization tank as an attempt to tackle this SRB issue. Nitrate stimulates the growth of heterotrophic-nitrate reducing bacteria (h-NRB) and nitrate reducing-sulfide oxidizing bacteria (NR-SOB). Both h-NRB and NR-SOB aided in the reduction of SRB activity and eventually became the dominant species, thus reducing or eliminating odor. This study has shown that nitrate addition is effective in reducing odors caused by SRBs. An increase in total suspended solids (TSS), as well as an increase in sulfate concentration in the effluent of the experimental equalization tank supports the fact that the presence of nitrate stimulates the growth of NRBs. A more efficient pretreatment is reflected by the reduction of dissolved organic carbon (DOC) in the effluent of the experimental equalization tank. The effect that temperature, hydraulic retention time (HRT), and the presence or absence of organics has on the microbes was evaluated by measuring sulfate, sulfide, and DOC concentrations in the influent and effluent of both equalization tanks.

Shakya, A. and B. Kiran. McSU. **Computational modeling of aluminum doped gold clusters: How good is the gold–hydrogen isolobal analogy?—**Transition metal catalyzed oxidation reactions play a very important role in chemical, microelectronic and energy industries. Although bulk gold is catalytically inert, nanosized gold particles (<5 nm) supported on oxide films such as SiO_2, TiO_2 or MgO exhibit extraordinary catalytic activity in CO oxidation, direct propylene oxidation and the water-gas shift reactions. While the structure, stability and catalytic activity of pure gold clusters are known in sufficient detail, not much is known about the metal doped gold clusters. Computational modeling offers a powerful tool for an 'atomistic' level understanding of the underlying process. In this presentation, our results on the structural behavior of Au_n clusters doped with an aluminum atom will be presented. Following the isolobal analogy between gold and hydrogen, we observed that the $AlAu_n$ (n=1-5) clusters show structural similarity with the corresponding aluminum hydrides, AlH_n for (n=1-4). However larger clusters, where n>5, strongly deviate from this analogy.

Sreelatha S.S. and P.S. Russo. LSU-BR. **Preparation and characterization of multifunctional colloidal particles**.**—**This work explains the preparation of multifunctional colloidal particles having a superparamagnetic core and fluorescent silica shell. The surface of these particles was then grafted with α-helical polypeptides. A sol-gel approach was used to coat the magnetic core with silica shells. A fluorescent dye molecule was incorporated into one of the silica layers by covalently attaching FITC molecules to the network of silica. The outer layer of silica not only prevents the bleaching of dye, but also provides a surface for further functionalization and attachment of polymers or biomolecules to these particles. We have functionalized the surface of these particles with amine groups, which were then used for the growth of different α-helical polypeptides by ring opening polymerization. An analysis and structure of the grafted polypeptides and the properties of these colloidal particles have been undertaken. Preparation of these new hybrid materials containing organic and inorganic building blocks is an important expanding field that bridges various scientific disciplines. Assembling different building blocks in one material can provide multifunctionality that may lead to new applications.

Tian, T., G. Clement and J. Chou. SLU. **The effect of opening the Bonnet Carré Spillway on the distribution of metals and nutrients in Lake Pontchartrain.—**Monitoring pollutants in

water is becoming more important due to the limited resources of water. The goal of our project is to determine the effects of the opening of Bonnet Carré Spillway on distribution of metals and some nutrients in Lake Pontchartrain. Samples of lake sediment and water samples including surface water and bottom water were collected from several different locations near Bonnet Carré Spillway before and after the opening of the spillway. After the opening of the spillway, we continued to collect samples in May, August and October, respectively. The concentrations of different metals and nonmetals, such as Ca and P as well as toxic metals such as Pb and As, were analyzed by inductively coupled plasma- atomic emission spectroscopy (ICS-AEM, available at Louisiana State University). The conductivity of water samples were measured before and after the opening of the spillway. We will discuss the effect of the opening of Bonnet Carré Spillway on the metal and nutrient distributions in Lake Pontchartrain. The trend of conductivity in the lake before and after the opening of the spillway will be presented as well. Furthermore, the difference of metal and nutrient distributions between surface waters and bottom waters will be compared statistically.

Tong, X. and P.S. Russo. LSU-BR. **Fluorescence photobleaching recovery (FPR) application for the self diffusion studies of polyelectrolyte**.—A novel strategy involving the fluorescence photobleaching recovery (FPR) technique has been designed to investigate the slow mode problem—which probably portends weak aggregates—in polyelectrolyte solutions at low salt. New information about the salt dependence of probe diffusion in bimodal polyelectrolyte systems is gained. Perfectly sulfonated, lightly labeled poly styrenesulfonate sodium salt was synthesized as the fluorescently tagged polyelectrolyte. The narrowly distributed sample for FPR runs was obtained by following analytical scale gel permeation chromatography with a simple fraction collector.

Venable, S. and P.D. Voegel. SLU. **Chemically modified electrodes for determination of theophylline**.—Chemically modified electrodes (CME) were prepared by adsorbing cobalt pyridinoporphyrazine and related catalysts dissolved in DMSO containing tetraethyl ammonium perchlorate onto the surface of 3 mm glassy carbon disks using cyclic voltammetry. During electrode preparation the potential was swept from -200 to +900mV at a rate of 100mV/s. Cysteine and theophylline in aqueous solutions were detected at each CME using cyclic voltammetry. As in CME preparation, the potential ranged from –200 to +900mV during cysteine or theophylline analyses. The scan rate, however, was systematically varied to determine if cysteine and theophylline redox reactions were under diffusion or kinetic control. To compare with literature results for CME prepared with cobalt phthalocyanine, the pH of the analyte solutions were varied from pH 3-9. Generally, maximal oxidation current was achieved between pH 6-7. Compared to cobalt phthalocyanine CME, electrodes modified with cobalt tetra-2,3-pyridinoporphyrazine oxidized cysteine at slightly less anodic potentials with comparable to slightly larger oxidation currents.

Weber, R.J. and T. Sommerfeld. SLU. **Molecular visualizations**.—A molecular orbital (MO) is a wave function for one electron (a function of position in three-dimensional space). One way of plotting this function is to choose a contour value or iso-surface, and to show a picture of the volume enclosed in this iso-surface. The choice of a particular iso-surface is rather arbitrary. In the past, it has been chosen such that the displayed orbital has roughly the size of the associated

molecular system. While this choice is as a rule a good representation of the general shape of the orbital, it can be misleading about the extent of the electron density. We have chosen to study the orbitals of several molecules, exploring the differences between contour values. We compared a contour value commonly used in reference books against one that encloses 90% of the electron density or the orbital. The electron density of a specific orbital within a given contour value has been calculated and comparisons made between the "aesthetic" visual and the scientific one to see if the picture truly was misleading. Several molecules were studied: ethylene, 1,3-butadiene, 1,3,5-hexatriene, benzene, water, formaldehyde, and $ClCH_3$.

Wills, V., D. Dolliver, M. Lanier, J. Dinser and K. Miles. SLU. A.S. McKim. GCC. **Synthesis of single geometric isomers of oxime ethers of unsymmetrical 4,4'-disubstituted benzophenone by palladium-catalyzed cross coupling reactions**.—Generally synthetic schemes to produce oxime ethers involve the reaction of an alkoxylamine with a ketone. In cases where the R groups on the ketone are of similar size, as in the case of unsymmetrical 4,4'-disubstituted benzophenone, both geometric isomers are produced, and the separation of these two geometric isomers is problematic. We introduce a general method to separately produce each geometric isomer of unsymmetrical 4,4'-disubstituted benzophenone oxime ether via a palladium-catalyzed cross coupling reaction utilizing an O-alkylbenzohydroximoyl halide and a potassium trifluoroborate salt.

Wilson, D. and J. Sneddon. McSU. **Graduate program in environmental sciences and chemistry at McNeese State University**.—This poster presentation will describe the details of the Masters in Environmental Sciences and Chemistry (Chemistry Option) at McNeese State University. It will provide details of formal coursework, graduate stipends and individual details of faculty research and interest.

Computer Science Section

Durand, J. and N. Ndlabhu. GSU. **Elevator control system**.—The Elevator Control System application is a simple graphical representation of a real-world elevator control system designed and implemented to coordinate and conduct the operations of four elevators in an eight story building. The system accepts elevator requests from passengers in the form of a start floor - the floor from which the request is being made, and a stop floor - the destination floor of the passenger, and stores the request in a queue. The elevator control system periodically dequeues requests from the request queue for servicing. It considers the floor from which the request was made, the current locations of all the elevators, and calculates the nearest elevator that will get the requester to the destination floor. In order to determine the closest elevator, the control system uses an algorithm that calculates the distance from each elevator to the start floor of the request; the elevator with the least distance is the closest. It is important to understand that our concept of distance does not only consider the number of floors which separate the elevator and the start floor of the request but also the number of stops the elevator has to make before it reaches the start floor of the request. By using this approach it does not matter in which direction the elevators are moving. The application updates the graphical display in real-time as the system

selects and dispatches the 'best' elevator to the originating floor of the request, and also allows for customization of the display speed and the number of functioning elevators.

Etherly, K. and M. Terrel. GSU. **Efficient communication between two computers using VPN package and routers**.—The overall objective for our project was to modify the protocol(s) that optimizes the size of a packet and increases its efficiency. The setup consisted of two desktop computers and two virtual private network routers. Initially, we studied the configuration of a router and then figured out a way to rout the text using the VPN routers. We then studied the Windows operating system, Linux operating system, and VPN package for the current project. After many trials, we found Mandriva version of Linux is more suitable for this project. We then installed Mandriva on both computers and proceeded to download the Internet Protocol Security (IPSec) program that would aid in the process of configuring the routers. The program we used to route the messages between two computers was called OpenSwan ,which is an implementation of IPSec for Linux. Assigning correct IP addresses and using the VPN package the two systems are able to communicate with minimum error rate.

Gwee, N. SU-BR. **The theory of NP-completeness: Applications and implications**.—In 1971, Stephen Cook categorized a computational problem that was the first of many to share a strange relationship. These problems were all so complex that no computer could solve them within a reasonable time once the input data exceeded even a reasonable size. Yet, if by some miracle someone found a practical way to solve perfectly and efficiently even one of these problems, then all these problems would be equally and easily solved. To this day, no one has ever done so. The theory of NP-completeness begun by Cook plays a central role in theoretical computer science. Since Cook, many NP-complete problems have been identified, many of which are related to important applications. In this presentation, we outline the importance of this theory, and give interesting applications that can be as varied as music composition and dance choreography.

Halvorson, K. and K.P. Yang. SLU. **Using Java network protocols to deliver medical education applications**.—This research explains the process used to deliver a medical education application to students who study across the country. By using both Java's Network Launch Protocol and Java's Network Socket Communications, it is possible to optimize this medical education application and many other Java applications to be installed and used over the Internet. In addition, it also covers some of the problems, such as data encapsulation, query reading performance, and network deployment, and their solutions, which were observed during the implementation phase. It also describes other methods of data transfer over the Internet such as using web services. The future work that this research can bring is to encapsulate the data within a custom object or class, then transmit it over the network for faster query performance.

Kuyya, S. and N. Gwee. SU-BR. **Smart diabetes management system with automated diet charts**.—For more than five years now the incidence of diabetes has increased worldwide by a staggering 13.5% per year. The woeful lack of preventive guidance and proper treatment has led to this modern day medical crisis. The Smart Diabetes Management System intends to ameliorate this situation by facilitating the tracking of glucose levels and the maintenance of proper diets. Using machine learning and intelligence, this web-based system supplements primary physician

care by providing timely and reliable warnings of pending diabetic stages and by recommending up-to-date and appropriate diet modifications based on established medical knowledge. In this presentation, we shall introduce the Smart Diabetes Management System and outline its current state of development.

Lopez, A.M. XU. **Ontology development for network science**.—The National Research Council (NRC) has identified an emerging field of investigation dubbed Network Science. Their analysis of the situation contends that the "current state of knowledge about networks is insufficient to support the design and operation of complex global networks for military, political, and economic applications." The term 'network' is understood broadly, encompassing the physical, information, cognitive, and social domains. The thinking is to use the scientific method to study networks and create models that predict network behaviors. The NRC argues that, "By focusing on the development of models and properties of the underlying representations, this new area of scientific investigation offers the promise of developing tools, techniques, and models that apply to multiple applications areas." Ontology development offers a means of codifying various nomenclatures and lexicons that support Network Science research. Ontology models the vocabulary common to knowledge-holders in a particular domain. It explicitly describes the different concepts and the relationships that exist between those concepts thus giving structure to the knowledge. The presentation addresses the work in ontology development that is currently underway in an effort to understand both the explicit and tacit knowledge found in Network Science.

Reddy, Y.B., and S. Chao. GSU. **Detecting the sinkhole attack in wireless sensor networks**. —The wireless sensor network (WSN) consists of tiny sensors and actuators with general-purpose computing elements. A wireless sensor network (WSN) is composed of hundreds or thousands of small, cheap sensor nodes that communicate with one another wirelessly. These sensor nodes have limited computational power, networking capability, and security mechanisms. They are normally distributed over some hostile geographic area. One of the routing procedures is cluster-based, where nearby nodes have highly correlated data. In cluster-based routing, the network is divided up into clusters, which consists of a cluster head and member nodes. The member nodes send their data to the cluster head, which aggregates the data before sending it out of the cluster toward the base station. The sensor networks are particularly vulnerable to damage from malicious activities. One of the severe attacks on the nodes is sinkhole attack. The sinkhole attack is a particularly severe attack on a base station, preventing it from obtaining complete and correct sensing data. In sinkhole attacks, a compromised node tries to draw the nodes in a particular area by making areas attractive using routing metrics. As a result, the sinkhole node attracts all the traffic that was designated to a base station. In this research, we present the effective method to identify the sinkhole attack by checking the data consistency.

Shrestha, A. and P.D. Wiedemeier. ULM. **Modeling GEO satellite based VHF packet radio network data multicasts**.—During emergencies, the ability to transmit data between several destinations is of paramount importance. Often, very high frequency packet radio networks (VHFPRN) are used by ham radio operators to provide multicast (i.e. one sender, multiple receivers) data communication services when such situations occur. Specifically, two options are

available to ham radio operators to multicast data. First, depending upon atmospheric conditions, they can multicast data up to 1000 miles using terrestrial VHFPRNs. Second, they can use low earth orbit satellite based VHFPRNs to multicast data up to 4000 miles. Unfortunately, the ability to multicast data across distances greater than 4000 miles requires use of repeaters. However, a geo-stationary earth orbit (GEO) satellite based VHFPRN may be available in the near future and will permit data multicasts over distances up to 11,000 miles. In this poster, we present mathematical models and computer simulations of data multicasts over a VHFPRN that includes a GEO satellite positioned at 0° latitude and 129° west longitude. Our results show that the time required to multicast data over a GEO satellite based VHFPRN is approximately 15% greater than that of data multicasts over a terrestrial VHFPRN, but allows transmission over distances eleven times larger.

Smith, H. and J. Smith. GSU. **Graduation management tool for undergraduate students**.—Upon entering college most students face a difficult challenge involving time management over a four-year time frame. We believe that if the students were given a tool to help manage this difficulty that the overall organization would be enhanced. The entities involved were the students and the curriculum. The relationship between these entities is the students enrolled in courses of the curriculum. We designed a database to store the curriculum that is comprised of the relevant course information. Next, we constructed an algorithm that included methods to accept and store the student information, display the database contents, and return the values such as minimum course load and semesters remaining. We used Visual Studio to create user-friendly forms that allowed the user to navigate the software and retrieve the desired information. The forms contained buttons that evoked the execution of the methods created by the algorithm. The software also provided additional information to the student such as electives required and a list of the courses that require prerequisites. In the future, we desire to add features that actually store the completed courses pertaining to a certain student so that upon reuse of this tool the user would not be required to reenter courses completed but only update them. This project was created as a guide to help speed up the process of registration by giving an outline of the time remaining and the minimum hours needed to be taken by a student in order to complete the curriculum within a four year time frame resulting in better time management.

Yang, K.P., T. Beaubouef and G. Alkadi. SLU. **A FPGA development and education board for computer science**.—Computer Science students do not have opportunities to work with real hardware equipment although they have a series of hardware courses, which are traditionally ended at the simulation level. A development and education board, which is supported by the Undergraduate Enhancement Program of Louisiana Board of Regents, works as a small mother board in a personal computer. It offers a rich set of multimedia features such as standard connectors for audio, video, networks (wire and wireless), memory (SD, SRAM, and SDRAM), and USB ports. A Field Programmable Gate Arrays (FPGA) device on the board is reconfigurable, which means its hardware configuration can be changed by the customer or designer after manufacturing. Our students currently involved in FPGA embedded system research employ the hardware and software package to draw schematic captures and to write hardware description language (VHDL) and C/C++ programs. After compilation and simulation, hardware configurations are fabricated and demonstrated on the board. A variety of applications using the reconfigurable FPGA device include data encryption, automatic target recognition,

error detection, string pattern matching, Boolean satisfiability, data compression, and genetic algorithms. This teaching enhancement makes Computer Science students more productive and marketable in the real world.

Earth Sciences Section

Stringer, G.L. ULM. **New fossil centropomid fish (snook) from the late Eocene Yazoo Clay of northeast Louisiana**.—The Yazoo Clay exposures near Copenhagen, Caldwell Parish, Louisiana, have one of the most diversified marine vertebrate fossil assemblages in the Paleocene Period (23 million to 65.5 million years ago) in the Gulf Coast. Reported fossil vertebrates, which include sharks, bony fishes, reptiles, birds, and mammals, number almost 80 taxa. The Teleostean fauna is the most diversified with 43 taxa based on otoliths and at least 11 skeletal-based taxa. Although over 10,000 otolith specimens have been recovered and analyzed, additional species continue to be found. Most recently, otoliths representing what appear to be a new species of *Centropomus* have been discovered. Specimens match otoliths from *Centropomus undecimalis*, the common snook, found presently in the Gulf of Mexico. However, the pronounced ontogenetic changes in *Centropomus undecimalis* hindered identification since smaller juvenile otoliths are quite different from larger adult otoliths. Analysis of a growth series of recent *Centropomus undecimalis* illustrates significant changes in the height/length ratio, convexity, and sulcal shape. The Yazoo Clay specimens display the characteristics of the larger adult *Centropomus undecimalis* but probably represent a new extinct species. Additional fossil specimens are required to confirm the identification. The Florida Fish and Wildlife Conservation Commission provided otoliths for this study.

Materials Science and Engineering Section

Abed, Z and J. Omojola. SU-NO. **Lights-out problems**.—The objective of this project is to use linear algebra to solve the problem of which array of lights that were initially turned on will all be turned off by pressing a sequence of buttons. The lights out game consists of a grid of lights. When the game starts, a random set of these lights are switched on. Pressing one of the buttons will toggle the pressed button and its neighbors on and off (diagonal neighbors are not affected). The aim of the game is to switch all the lights off. Given an initial configuration of lights, the problem is to solve the lights out game, that is, to determine a sequence of steps that will switch all the lights off. The objective is to determine the minimum number of steps required to obtain lights out. The general project was to solve this problem by using a system of linear equations. Given an arbitrary m by n grid of switches, one seeks to solve the problem of achieving an all-off configuration. The effect of a button press (or several presses) can also be written as a list of bits; 0 if a light does not change, and 1 if a light changes because of the button pattern. If you apply a button pattern to a particular position, then the result is described by a vector, which is the sum of the two vectors modulo 2. This means that the result for a particular light is computed by adding the corresponding entries in the two vectors, and that if we have two 1's then the result of 1+1 should be 0 (a light that is on, and is changed by a button pattern, will be off afterwards).

The presentation will describe how the problem was solved mechanically and by using Sage (a free, open source computer algebra system).

Beattie, W.R. LTU. S.T. Baker and P. Derosa. GSU. **Molecular modeling-based assessment of nanocomposites electrical properties**.—Nanomaterials have brought to science and technology a new dimension of opportunities and technical challenges that were not even imaginable a few years ago. Furthermore, nanomaterials present properties that may significantly differ from those of their macroscopic counterparts. On those lines, the incorporation of a nanosystem into a polymeric matrix can potentially affect its properties in unsuspected ways leading to the development of a new kind of material type called nanocomposites. Particularly attractive is the possibility of using nanoscale systems to alter and fine tune different properties of commonly used materials. Whether the aim is to determine the new properties of a nanosystem-embedded matrix or to design novel nanocomposites with on-demand properties, computer modeling can play an important role pre-scanning these properties in combination with experiments or even before experiments are conducted. In this work, the effects of SWCNTs, which can be fabricated with a wide range of electrical conductivities, on the electrical properties of polymer resin, which is not conductive, were studied. However, the main focus is on establishing a suitable molecular-level approach to study this process. The first step was the comparative study of alternative conformations for the monomer to determine relative stability of these isomers. Next, the physics and chemistry of the polymer-SWCNT link was determined. Density Functional Theory (DFT) combined with the semi-empirical AM1 method and the Hartree-Fock method was used for these studies. Finally, preliminary studies of conductivity through CNT-oligomer-CNT were performed using a combined DFT/Green functions approach. This work was done as a summer internship program supported by the Minority Leaders Program, U.S. Air Force Research Lab.

Burks, G. and N.V. Seetala. GSU. **Positron lifetime studies of carbon nanotubes incorporated B_4C**.—Positron lifetime spectroscopy is used to estimate the microscopic free-volume spaces including relative pore size, pore concentration, and fractional free volume in carbon nanotubes incorporated B_4C. The positron source, ^{22}Na, is prepared from a radioactive 10 μCi NaCl solution obtained from Spectrum Techniques, Oak Ridge, TN. ^{22}Na source is sandwiched between two identical pure silicon samples and the lifetime spectrum was collected. The positron lifetime spectra were analyzed using POSFIT computer program for three lifetime components. The O-Ps lifetime and intensity values were used in a simple model to estimate the free-volume parameters in pure and heat treated B_4C pellets with and without carbon nanotubes.

Namwamba, J.B. SU-BR. **Experiential learning through practicals**.—Baton Rouge experimental data from a food drying experiment was incorporated as part of pedagogy to teach mathematical modeling through studying the effect of drying temperature and air velocity on potato slices. The students based formulation of drying models from the fact that heating water resulted in evaporation. They then used proportionality to propose models. Regression analysis was applied to the data to finalize modeling. The models were compared against actual data to determine the best model and predictors. This approach uses practical experimentation from food science to provide experiential learning of applied mathematics.

Yang, S., S. Bai, E. Khosravi and G.L. Zhao. SU-BR. **First principles molecular dynamics simulation of nano gold adsorption on (0001) surface of ruthenium**.—Gold nanoparticles are widely studied in catalyst, fuel cell, and nano electric device applications. We have simulated the gold nanoparticles adsorbed on the (0001) surface of ruthenium with the coverage of less than one monolayer, close to one monolayer, and large than one monolayer using first-principles molecular dynamics (MD) method. Our MD results show that when the coverage is less than one monolayer, the gold layer is relatively flat, while in the coverage large than one monolayer, the top gold surface shows uneven growth. The adsorption energy of CO on the above three systems also was calculated and discussed.

Mathematics and Statistics Section

Chi, O. LSU-BR. Y.N. Chi. UT-B. **Business students' attitudes toward statistics: A path analysis**.—Attitudes toward statistics could be one of the critical factors influencing college students' motivation to enhance their learning experiences in statistics courses. The purpose of this study was to understand business students' attitudes toward statistics that enrolled in an introductory statistics course during the fall semester 2006, measured on a seven-point Likert-type scale based on the Survey of Attitudes toward Statistics. It was chosen not only because the subscales on the survey represent important attitudes that are related to student achievement, but its reliability and validity indices have been empirically documented. Results showed that respondents held positive attitudes on the Affect, Cognitive Competence and Value components, but negative attitudes on the Difficulty component. A path analysis revealed that the Cognitive Competence and Affect components had direct effects, while the Difficulty component had indirect effect on the Value components. Empirical results also found that gender, current academic status, previous mathematic background, experience with computer and statistics, expectation and confidence with statistics performance were the variables of interest in this study. Results of this study provided insight into the understandings of business students' attitudes toward statistics that can be used to frame scenarios for statistics education improvement purposes.

Milliern, T. A. and A.J. Soileau. LSU-A. **Remarks on exponential function and ellipses**.—We will show some properties between the natural exponential function and ellipses.

Physics Section

Baker, S., B. Ramachandran and P. Derosa. LTU. **Selective complexation of alkali metal cations with calix[4]crowns in aqueous media: A density functional theory study**.— Production of nuclear energy often results in a radioactive aqueous solution that contains long half-life isotopes mixed with inert waste or radioactive waste that decays quickly. One of those long-life radioisotopes is $^{137}Cs^{+}$, which is commonly found mixed with other radioactive ions. A method to extract the ^{137}Cs from the aqueous solution is nanofiltration-complexation, which consists of using the appropriate ligand molecule to form a complex with the target ion and using a filter that will only allow non-complexated species to go through. Understanding the chemistry

of the complexation problem, which includes finding adequate methods to accurately predict ligand-ion interaction, particularly selectivity, is a first step in the design and/or selection of appropriate ligands. We present Density Functional Theory calculations (B3PW91/LANL2DZ) on the thermochemistry of complexation of Cs^+ and K^+ ions with five ligand molecules and their reaction with these cations. Binding energy and equilibrium reaction constants were determined. The 1,3-dimethyl-calix[4]arene-crown-6 was found to have the highest affinity towards Cs^+ while 1,3-dimethyl-calix[4]arene-crown-5 had the highest affinity towards K^+. However, both molecules show a higher gas phase binding energy with K showing that solvation energy may be the key factor determining the selectivity of these molecules.

Bond, Z.B. and K. Hye-Young. SLU. **Static polarizability and energy of a water cluster with two excess electrons**.—A single water molecule cannot bind an electron, but a cluster of water molecules can capture few electrons. The resulting cluster anions are very challenging systems from a theoretical point of view. Using full quantum chemistry, the size of a water cluster is limited usually to about ten molecules. In the present work, we calculate the energy of the system of water clusters with two excess electrons using a coupled dipole method. With one electron each attached on opposite sides of a water cluster, the electric field felt by water molecules is non-uniform. The static polarizability of the cluster in this non-uniform field is evaluated by including all many-body interactions for various sizes of water clusters. The energy of the water cluster with two excess electrons also is calculated. The results of the present calculation demonstrate the effects of water cluster size on the binding energy of electrons and provide the microscopic view on how water molecules, as a group, respond to the excess electrons. Supported by DOE-FG02-07ER46414.

Franklin, D.S. UNO/QQNA. G. Peggion. UNO. **Comparison of the Gulf Stream northern front from the hybrid coordinate ocean model (HYCOM) versus infra red satellite data**.— The subject of intense scientific observation for over 200 years, the Gulf Stream still elicits research as a major component in modeling of ocean currents. Accurate computer modeling of the area at the surface as well as deeper depths is important for correctly recreating the mechanism of the Atlantic Ocean gyre. One of the computer models currently under validation at NRL is the global Hybrid Coordinate Ocean Model (HYCOM). To validate the computed data against the infrared frontal analysis involves an automated process for the comparison. This procedure determines the steepest gradient of the computed temperature field at defined depths near the region of Cape Hatteras, North Carolina. At the location of this gradient, the Sea Surface Height value creates the contour of the defined HYCOM North Wall of the Gulf Stream. From the observed front and the newly created model front, statistics relating to the bias and standard deviation assess the accuracy of the modeled Gulf Stream. This research was supported by NRL.

Gaffney, J. and S. Yoshidao. SLU. **Determining fatigue history of an aluminum sample with interferometric and acoustic methods**.—Our goal was to be able to determine the fatigue history of an aluminum sample using two non-destructive methods. The first method attempted used an interferometer to characterize the fringe patterns of an unloaded sample. The sample was then deformed through the application of a load using a tensile machine. The fringe patterns of the deformed sample were then characterized and compared to the original fringe patterns. A study was conducted to determine the changes in the fringe patterns as a result of application of a

load. The second method used a speaker to create a standing wave pattern on the surface of the sample at different frequencies. This was done on an unloaded sample with no fatigue history and the fringes were recorded. A load was applied on the sample through the use of a tensile machine. The speaker again was used to create a standing pattern on the sample and the results were recorded. The recorded fringes before and after the application of the load were compared in order to determine any change as a result of the application of load.

Henry Smith. RPCC. **Hybrid course creation for alternative presentations**.—This presentation is an overview of a current grant that enables multiple presentations of a physics course with a dual purpose. One function is to reach students through a myriad of formats, better enabling them to grasp the material. The second function is to create science courses that can continue should the normal classroom format be interrupted by a catastrophic event. The discussion will handle continuation of a multidimensional course, and avoidance of problems that could occur.

Istre, C. and A.K. Kandalam. McSU. **A DFT study of neutral and anionic metalorganic complexes [TM_n(COT)] (TM = Sc, Ti, Fe, and Co; n=1, 2)**.—The stability of metallic clusters is an important requirement in the synthesis of cluster-assembled materials. A considerable amount of work has been done recently on metal atoms and metal clusters supported on molecular surfaces. The study of transition metal atoms (TM) supported on organic templates especially has become a focus of many studies. The availability of new experimental techniques to generate these complexes in the gas-phase and the potential applications of these gas-phase metal-organic complexes as building blocks of novel magnetic materials has attracted considerable attention from experimentalists over the past few years. However, direct structural information and accurate magnetic measurements of these complexes cannot be obtained from these experiments. We will present our recent density functional theory (DFT) based results on the structural, electronic, and magnetic properties of neutral and anionic [TM_n (COT)] (TM = Sc, Ti, Fe, and Co; n=1, 2) complexes. The spin magnetic moments of [Fe (COT)], [Fe_2 (COT)], and [Co(COT)] retain the large magnetic moments of the Fe atom, the Fe_2 dimer, and the Co atom, leading to the possibility that these complexes may form novel magnetic materials. Supported by LARegents-RC/EEP.

Kandalam, A.K. McSU. **Stability and magnetism of Mn doped stannaspherene dimers [Mn@Sn_{12}]^2**.— Recent discovery of highly stable stannaspherene (Sn_{12}^{2-} cage clusters has stirred interest in exploring the stability of Transition Metal atom (TM) doped Sn_{12} cages. Since TM atoms carry sizeable magnetic moments, it is expected that new magnetic materials can be synthesized with the TM@Sn_{12} as building blocks. However, if one has to either realize the synthesis of a bulk material with these highly stable endohedral clusters as building blocks, it is very important to understand the nature of interaction between the TM@S_n^n cage clusters. In particular, the search is on for doped clusters that cannot only be magnetic but also can retain their structure and properties when assembled into bulk form. We report the DFT based study of the interaction between two Mn doped stannaspherenes (Mn@Sn_{12}). The calculated results show that Mn@Sn_{12} cluster is not only highly stable and carries a high magnetic moment, but these clusters retain their structural identity and form a stable dimer cluster. Most importantly, the magnetic coupling between the Mn@Sn_{12} clusters depends upon the relative orientation of the

cages. These results are expected to trigger further investigations on highly-stable bi-metallic magnetic cage complexes.

Koirala, P., B. Kiran and A. K. Kandalam. McSU. **Stability and magnetic properties of iron doped neutral and charged gold clusters $[FeAu_n]^{(+/0/-)}$ (n= 1-7) clusters**.—Electronic structure and magnetic properties of iron-doped neutral and charged gold $[FeAu_n]^{(+/0/-)}$ clusters are investigated using Density Functional Theory (DFT). The structural evolution and stability of the Fe-doped Au clusters are compared with the pure gold clusters. Our results show that the magnetic moment of the dopant metal atom is not quenched completely by the Au cluster resulting in magnetic bi-metallic clusters. The calculated vertical transition energies and electron affinities of the doped gold clusters are in agreement with the anion PES experimental measurements. The unusual stability of $FeAu_6^-$, over its immediate neighbors ($FeAu_5^-$, and $FeAu_7^-$), observed in the mass spectrum is also analyzed from a theoretical perspective.

Sasaki, T., J. Gaffney and S. Yoshida. SLU. **Prediction of loading history using electronic speckle pattern interferometry**.—Electronic speckle pattern interferometry (ESPI) has received considerable attention as a measurement method capable of whole-field, dynamic analysis. In this technique, a specific fringe pattern image corresponding to deformation behavior such as elastic or plastic deformation, non-uniform deformation caused by stress concentration can be obtained. This study focuses on the change in fringe pattern that preloaded materials show when they are reloaded after being released from the initial load. If the degree of preloading can be identified from the specific fringe pattern obtained by reloading in small load range, ESPI can be potentially used to predict a material's remaining life. We present some experiments about practical application for diagnosis of a material's life. We show the effect of preloading on ESPI fringe pattern during uniaxial tensile reloading and the fringe patterns obtained when we use a vibrator as a reloading device.

Smith, G.B. UNO. **Ordering the quantum vacuum**.—By introducing order to the production and propagation of polarized virtual particle-antiparticle pairs in the quantum mechanical vacuum, a new conceptual understanding of fields, particles, zitterbewegung and motion can be obtained which allows the Lorentz transformation to be derived as the enforcer of the proposition that all motion can be considered to be zitterbewegung induced – that is, the collective result of a large number of vacuum exchange scattering events.

Division of Science Education

Higher Education Section

Dees, W.H. McSU. M. Diack. SU-BR. **"Achieving excellence" – The 1st annual "State of the Academy" colloquium**.—This colloquium is a "tea room" discussion about the Louisiana Academy of Sciences. This "tea room" discussion will be the first annual collegial-based forum that gives interested members of the Academy the opportunity to dialogue on issues relevant to the Academy. The presentation will include the current state of the Louisiana Academy of Sciences and future programs and Academy directions. Member input is welcome. Colleagues and students interested in becoming involved in the Louisiana Academy of Sciences are encouraged to attend.

Overby, A.C., E.A. Tucker and A. Lusby. LTU. **Issues with implementing service learning into an agricultural sciences equine program**.—Service learning classes were implemented in an equine science program in the spring of 2007 after being funded for animal evacuation and recovery grants. This program was met with great enthusiasm and participation; however, the authors raise questions about some of the obstacles they have found while implementing this program. The three major areas of concern include the optimum class size for learning, transportation, and the depth of responses to student reflective pieces.

Pugh, A.F. and J. Washington. ULM. **Methods of teaching science and social studies.—** During the semester prior to student teaching, candidates meet on the Professional Block. For this semester, candidates take methods in lower mathematics, social studies, upper mathematics, and science. Candidates meet on campus for 15 days and then go to the assigned schools for grades 1-2 for 20 days from 8:00 until 11:50 each day. State requirements mandate they teach approximately 20 hours in each of the four areas. After the first assignment, they return to campus for an additional 15 days for classroom instruction in upper mathematics and science. The second assignment will be in grades 3, 4 or 5 for an additional four weeks for the assigned 8:00 until 11:50 each day. For the science class the candidates conduct peer teaching on the subjects of Magnetism/Electricity, Human Body/Sound, Plants/Animals, and Flight/Solar System. Topics in social studies would include Geography, History, Economics, and Political Science. During the peer teaching presentations, the group is required to present a power point presentation and "hands-on" activities that would involve the entire class. Therefore, the purpose of this paper is to discuss the science and social studies methods for elementary education at the University of Louisiana Monroe.

Robinson, M., T. Tanner, T. Hall and D. Wilkerson. SU-BR. **The student athlete: A comprehensive "student orientated" approach to athletics and academics**.—Productive/ dynamic student athletes are an invaluable resource not only to universities but to local communities, neighborhoods, and the economy as a whole. Our approach to enhancing the total athlete includes several aspects that focus on developing and maintaining the total student. Foremost, all athletes must recognize that his or her main priority is industrious class attendance and participation. Hence, he or she must focus on being a student first! Moreover, we emphasize successful student retention by incorporating mandatory study hall meetings, utilization of

technology and ample understanding of fundamental library resources such as scholarly books, magazines, and journal articles. Furthermore, all student athletes are required to maintain periodic meetings with his or her academic advisor. Lastly, all student athletes must recognize and practice "The Foundations of Life" which include: 1) Self-Respect, 2) Acquisition of Knowledge by means of Intelligence, 3) Productive/Positive utilization of their acquired knowledge, skills, and abilities, and 4) Graduate with a clear academic record in order to enter society or further his or her education. Lastly, the hub of our approach is to treat each student as an individual and cater to their individual life goals. We plan to continue our research by interviewing former student athletes.

Washington, J. and A. Pugh. ULM. **Designing pre-service elementary mathematics instruction**.—During the semester prior to student teaching, candidates meet as a block for four methods courses: lower and upper elementary mathematics, social studies, and science. University classes model the elementary school classrooms. Thus, listed below are five of numerous principles to which the professor adheres in designing pre-service elementary mathematics instruction: First, the children and teacher candidates are actively engaged in learning, exploring materials freely and in problem situations, and in cooperative learning projects. Second, calculators and computers are employed, as a means to explore mathematics and enjoy the challenge of problem solving. With the proliferation of sites on the Internet, students and teacher candidates have many areas to explore and create their projects. Third, student-centered instruction is utilized. The ideas, opinions, and interests of the children are focal points around which instruction is centered. National, state, and local content and process goals for mathematics along with textbooks are necessary for the mathematics programs. Fourth, higher order thinking is encouraged. Children and teacher candidates are challenged with problems, puzzles, and patterns throughout their learning of mathematics. Fifth, children and teacher candidates are taught diagnostically. As they learn mathematics, the professor or teachers constantly monitor their progress.

K-12 Education Section

Munajj, R. GSU. **Programming IntelliBrain-Bot**.—The experiments that my teammates and I conducted in the research program were dealing with the coding of an IntelliBrain-Bot using Java language. These experiments were carried out through a two week time span. We also had the opportunity to learn about the different parts of computers, and different software such as Linux, UNIX, Microsoft, etc. My team first had to deconstruct the robot then rebuild it; the robot was a three wheeler rover with Optical senses. We were given a code and a sheet of assignments to complete for the two weeks. Over the two weeks, we were given different Java codes that produced certain movements in the robot and display on the robots display screen. The instructors explained the different parts of the code which helped produce the different movements. The most important codes in the experiment were the servo codes that controlled the movements of the wheels, and the thread time which determined the time of each movement. The thread time was alternated through the entire code, to stop one part of the code and begin another giving desired trail shapes such as a square, the letter T, etc. Displaying our names on the screen of the robot also was conducted at this time. Over the days, the experiments became more

challenging dealing with the looping of codes for the desired two or four times. The construction of the code also was challenging for even the slightest mistake could result in no movements or different results than predicted. Once or twice, we were forced to erase the code and construct it over again, all because of a misplaced statement. At the end of each day we would create a power point on the day's activities. The major and last power point was at the end of the two weeks.

Nwoha, N., A. Robinson, Breyonna and P. Williams. GSU. **Summer robotics workshop experiences**.—During my summer vacation, I went to a summer program called Summer Robotics Workshop. I attended this program for two weeks (ten working) days, along with two of my fellow students from Grambling Middle School. The first day of the program, we were introduced to Dr. Reddy, who was to be our supervisor. We met in the science building on Grambling campus called Carver Hall. After the introduction and a brief explanation of what we were to do during those ten days, we began to build our robots, a type called "IntelliBrain-Bots". After we had them assembled, we began to input various data and program a lot of different actions for the robots to perform. All the while, we had been putting together a power point presentation of our time at the program. There were a few difficulties along the way, but we managed to get past them rather easily with the help of our mentors. On the last day of the program, we gave one last show of what we did during the program and presented our power point presentations as well as gave a demonstration of the data and actions we had inputted and programmed into the "IntelliBrain-Bots". I would love to continue the program, and perhaps be able to participate in even more advanced projects in the future. I am sure that the other students that attended the program would say the exact same thing.

Robinson, G. GSU. **Experiences with IntelliBrain-Bot summer program 2008**.—I really enjoyed my two weeks at Grambling State University. It was a great experience for me. I am unresolved as of right now which major I would like to study in college; however, this program has really made me lean towards engineering. While I was at Grambling, we did projects with a robot. It was called an IntelliBrain-Bot. We programmed the IntelliBrain-Bot to do a variety of things. Before we started to program it, we took it apart to learn how to put it back together again. We went to http://www.ridgesoft.com to figure out how to program the IntelliBrain-Bot. We first started by programming it to perform basic maneuvers. During that time, we learned how to control the servos for movement. The position command was set to 0% to move the IntelliBrain-Bot in reverse, 50% to make it stand still, and 100% to move it forward. Using this information and a little creativity, we programmed our IntelliBrain-Bot, RoboDog, to maneuver into different figures, display names, and beep. I enjoyed the experiences and the sites we viewed around the campus. I would like to thank the instructors and Dr. Reddy for their help and guidance. I also would like to thank the Clarkson Group for funding this project.

Williams, T. D. and G. Autin. SLU. **A novel approach to increasing teacher content knowledge**.—The enhancement of teacher content knowledge has been shown to have a direct effect on student performance. Project Producing Results in Science and Mathematics Equals Highly Qualified Teachers (PRISM=HQT) was a state funded Math and Science Partnership. The goals of the project were threefold: (1) to increase the subject matter knowledge and teaching skills of middle school science and mathematics teachers, (2) to affect improvements in

student outcomes in the areas of science and mathematics, and (3) to increase the number of "highly qualified" middle school science and mathematics teachers. The project partners, Tangipahoa Parish School System, Southeastern Louisiana University, and the Laser Interferometer Gravitational Wave Observatory Livingston (LIGO) worked in unison to insure the goals of the project were met. Participant pre/post-test results and student 2007-2008 academic year test data will provide more insight into project outcomes.

Williams, Z., P. Schneider and N. Freeman. GSU. **Summer workshop experiences with IntelliBrain-Bot**.—My two weeks at Grambling State University were extremely fun. I really enjoyed every day of it. It helped me advance many of my skills such as engineering, computer science, cooperative skills, and my knowledge in the college life. My goal is to major in engineering, and this experience helped me a lot with preparing to take on that task. While at GSU, we worked on a robot called the IntelliBrain-Bot. We learned how to program and assemble the robot. Our group programmed our robot, RoboDog, to maneuver into different shapes, letters, and even words. We also got our IntelliBrain-Bot to display our names and phrases on its LCD display screen that we assembled onto the robot. I learned so much in those two weeks we spent at Grambling. I thank Dr. Reddy for allowing me to enjoy myself and learn many new wonderful things that without this program, I may have never been able to experience.

Division of Social Sciences

Batiste, D. SU-BR. **The feasibility of U.S. trade of organic products with Uganda**.—Research has shown an increase in the demand for organic products in the U.S. as well as a surplus of organic products being supplied in Uganda. The purpose of this research was to determine the feasibility of U.S. trade of organic products with Uganda while examining the demand for organic products in the U.S. This research is significant because it helps the U.S. explore an alternative method to provide consumers with organic products. By trading organic products with Uganda, the U.S. may have a pivotal role in one of the largest developing trading rings of organic products in the world. The research compared the demand in the U.S. for organic product with the surplus of organic products in Uganda. The research also examined the feasibility of importation including consumer demand for organic products, history of organic products, and the certification of products. Findings of the research were (1) importation of organic products from Uganda was feasible in terms of costs, transportation and food safety issues; (2) the need to establish a trade infrastructure for organic product delivery; and (3) Uganda has the ability to produce organic products for exportation to the United States.

Bennett, F. SU-BR. **Overweight and obesity among children in the United States**.—The research analyzed the prevalence of overweight and obesity among children and adolescents in the United States. Overweight and obesity have increased in children and adolescents from 1965-2005 with the percentages practically doubling and tripling. With the increase in overweight and obesity, children and adolescents have developed diseases that were previously only linked to adults. The diseases included sleep apnea, glucose intolerance, growth and maturation, hypertension, hyperlipidemia, and orthopedic complications. The morbidity and mortality rates also were higher in those who are obese and overweight because of the diseases that are associated with being overweight and obese. This project was supported by a Ronald E. McNair Grant from the U.S. Department of Education.

Borne, M. SU-BR. **The effect of cultural misorientation on skin tone and physical characteristic preferences among African American college students**.—Using data collected from students attending Southern University, this study examined whether a relationship existed between cultural misorientation, skin tone, and physical characteristic preferences for mate selection among African American college students. A battery of instruments was administered to assess subjects' level of cultural misorientation and perceptions of skin tone and physical characteristics. This study consisted of 71 females and 37 males ranging in age from 14-56. Cultural misorientation is defined as a basic personality/mental health disorder in African American people which is sanctioned, nurtured, and reinforced by the institutional structure of European American culture/society. Results revealed that subjects who placed emphasis on material objects were more likely to rate persons of the same sex as attractive when they had lighter skin tones, preferred future spouses of lighter skin tones, and evaluated members of the opposite sex as attractive when they had lighter skin tones. The findings also indicated that subjects who placed more emphasis on Eurocentric values and traditions were more likely to prefer marrying spouses of a lighter complexion. Furthermore, males were more likely to prefer mates of a lighter skin tone and with more mature features than females.

Corrigan, G.E. EBRCO. **A bulletin board demonstration on urban public death 2008**.—A public death update by case category for 2008 is presented. The current five year autopsy table with nine different case classification categories is updated to show the continued elevated incidence of gunshot wound cases and a stable incidence of the other cases required for certification (stabbings, fire victims, and SIDS). Currently applicable features of each of the other case classifications (disease and metabolic conditions, traffic fatalities, cardiac arrest, and infections) are presented with discussion on procedural details. The 2008 female shooting victimology is presented and the differences compared with the previous year in social and forensic attributes. A forensic study of public deaths from oral ingestions provides a unique analysis of one year of oral ingestions with complete toxicological data. Data are provided identifying each of the forty three drugs active in the 2008 series and precisely quantifying their incidence in these fatal cases. Sociological data include sex and age while the nontoxicological conditions confusing these cases are identified for the year. Ten conclusions relating to the forensic and sociological factors in drug death are presented for discussion.

Durriseau, J.A. SU-BR. **The impact of observing animated agent affect on learning**.—This study investigated the impact of observing an animated agent's effect on learning. As the usage of computerized animated tutors (agents) rise, it is important to develop methods that maximize learning gains. This study sought to discover if presenting an animated pedagogical agent's effective state (facial emotions) can affect learning. The study had six different conditions: approval, disapproval, skepticism, surprise, empathy, and neutral. Each participant in the study was given a pretest, learning tutorial, and posttest. The learning tutorial contained one of the six conditions. These conditions were displayed through an animated agent that appeared periodically throughout the tutorial. The participants then took a posttest and attempted to validate what emotion they saw during the tutorial. Preliminary results indicated no significant differences among conditions.

Jones, Q.K. SU-BR. **The relationship among household structure, parental involvement, and early sexual behavior in African American adolescents**.—Many adolescents begin to have sexual intercourse during their late middle and early high school years. Moore and colleagues (1995) reported that initial sexual behaviors are often one of the most defining events in the lives of adolescents. However, studies are limited when focusing on the effects of household structure and parental involvement and the early sexual behavior among the African American adolescent. The purpose of this study was to investigate whether a weak household structure and low levels of parental involvement are factors that initiate early sexual behavior in African American adolescents. It was hypothesized that: (a) adolescents who live in single-parent households would be more likely to engage in early sexual behavior than adolescents who live in two-parent households, (b) adolescents who have low levels of parental involvement would be more likely to engage in early sexual behavior than adolescents who have high levels of parental involvement, and (c) adolescent males in the African American community are more likely to engage in early sexual behavior than African American females. Data were analyzed to determine the results using several factorial analyses of variance and Pearson product moment correlations.

King, K.T. SU-BR. **The effects of an author's gender and race on the likeability of a poem**. **—**Gender and race were assessed to determine effects on poetry likeability. Likeability was measured by responses to a seven item likert-type rating of a poem. Forty African-Americans, college students (16 males and 24 females) participated in an experiment that explored poetry preference. Using a four-group experimental design, four groups of 10 subjects were randomly selected from a class of 40 students. Each group was treated the same but differed by the information provided about the author of the poem. Group one subjects were told that the author of the poem was a white female. Group two subjects were told that the author of the poem was a white male. Group three subjects were told that the author of the poem was a black female. Group four subjects were told that the author of the poem was a black male. The study found a significant difference when controlling for gender and race. Higher poetry preference where found when subjects were told an African American male.

Long, T. SU-BR. **The relationship between nutrition, self-esteem and parental expectation and academic achievement among African American college students**.**—**The purpose of this study is to investigate the relationship between nutrition, self-esteem, parental expectation and academic achievement among African American college students. While some college students concentrate and focus on academic achievement; others deemphasize the importance of performing academically. Research suggests that there is a link between nutrition, self- esteem and parental expectation with regards to academic achievement. This research is examining the direct effects on academic achievement among college students (Coley, 2001; Lockett and Harrell, 2003; Maddox and Prinz, 2003; Sirin and Rogers-Sirin, 2004, Witherspoon et al., 1997). It was hypothesized that individuals' high levels of nutrition will increase academic achievement rather than individuals with low levels of nutrition. It also was hypothesized that individuals' high levels of self esteem will increase academic achievement rather than individuals with low levels of self esteem. Finally, individuals whose parents had high levels of academic expectations will perform better academically than individuals whose parents had low levels of academic expectations. A battery of surveys was administered to 94 participants at Southern University. The battery of surveys consisted of 55 questions and consisted of the self esteem, nutrition, parental expectation and academic achievement surveys. This project was supported by a Ronald E. McNair Grant from the U.S. Department of Education.

Murphy, N. SU-BR. **Gender diversity in engineering software development virtual teams**.**—** Gender diversity in virtual teams within high technology industries is important in the technological age due to the inequalities that exist based on gender in the workplace. There may be a need for policy reform, training, or specific interventions to take place within virtual groups. This research involved a case study of the role that gender diversity plays in engineering software development teams in the major Fortune 500 "high technology" companies. There were 89 management leaders and 50 team members (22 women, 67 males) that were located across geographical locations of a Fortune 500 company that were interviewed. Participants were interviewed by phone according to a survey. They were asked to describe their current jobs and responsibilities and challenges faced in their work context. The goal commitment, team identification, individual performance, and media of communication used by members within the virtual team were determined between genders. The results showed that there were significant

differences in goal commitment and team identification, while there were no significant differences in individual performance.

Ngnitedem, A.M. and M.S. Kim. SU-BR. **Performance-based budgeting in Louisiana: The case of public hospitals**.—The 1990s witnessed a renewed interest in budget reform in the U.S. marked by the adoption of Performance-Based Budgeting (PBB) by the federal government and all but three states. This was in reaction to the "managing for results movement" sparked by a great fiscal pressure, the shrinking taxpayer's willingness to pay more taxes and their increasing demand for more efficiency and accountability in the use of their monies. By adopting PBB governments hoped to restore faith in government by linking budget appropriations to program performance. Smith and Lynch (2004) note that "one way to restore faith in government was to make government more accountable, more citizen focused, more performance oriented, and more effective". Theoretically under this budget reform budget appropriations are ultimately linked to the outcome of the program measured with performance measures (PM). Research shows that in practice this remains to be seen (Melkers and Willoughby, 2001). This paper assesses the effectiveness of PBB in Louisiana public hospitals by testing the theoretically potential link between the implementation of PBB and budget appropriations. First, we review PBB requirements for the state of Louisiana to determine their scope and focus. Second, we use an empirical approach with data from public hospitals in Louisiana and the Louisiana Accountability and Performance System (LAPAS) to investigate the effectiveness of performance-based budgeting in Louisiana. Our findings suggest that: 1) the use of performance measures in the budget process is widespread in Louisiana public hospitals, 2) yet, the contribution of the implementation of PBB to the budget appropriation is unclear, and 3) the result of our empirical investigation was inconclusive. We did not find enough evidence to conclude with a reasonable level of certainty whether performance-based budgeting is effective or not in Louisiana public hospitals. This could be attributed to a number of factors including: 1) the fact that the implementation of PBB is still at its initial stage in Louisiana public hospitals, 2) the complexity of the incentive program that rewards good performers, and 3) the absence of reverse actions or disincentives for poor performers.

Sillers, L.M. SU-BR. **The role of social values in forming the attitudes and beliefs of individuals toward gays and lesbians in the African American community**.—Only one study has been devoted exclusively to determining the attitudes and beliefs of African Americans towards gays and lesbians (Herek and Capitanio, 1995). All other data on this topic have fallen victim to inadequate study and considerable speculation (Herek and Capitanio, 1995). An experiment was conducted via survey on a college campus to study the attitudes and beliefs of African Americans towards the gay and lesbian lifestyle (N=46). The purpose of this study was to examine the role of social values in forming the attitudes and beliefs of individuals toward gays and lesbians in the African American community. The social values examined were age, religious affiliation, religious attendance and gender. Statistical findings showed there was no generational difference between African Americans' attitudes toward gays and lesbians. Religious attendance and affiliation was positively related to an individual's beliefs toward gays and lesbians. Women demonstrated more positive attitudes toward lesbians but not towards gays. These findings may suggest that social values play a role in shaping an individual's attitudes and beliefs in the African American community.

Smith, A.M. SU-BR. **The influence of goal setting on feedback**.—This scientific investigation sought to test the effects of goal setting and encouragement on performance to understand if seemingly high goals are achieved when encouragement is offered. Sixty-eight African-American college students ages 14 to 54 were used to test the effects of goal setting and encouragement on performance. Participants were randomly assigned to either high or low goal groups and given feedback or no feedback, with performance being the number of successfully located word search clues. Contrary to expectation, goal setting did not have a significant effect on the number of successfully located word search clues as previously stated in the hypothesis, encouragement had an inverse significant effect on the number of successfully located word search clues which contradicts hypothesis, and when goal setting and encouragement were manipulated simultaneously, goal setting was found to be insignificant; whereas, encouragement was found be significant in the number of successfully located word search clues.

Sugulleh, K. SU-BR. **Post-traumatic stress among Hurricane Katrina evacuees**.—Many persons have experience disaster related trauma and stress. This study examined stress related behavior and the affect that it has on individuals who experience traumatic events. The purpose of this study was to examine coping mechanisms of persons who have experienced disaster or traumatic life events, to determine the effects of the hurricane disaster and to understand how hurricane victims have adjusted to their environment. A case study was conducted with a convenience sample of 20 individuals who had been dislocated because of Hurricane Katrina. Many respondents indicated that they had experienced increased episode of loneliness and being depressed. Feelings of isolation, numbness, hopelessness, also were evidenced. Other respondents were fearful of the consequences of future disasters. The research suggested the need for a more detailed study of factors influencing psychosocial responses in the aftermath of a disaster.

Taylor, J.A. SU-BR. **The effects of circuit court decisions on higher education opportunities for minorities**.—The purpose of this study is to analyze the effect of circuit court decisions on educational opportunities for minorities. This study focuses on the struggle for equal opportunity in higher education for the underrepresented population and will examine enrollment numbers to assess any statistical change from 1990 to 2005. Both total enrollments in higher education across the United States as well as three individual circuits are examined. The research examined a key question – "Do circuit court decisions correlate with academic opportunities for minority applicants?" The circuit court decisions analyzed were the 5th, 6th and 11th. These opinions were assessed because of the varied position handed down by the judicial bodies. This research addressed a significant gap in literature and the limited research existing on the effect of circuit court decisions as related to affirmative action and higher education opportunities for minorities.

Thomas, A.N. SU-BR. **Saving our youth: Reviewing pro-social and academic self-regulation in African-American youth**.—The purpose of this study is to examine the difference between pro-social behavior and academic self-regulation in African-American males and females. A sample of twenty-five (25) African-Americans, of both genders, registered in 6th thru 8th grade in the 2008-2009 school year were randomly selected; eighteen (18) usable parent assent forms were returned, nine males and nine females. The group of males questioned range from middle childhood to early adolescence. Sixty-nine percent of the students assessed qualified for full or

partial financial assistance in the Timbuktu Academy summer program which consisted of students enrolled in East Baton Rouge Parish schools and school systems in the surrounding parishes. Full financial assistance for the program was granted to families whose income did not exceed 250% of the federal poverty level. Youth were assessed with the Academic Self-Regulation and Pro-social Self-Regulation Questionnaires. It was hypothesized that there would be a significant difference in academic self-regulation between males and females. Secondly, it was hypothesized that there would be a significant difference in pro-social self regulation between males and females. This research seeks to find out "Is there a difference in academic self-regulation between African American males and females in their middle childhood and early adolescent years?" and "Is there a difference in pro-social self-regulation between African American males and females in their middle childhood and early adolescent years?" Data analysis revealed significant differences between female and males autonomous academic self-regulation; however, there was no significant difference in the group's identified pro-social regulation. This project was funded by the Ronald McNair Scholar program and the U.S. Dept. of Education.

White, E.H. SU-BR. **A case study approach to the examination of cultural identity formation among African-American adolescents**.**—**The purpose of this research is to apply a case study approach to the examination of cultural identity formation among African-American adolescents. The research suggests that African-American adolescents who develop a strong sense of self will surpass the identity struggles of adolescence, enabling them to profitably navigate the challenges of adulthood. The research also suggests that those who encounter difficulty (i.e. neglect, rejection, broken promises) during childhood and adolescence will encounter a measure of confusion on their path to developing a suitable identity. Despite the reputation of adolescence as a time of confusion and rebellion, research increasingly shows that most people pass through the period without much turmoil. This is not to say that the transitions adolescents pass through are not challenging. This review of the literature shows, as personality, social development, and identity formation are discussed, that adolescence brings about major changes in the ways in which individuals must deal with the world. The interaction of race, culture, socioeconomic status, and various contexts of development with identity formation are also highlighted, using Erikson's psychosocial theory as a guiding framework. Directions for future research and implications for professional practice also are included. The primary methodology used in order to determine the results of the problem was a content analysis of one case study subject. Data were collected using an unstructured interview with a nineteen year old, African-American male. Based upon the data collected, it was found that the subject, Paul, moved through several different statuses during adolescence. It was also determined that his early childhood experiences affected and influenced how he moved through the several identity statuses while striving for identity achievement—where he is now.

Whitney, S.W. SU-BR. **A study of juvenile delinquents in the state of Louisiana: A demographic profile of HIV/AIDS**.**—**In the state of Louisiana, juvenile delinquency is a major problem. Juveniles represent 1 in 10 arrests for murder and drug abuse violations, and 1 in 4 arrests for weapons violations, motor vehicular theft, larceny-theft, and burglary in 2006 (OJJDP Statistical Briefing Book, Juvenile Arrest 2006). Among racial groups, 83.2% of African Americans and 15.9% of White Americans are incarcerated in juvenile detention centers.

Incarcerated males represent 95.1% and females 4.9% (OJJDP Statistical Briefing Book, Juvenile Arrests 2006). Incarcerated juveniles not only rank high in crime offenses, but they rank high in HIV/AIDS as well. Youths in prison have several health issues, such as sexually transmitted diseases (STDs) and HIV/AIDS. One of the leading causes of HIV/AIDS and other STDs among incarcerated juveniles are risky sexual behaviors. This research paper will develop a demographic profile of incarcerated juveniles in Louisiana who are infected with HIV/AIDS.

Wilkerson, D., C. Tsuma and E. Martin. SU-BR. **Political economy: An examination of globalization on the continent of Africa**.—An increasingly significant feature of the global economy is the integration of the emerging economies in world markets. Hence, more countries are integrated into a global economic system in which trade and capital flow across borders with unprecedented energy. Albeit, globalization offers extensive opportunities for worldwide development; it is not progressing evenly. Hence, a large number of countries are becoming integrated into the global economy more quickly than others. While globalization offers unprecedented opportunities for growth, globalization comes with elevated costs, which can be challenging to poor countries that do not have the structural and policy foundations in place to take advantage of more open trade, investment and financial flows. Moreover, our research examines the vast continent of Africa's whose broad economy has largely been by-passed by the phenomenal increase in global trade, investment and financial flows. In particular, per capita incomes in Africa have declined relative to the industrial countries and in some African countries the per capita income has declined in absolute terms. Furthermore, 40 of the poorest nations, many in Africa, have had 0 growths during the past 20 years although their governments followed advice from wealthy nations and World Bank consultants. Ironically, the wealthiest people termed "The Elite" benefit from the source of cheap labor and policies of the West reinforcing a growing divide between the rich and poor.

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