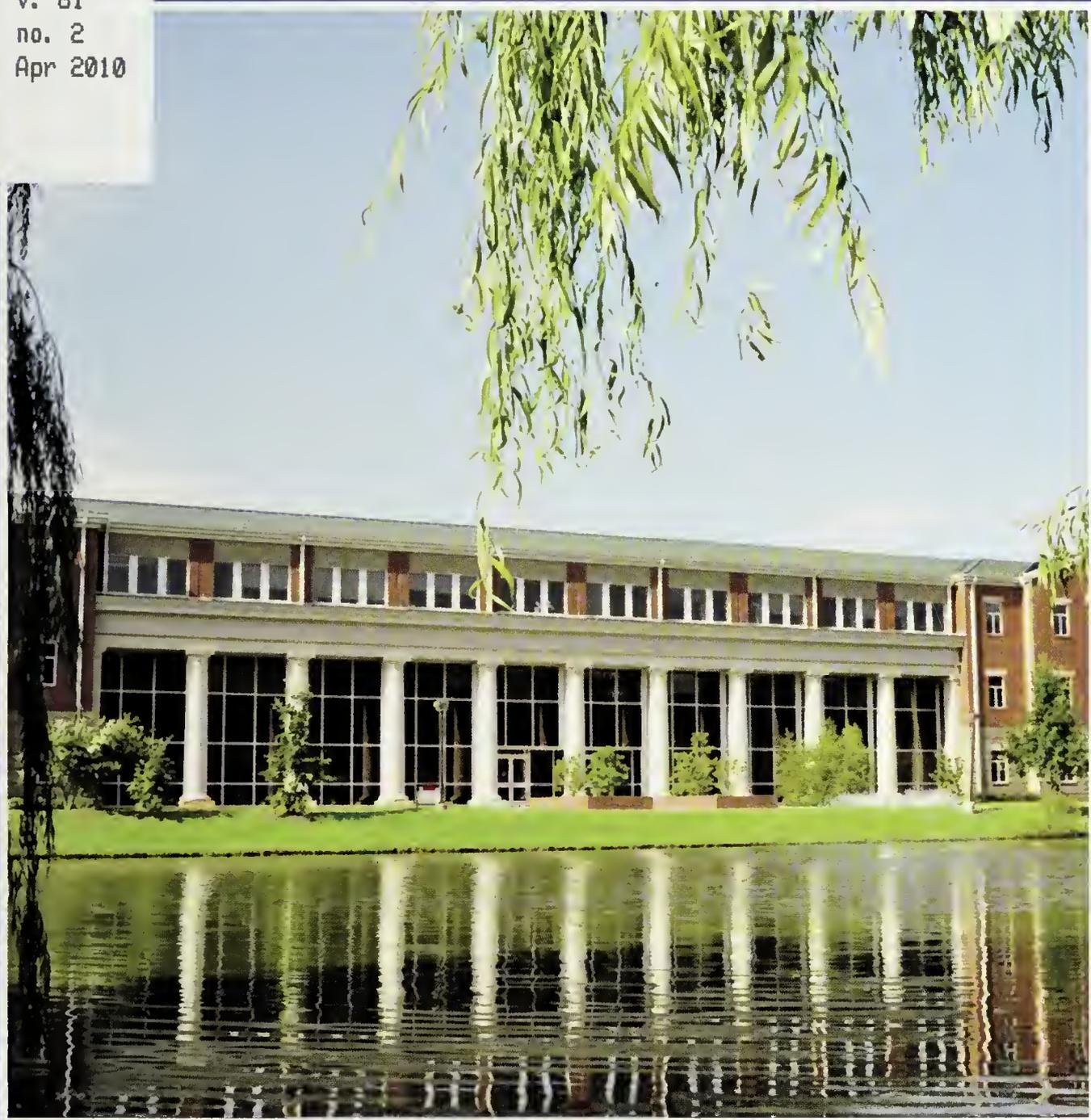


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Cover Photograph: School of Engineering & Technology Building on the campus of Alabama A&M University, Normal, Alabama, site of the 87th Annual Meeting of the Alabama Academy of Science.

Photo is courtesy of Dr. Sha Li, Associate Professor of Educational Technology School of Education at Alabama A&M University.

Editorial Comment:

On behalf of the Alabama Academy of Science, I would like to express my deepest gratitude and appreciation for the Alabama A&M University for their generous hospitality in hosting the 87th Annual Meeting of the Alabama Academy of Science.

Safaa Al-Hamdani

Editor, Alabama Academy of Science Journal

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ABSTRACTS
The 87th Annual Academy of Science Meeting
Alabama A&M University
Normal, AL
March 30-April 1, 2010

Anthropology Paper Abstracts

A CASE OF CRANIAL DEFORMATION FROM THE LIDDELL SITE, 1Wx1, Wilcox County, Alabama. *Kelly M. Ervin*, Dept. of Sociology, Anthropology, and Social Work, Auburn University, Auburn, AL 36849-5049.

A surface collection of human and faunal remains from the multi-component Liddell Site, 1Wx1, was donated to Auburn University by Mr. and Mrs. Liddell of Camden, AL in 2009. The collection includes a minimum of at least three human individuals, as well as deer and other faunal remains. Using bioarchaeological research methods, a case of cranial deformation from a female individual of Asiatic decent was suggested by the morphing and expansion of the cranium between the right parietal, temporal, and occipital lobes of the skull. Interestingly, recent publications on the bioarchaeology of proto-historic aboriginal remains excavated from Liddell site have also observed individuals exhibiting cranial deformation. This preliminary report examines the possible causes and proposes suggestions of differential diagnosis for cranial morphing exhibited by the skull collected in 2009, and investigates the cultural, genetic, and pathological implications of cranial deformation during the proto-historic period of the Southeastern United States.

ARCHAEOLOGICAL INVESTIGATION OF A NINETEENTH-CENTURY CHARCOAL-PRODUCTION SITE, 1CA567, IN CALHOUN COUNTY, ALABAMA. *Valerie Glesner*, Jacksonville State University, Jacksonville, AL 36265.

In 2001, the JSU-ARL conducted a Phase III Investigation along the proposed Anniston East Bypass right-of-way on site 1CA567. This multi-component site contained a prehistoric Archaic and Woodland component, a late nineteenth-century charcoal-production site, and an early to mid-twentieth-century military presence. The prehistoric artifacts indicated the site was used as an ephemeral lithic procurement site. In-depth research of the historical component represents a charcoal production site of the iron industry in nearby Anniston, Alabama, and the beginning of the ongoing military presence in the area. This paper will briefly address the prehistoric component and focus mainly on the overwhelming archaeological and historical information that was obtained from this investigation.

CERAMIC ASSEMBLAGE OF A MISSISSIPPIAN DOMESTIC STRUCTURE FROM 1MC25. Ebert Canebrake. *John A. Gullatte and Hamilton Bryant, Dept. of Sociology, Anthropology, and Social Work, Auburn University, Auburn, AL 36830.*

Archaeological evidence recovered from site 1Mc25, located in Macon Co., Alabama, indicates the presence of Woodland and Mississippian cultural components. Field investigations at 1Mc25 conducted during the summer of 2009 investigated a Mississippian domestic structure first identified in 1999. This paper provides a descriptive as well as quantitative report on the ceramic assemblage associated with the structure. These ceramics were sorted, classified, and analyzed according to their technological and decorative aspects. This analysis verifies the structure's association with Mississippian cultural context as well as provides data for future research.

DIETARY VARIATIONS OF THE SEXES AND HOW THEY ATTRIBUTE TO DENTAL CARIES FROM NEWTON PLANTATION. *Brittany Cooper, Kenyetta Bryant, Dr. Kristina Shuler. Department of Sociology, Anthropology and Social Work 7030 Haley Center, Auburn University, Auburn, AL 36849-5049.*

Our research focuses on the remains of enslaved Africans exhumed from the Newton Plantation cemetery (ca. 1660-1820) in Barbados. Archival evidence supports a diet largely of plants such as guinea corn (sorghum) and sugar cane but with limited protein. We examined dietary variability in adult male and females through dental caries. Dental caries result from bacterial destruction of tooth crown and/or root surfaces and have a well-documented connection to higher carbohydrate diets (Hillson 1996). We scored eighteen individuals for caries presence, severity, and antemortem tooth loss. Our methods include examining each individual tooth to better determine and understand the severity in specific individuals. Higher carie rates in females may support sex differences in the diet of West Indian Plantation slaves.

FORT ALABAMA IN THE SECOND SEMINOLE WAR. *Phillip E. Koerper, Department of History and Foreign Languages, Jacksonville State University, Jacksonville, AL 36265.*

In February 1836, two battalions of Alabama Volunteers answered the summons to serve in the Second Seminole War (1835-1842) in Florida. They were assigned to Fort Brooke at Tampa Bay. During their field duty, the volunteers constructed Fort Alabama on the nearby Hillsborough River. This paper examines the construction of Fort Alabama, the volunteers brief service in the war, and the destruction of the fort. Some mention is also given to the rebuilding of the fort as Fort Foster and the archaeological reconstruction of the second fort in recent times.

THE ART OF PHOTOGRAPHING ARCHAEOLOGICAL ARTIFACTS FOR TECHNICAL REPORTS. *Sean Williamson, Jacksonville State University, Jacksonville, AL 36265.*

The JSU-ARL conducts numerous cultural resource management projects which require technical reports. An important portion of these reports is an accurate documentation of the artifacts recovered during these investigations. This paper will briefly discuss the advantages of point-and-shoot versus a digital single lens reflex (SLR) camera, and the problems inherent in photographing archaeological material within a laboratory setting, including scanned versus photographed material. The importance of calibrating your computer monitor and the techniques for producing high-quality digital photographs of various archaeological artifacts will be discussed. The difficulty of recording the details on artifacts such as glass, and the software used to produce the highest resolution digital photographs also will be addressed.

THE CITY OF OXFORD, ALABAMA, STONE AND EARTHEN MOUND CONTROVERSY FROM AN ARCHEOLOGICAL PERSPECTIVE. *Harry O. Holstein, Jacksonville State University, Department of Physical and Earth Sciences, Jacksonville, AL 36265.*

In 2009, the City of Oxford, Alabama, was in the process of removing fill dirt from a natural hill for commercial development. Atop this hill sat a large loose stone mound which Native Americans, archaeologists, and other individuals believed to be a sacred Native American site which was constructed by prehistoric peoples, and were concerned for the mound's potential destruction. However, city officials believed this stone structure was neither sacred nor important to Native American beliefs and may, in fact, not have been constructed by human hands, but was the result of natural erosion. These conflicting beliefs resulted in a battle to save this mound and preserve Native American heritage. Archaeologists and geologists entered this battle that summer and the results from an archaeological perspective will be discussed in this paper.

THE TALLISE PHASE: THE DECONSTRUCTION OF THE LATE HISTORIC CREEK. *John W. Cottier, Department of Sociology and Anthropology, Auburn University. Auburn, AL 36849*

Archaeological evidence and historical information demonstrates significant cultural changes within the Historic Creeks following the First Creek War. The identified Tallise Phase represents the time period after 1815 until the Creek removals of the 1830s. A significant factor during this short period was the relocation of numerous Creek households into the more limited physical space of the Creek county of eastern Alabama. An added aspect was the dramatic increase of more domestic animals as well as major changes in economic endeavors. Creek identify was thus transformed into an economic and political model that more closely resembled that of the southern independent farmer.

Behavioral and Social Sciences Paper Abstracts

A COMPARISON OF PHYSICAL AND MENTAL HEALTH INDICATORS OF PEOPLE EXPOSED TO PCB CONTAMINATION AS RELATED TO ACCESS TO HEALTH CARE. *Eric G Brown and Jan Case and Christie Shelton, Dept. of Mathematics, Jacksonville State University, Jacksonville, AL 36265.*

A Monsanto plant in Anniston, Alabama manufactured PCBs from 1929 to 1971. Thousands of current or former Anniston residents sued Monsanto (now Pharmacia) in a landmark environmental case, and in 2002 the company was convicted of: negligence, wantonness, suppression of the truth, nuisance, trespass and outrage. Residents allege they developed various illnesses, including diabetes, osteoarthritis and cancer, because they were exposed to PCBs from the plant. The Center for Health Promotion of the UAB School of Public Health collected data in 2005 to study health impacts of the contamination. The purpose of the study is to give a community-wide description of the health status of people living in the city and to address concerns people may have about various health problems. The overall goal of the project is to learn more about the association of PCB exposure and the development of health problems. The instruments used to measure health status are the Brief Symptom Inventory and the QualityMetric SF-12v2 Health Survey – two of the most widely used tools for measuring patient-reported outcomes. The measures provide practical information about functional physical and mental health. This paper analyzes the data from the study in the context of access to health care.

A STATE OF EMERGENCY IN ALABAMA: PRISON OVERCROWDING. *Larry E. Spencer, Dept. of Sociology/Criminal Justice, Alabama State University, Montgomery, AL 36104.*

A review of the Alabama Department of Corrections August 2009 Monthly Statistical Report, Fiscal Year 2008 Annual Report, recent newspaper articles about the serious public safety issue of prison overcrowding within the state of Alabama, lack of funding, and correctional staff. It is imperative that the stakeholders take a restorative justice approach to offenders who commit nonviolent crimes or otherwise be prepared to release substantial numbers of violent inmates due to federal court intervention, expanding parole, and starting other types of early release programs. Violent offenders will pose a greater threat to the community. Correctional workers continue to be exposed daily to the risk of injury or death caused by severe prison overcrowding. The state could experience additional financial hardship to rebuild a destroyed correctional facility in an event of a riot. The excessive use of incarceration for nonviolent offenders is one of the most important issues facing the state of Alabama this decade.

BIAS BASED POLICING: COMPARING THE VIEWS OF MINORITY OFFICERS WITH NON-MAJORITY OFFICER VIEWS. *Ralph E. Ioimo, Justice and Public Safety, Auburn Montgomery, Montgomery, AL 36124.*

Bias-based policing is an issue that police departments all over the country are addressing. This research project surveyed officers from both urban and rural police departments throughout the Commonwealth of Virginia. Considering that, bias-based policing undermines relationships between the police and the public a considerable amount of research has been conducted to uncover and prevent the occurrence of bias-based policing. This past research has primarily focused on traffic stops to assess the level of bias-based policing. Very little research exists that assesses police views on bias-based policing and non that compares minority officers views with that of non-minority officers. This research project sought to broaden the approach to assessing the views of minority officers on bias-based policing and compare their views with their non-minority counterparts. The result of this research confirms that minority officers have a very different view than that of their non-minority counterparts, which proved to be statistically significant in all of the questions asked pertaining to biased-based policing. This presentation presents our findings for the Commonwealth of Virginia.

HARSH EARLY FAMILY ENVIRONMENT AND ITS EFFECT ON THE MENTAL AND PHYSICAL HEALTH OF CHILDREN AND ADULTS. *R. Bryan Kennedy, Susan Davis Herring, Susan Calhoun, Kimberly Bell, Michael Essary, Matthew Holland, and Linda Shonesy, Athens State University, Athens, AL 35611.*

Members of the mental health profession have long recognized and researched the devastating effect of stress on humans and well as members of the animal kingdom. This research has provided a large body of worthwhile information that has been utilized in stress management efforts. This paper explores some of this research and focuses primary attention on the relation of a harsh early family environment to the mental and physical health of children and its continuation into adulthood and throughout the individual's life span.

JUNGIAN PSYCHOLOGY AND THE TWELVE STEPS. *R. Bryan Kennedy and Maureen Chemsak, Athens State University, 300 N. Beaty Street, Athens, AL 25611.*

This presentation provides historical information regarding the influence of Dr. Carl Jung and Jungian psychology on Alcoholics Anonymous. Dr. Jung had twice attempted, unsuccessfully, to bring about a cure for the American Mr. Roland H. in the early 1930s. Unknown to Jung, Roland shared the counseling information with groups in the U.S. and the information became part of the early foundation of Alcoholics Anonymous. Jung was not aware of his influence on A.A. until six months prior to his death, when he received a letter from Bill W., one of the two founders of Alcoholics Anonymous.

MAPPING THE TABOO: OFFENSIVENESS OF IMAGES AND DISCOMFORT FOR WORDS AMONG RELIGIOUS FUNDAMENTALISTS. Amy Vosburgh, Ben Tate, Sara Blasingame, Larry Bates, and *Richard Hudiburg*, University of North Alabama, Florence, AL 35632.

Two studies are reported using the construct of religious fundamentalism based on Altemeyer and Hunsberger's (2004 Religious Fundamentalism Scale – Revised (RF-R) and responses to potential taboo stimuli. The first study used 96 university students to determine offensive of images. After completing the RF-R, participants viewed figures, computer displayed as silhouettes. Silhouettes were hypothesized to be neutral in offensiveness (8) and others somewhat offensive (12). The image presentation order was randomized and the silhouettes were also randomly displayed in four colors. Participants rated the silhouettes on a 0 to 9 scale of increasing offensiveness. Differences between the extreme thirds groups based on the RF-R: high fundamentalism (N=32) and low fundamentalism (N=32) were analyzed using ANCOVA with sex as the covariant. All images hypothesized to be offensive (taboo) were significantly rated more offensive by the high fundamentalism group. The second study used 160 university students to determine the rated discomfort to 24 religiously taboo or neutral images and 48 words. After completing the RF-R, participants gave subjective ratings of discomfort on a 1 to 6 scale of increasing discomfort to images and words. Discomfort ratings to images and words from the high RFs (N = 52) and low RFs (N = 52) were analyzed using MANCOVA. The high RFs rated significantly higher discomfort for all stimuli that were assumed to be taboo. Analysis of neutral stimuli revealed no RF group differences.

Behavioral and Social Sciences Poster Abstracts

ASSESSING TODDLERS' VERB COMPREHENSION IN VARYING SENTENCE CONTEXTS USING EYE GAZE. *Shayne Lawley Keyes* and *Brenda L. Beverly*, Dept. of Speech Pathology & Audiology, University of South Alabama, Mobile, AL 36688.

Toddlers' comprehension of nouns is facilitated by knowledge of the grammatical noun phrase, but an effect of sentence context on verb comprehension has not been shown. Twelve toddlers' eye gaze patterns were video-recorded to measure verb comprehension in 3 sentence contexts: grammatical morpheme –ing, ungrammatical morpheme –est, and nonsense –il. Children viewed split-screen video events for 6 verbs per context (e.g., Who is pushing?; Who is sleepest?; and Who is jumpil?). Results revealed toddlers' percentage of looking to targets for the –ing condition (M = 58%) was significantly better than chance (p = .037), unlike –est and –il (M = 52% and 53%, respectively). To explore children's sentence processing, percent looking to target verbs was computed in 4 time windows: words before the verb (Who is); the verb (throw); the morpheme (–ing, –est or –il) and

1 s silence following the sentence. A significant effect of window was found ($p = .035$). Looking to targets was significantly greater for window 4 compared to windows 1-3 (p values $< .05$). Children showed increased verb comprehension after processing the sentence. Although a main effect for condition was not found, children's looking to target verbs was significantly better than chance for grammatical -ing ($p = .033$), but not for -est or -il, in window 4. Toddlers' knowledge of morphemes in grammatical sentences emerges ahead of morpheme production and supports verb comprehension.

SELF-BP MONITORING, STAGE OF CHANGE, MEDICATION ADHERENCE, SELF-EFFICACY AND BLOOD PRESSURE CONTROL IN HYPERTENSION WORKERS *Tonya Breaux-Shropshire RN MPH COHC, University of Alabama School of Nursing; Kathleen C. Brown RN PhD, University of Alabama School of Nursing, NB 306A; 1530 3rd Ave. South; Birmingham AL 35294-1210.*

Purpose: According to the World Health Organization, hypertension is the leading cause of death in the world. It has been established that poor medication adherence is a major factor in uncontrolled BP. Although self-BP monitoring is highly recommended by the JNC 7 to improve BP control, it is not routinely recommended by healthcare providers. Further, information related to assessing hypertensive patients' readiness to engage in healthcare treatment is limited in the literature. There is also a gap regarding self-efficacy for medication adherence and BP control. The purpose of the study is to determine the best predictors for odds of BP control and to test whether adding self-BP monitoring improves the model. Theoretical Framework: The Transtheoretical Model (TTM), highly acclaimed in the field of health behavior, guided this investigation. Method: A convenience sample of hypertensive municipal workers was invited to participate during the Good Health Program Screen in Birmingham, Alabama. Self-administered questionnaires were completed. The Medication Adherence Self-Efficacy Scale, Morinsky Scale, Transtheoretical Model scale and Behavioral Risk Factor Surveillance System based questionnaire were used. Analysis: Multiple logistic regression analysis will be used. Implications: Stage-correlated interventions may achieve improved BP control in hypertensive workers.

SPOTLIGHT EFFECT AND RELIGIOUS FUNDAMENTALISM. *Trent H. Walters, Leif E. Hetland, Jessica M. Williams, Richard A. Hudiburg, and Larry W. Bates, University of North Alabama, Department of Psychology, Florence, AL 35632.*

The Spotlight Effect observed by Medvec and Savitsky (2000) is the tendency for people overestimate the amount of attention they receive from others. In the original study, participants overestimated the number of people that would notice them wearing a t-shirt with the image of Barry Manilow. In the current study, targets wore a t-shirt with a taboo image into a room of observers. Eight targets, consisting of four fundamentalists and four non-fundamentalists, were designated from the sample pool of 90 participants using a

thirds-split of the results from the Religious Fundamentalism Scale – Revised (Altemeyer & Hunsberger, 2004). The results show that most targets experienced the Spotlight Effect, overestimating the percentage of observers who noticed the t-shirt, but it was not confirmed that the Spotlight Effect was greater for fundamentalist targets as compared to non-fundamentalist targets. Additionally, there were no differences between fundamentalists and non-fundamentalists regarding attentional bias to the taboo image. Further research should include a larger sample size and more targets for observation.

Bioethics, History, and Philosophy of Science Paper Abstracts

CHIMPS & HUMANS IN RESEARCH: A HISTORICAL RETROSPECTIVE & EVOLVING ETHIC. *Lewis Barker, Department of Psychology, Auburn University Auburn, AL 36849.*

The use of humans and other primates in high-risk space-related research projects for NASA in the 1940s-1960s is described. An ethos for hazardous research involving humans and other animals evolved during the 1970s and 1980s, affording near complete protection of chimpanzees by 2000.

ETHICS IN AN AGE OF GENETIC ENGINEERING. *Jennifer A. Trobaugh, Dept. of Biological Sciences and Dept. of Psychology, Auburn University, Auburn, AL 36849.*

Germline genetic engineering is the genetic alteration of cells such that those changes are passed along to future generations. The genome can be changed through the replacement of a mutated gene with a healthy copy, by “knocking out” the mutated gene, or by introducing a new gene into the body. These genetic alterations can be achieved by inserting a gene into an egg cell or by inserting the chromosomes of one egg cell into an enucleated egg containing only mitochondrial DNA. Successful experiments altering the germ line of primates show that germline genetic engineering may be possible and feasible in humans in the future. However, germline genetic engineering brings up several unique ethical concerns as the effects of such genetic alterations would persist into future generations. The complexity of the ethical issues concerning germline genetic engineering must be met with flexibility and solutions appropriate to the complexity of the problems. Beauchamp and Childress have proposed four principles to serve as a basic framework for bioethical thought: the principles of autonomy, nonmaleficence, beneficence, and justice. These four principles lie at the core of many different moral systems, and while they do not form a sufficient moral system on their own, they provide a basis for judging some moral dilemmas emerging from modern biotechnologies including germline genetic engineering. Many thanks to Dr. Bradley for his constant support and encouragement.

GENETHICS: A COURSE ON 21ST C BIOTECHNOLOGIES AND ETHICS. James T. Bradley, Dept. Biological Sciences, Auburn University, Auburn, AL 36849.

Genethics examines the science of and ethical issues emerging from biotechnologies including reproductive and therapeutic cloning, gene therapy/enhancement, neuropharmacology, age retardation, nanobiology, synthetic biology, human genomics, using stem cells in regenerative medicine, embryo screening, assisted reproduction, and synthetic biology. Through directed reading, discussion, writing, and presentations, students grapple with bioethical dilemmas and attempt to apply principles of diverse moral systems (e.g. utilitarianism, deontological ethics, virtue ethics, communitarian ethics) to their solution. Students keep extensive journals including notes on a personal, hypothetical bioethical situation assigned to each of them at the beginning of the semester. (Example: You and your spouse wish to have a child related to one of you, but you are both infertile. Reproductive cloning is illegal in the United States, but is offered on an experimental basis in a foreign country. You are now researching what reproductive cloning is, what its success rate has been in animals, and sorting through your own feelings about whether to attempt having a child by cloning.) These situations facilitate student learning about specific biotechnologies and help to prepare them for real-life, bioethical decision-making in the 21st century.

HUMAN ODYSSEY AT AUBURN UNIVERSITY: TEAM-TEACHING AN INTERDISCIPLINARY CURRICULUM IN THE SCIENCES AND HUMANITIES. L. Barker, M. Escobar, R. Knight, and M. Mendonca. Auburn University, Auburn, AL 36849.

The Human Odyssey Program at Auburn University started 32 years ago as an interdisciplinary course that merges instruction from the perspectives of sciences and humanities. This interdisciplinary curriculum emphasizes different “ways of knowing,” as illustrated by the continued and often circuitous journey of how and what humans have known in different cultures throughout history. The main characteristic of the course is interdisciplinary team-teaching, in which two professors from different disciplines (sciences and humanities) lead an interactive, small-group discussion. The course is organized around a set of readings (mostly from original sources), with plenary sessions consisting of videos or guest lectures that reinforce the curriculum. The symposium will discuss the main characteristics of the Human Odyssey program, the development of the interdisciplinary curriculum, and the benefits and challenges of team-teaching such an interdisciplinary curriculum.

THE END OF SCIENCE. Gerard Elfstrom*, Dept. of Philosophy, Auburn University, Auburn, AL 36849-5210.

In recent years, there has been considerable discussion of whether science will come to an

end, not in the sense that humans will turn to other activities or become hostile to scientific investigation, but in the sense that the science will accomplish all its goals and thus be complete. That question does not arise when discussing history, literature, or philosophy. Hence, there must be something about scientific endeavor that allows for the possibility that scientists will achieve all their goals and go on to other activities. This paper will examine the issues of what features of scientific activity make this possibility of the completion of the sciences seem reasonable and that of whether there is any good reason to believe that scientists will ever be able to achieve it.

Biological Sciences Paper Abstracts

ACUITY AND SPECTRAL SENSITIVITY OF THE MIDLAND BANDED WATER SNAKE (*Nerodia sipedon pleuralis*) DETERMINED WITH VISUALLY EVOKED POTENTIALS. *Michael S. Loop*, Dept. of Vision Sciences, *Jack R. Wimbish*, Dept. of Biomedical Engineering, *Timothy J. Gawne*, Dept. of Vision Sciences, University of Alabama at Birmingham, Birmingham, AL 35294.

In prior studies, evoked potentials were recorded in anesthetized water snakes to stripes of different sizes (high contrast, counter-phased). Spatial resolution (acuity) was estimated as the smallest stripe size eliciting a response. Decreasing mean luminance decreased acuity as a two-part discontinuous function which, in other species, has been shown to reflect changing mediation from cone to rod photoreceptors. To explore the possibility of a duplex retina in water snakes, we determined spectral sensitivity on a white background (48cd/m²) that produced the highest spatial acuity and possible cone mediation. Thresholds at each wavelength were estimated as the least intense flash (300msec.) eliciting a response. Spectral sensitivity functions from four preparations showed an average peak sensitivity at 555nm (sd 54nm) with a 50% reduction in sensitivity (HHBW) across 46nm. Rod mediated spectral sensitivity is universally around 500nm so this visual response was based upon cones. The HHBW is much narrower than that of human L- and M- cones (ca 123nm). The reason for this is unclear but could be based upon cone opponency which is known to sharpen spectral sensitivity functions.

ANALYSIS OF FISH COMMUNITIES: RESULTS FROM STUDENT OBSERVATIONS. *George R. Cline*, *James R. Rayburn*, *Frank A. Romano III*, *Kelly D. Gregg*, and *Robert E. Carter*. Jacksonville State University, Jacksonville, AL36265. Fishes represent the taxon with the greatest diversity of species within the Phylum Chordata. As part of our Tropical Biology course, students were taught fish identification and field survey techniques. During the field portion of the course, students applied roving diver (snorkeler) surveys to identify fish at 11 sites along the Gulf Coast of Florida. These sites

included 2 freshwater sites, 4 estuarine sites and 5 marine sites. The abundance collected in this survey were collapsed into presence/absence data to reduce problems associated with duplication of counts (counting the same fish by multiple teams), and to accommodate future comparisons with previous surveys, and with other sites. One hundred and ten species were recorded during these surveys. Species richness ranged from 3-56 species. Two sites had very high species richness (Looe Key (56 sp) and Key West (50 sp)). Three sites had high species richness (25-25 sp) and the remaining sites had species richness ranging from 3-10 species. Principal Components Analysis was conducted on the presence/absence data. The first 4 PC's explained 79.2% of the variation in the data set. The first PC explained 39.4% of the variation and appeared to be a species richness component – all species were weighted nearly equally. PC2 explained 14.7% of the variation in the dataset. Once again, all species were weighted equally, but the signs varied, suggesting a complex series of contrasts among species. Three groups separated along the 1st PC based on species richness. Cluster analysis produced the same three groups of species.

ANT5-2 – A NOVEL ANTARCTIC BACTERIUM PROVIDES CLUE OF LIFE PROCESSES IN EXTREME COLD ENVIRONMENT TO POTENT ANTIMICROBIAL AND ANTICANCER AGENT. *Nazia Mojib* and *Asim K. Bej*, Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.

The dry and cold environment of Antarctic continent offers extreme challenges to all life forms including microorganisms, which are suitable candidates to study the cellular adaptive mechanisms in extreme cold and dry conditions. Also protection against long hours of solar radiation often requires them to produce metabolites that can absorb UV and visible light. In this study, we have characterized a psychrotolerant bacterium, Ant5-2 (*Janthinobacterium* sp.) from Lake P9 in Schirmacher Oasis. The 16S rRNA gene sequence, DNA-DNA hybridization and a panel of biochemical tests revealed Ant5-2 to be a previously undescribed species of genus *Janthinobacterium*. The continued and prolonged expression of a cold shock protein, Csp at -1 °C and 4 °C and production of copious amount of extracellular polymeric substances (EPS), suggest their possible role in cold adaptation. A potent antimycobacterial and anticancer agent, violacein-like purple violet pigment (PVP) was purified from Ant5-2. PVP inhibited the growth of both virulent and avirulent strains of *M. tuberculosis* in vitro. PVP also inhibited the growth of non-small cell lung cancer cells A549 in vitro by inducing both autophagy and apoptosis.

ANTIOXIDANT CONCENTRATION COMPARISON BETWEEN KUDZU AND COMMON FOOD SOURCES. *David Ponder*, and *Safaa Al-Hamdani* , Department of Biology, Jacksonville State University, Jacksonville, AL 36265.

Kudzu (*Pueraria montana* var. *lobata*) is a fast growing plant, well adapted to southern region of United States and has been suggested as an excellent phytoremediator of heavy

metals. One of the advantages of utilizing Kudzu in phytoremediation, is the ability to withstand wide range of heavy metal contaminates. This is due to its ability of Kudzu to synthesize a relatively high concentration of antioxidants. This study was designed to compare antioxidant concentration in Kudzu versus common food sources such as shiitake mushrooms (*Lentinula edodes*), spinach (*Spinacia oleracea*), and nori seaweed (*Porphyra yezoensis*). The results were shown Kudzu had significantly higher concentrations of total polyphenolic compounds concentration followed by in decreasing order Spinach, Seaweed, and Shiitake mushroom.

APOPTOSIS AND DIFFERENTIAL EXPRESSION OF BAX AND BCL2 IN RETINOID INDUCED DIFFERENTIATION OF LEUKEMIA CELLS. *William Love, Tyson DeAngelis, Caroline Watkins. Dept. of Biology, Univ. of Ala, Birmingham, AL 35294.*

A hallmark of cancer cells is their reluctance to undergo apoptosis. The Bcl2 family of proteins govern outer mitochondrial membrane permeabilization that leads to release of cytochrome c into the cytoplasm, which leads to activation of the caspases, which leads to apoptosis. Bcl2 proper is an anti-apoptotic member of this family that competes with Bax, a pro-apoptotic protein. Agents that alter this balance in the favor of apoptosis might have anti-cancer therapeutic value. All-trans retinoic acid (ATRA) induces differentiation in human leukemia cells and has had significant clinical success treating promyelocytic leukemia. However, the mechanisms by which retinoids exert their therapeutic effects are not completely understood. This study shows that in addition to differentiating human leukemia cells, ATRA reduced proliferation, and induced apoptosis. Further the level of Bcl2 expression decreases while the expression of Bax remained constant. This differential expression may be the mechanism by which ATRA restores the ability of the HL60 cells to undergo apoptosis. This renewed apoptotic capacity might partially explain the clinical success of ATRA.

DISTRIBUTION OF THE CONFEDERATE DAISY (*Helianthus porteri*) IN ALABAMA. *David M. Frings and L. J. Davenport Department of Biological and Environmental Sciences, Samford University, Birmingham, AL 35294.*

Helianthus porteri is documented in the literature as growing on granitic outcrops in the Piedmont Province of Georgia and extreme eastern Alabama. There are also scattered reports of populations in St. Clair County, Alabama, in the Valley and Ridge Province. This report compiles present knowledge of populations of *H. porteri* from both existing literature and extensive field reconnaissance by the authors. *Helianthus porteri* is found on xeric outcrops in two distinct areas of Alabama. Populations found on granitic plutons in the Piedmont Province of east Alabama are best documented in the literature. Recent field investigations also documented large populations of *H. porteri* near Penton in northern

Chambers County, at Flatrock Park on Harris Reservoir in Randolph County, and near the town of Almond in Randolph County. The field investigations also added new or poorly documented populations of *Helianthus porteri* in Shelby and St. Clair Counties in the Valley and Ridge Province. Populations occur along the southern exposures of sandstone in Oak Mountain State Park on Double Oak Mountain in Shelby County. An additional population occurs on Double Oak Mountain east of the park in road cuts along Old U.S. Highway 280 in the Narrows. This population is noteworthy because it grows at one of the lowest elevations (approximately 580 feet MSL) recorded during the study. Other populations observed in the Valley and Ridge Province grow above elevation 900 feet MSL. Additional populations are found in three locations in St. Clair County. These sites include Stragglers Point, Bald Rock Mountain, and Bolin Mountain. All populations of *H. porteri* found in the Valley and Ridge Province occur on Pennsylvanian age sandstone of the Pottsville Formation

EFFECT OF ASCORBIC ACID ON WEIGHT GAIN AND ORGAN PRODUCTION IN JUVENILE *LYTECHINUS VARIEGATUS*. Warren T. Jones, Laura E. Heflin, Victoria K. Gibbs, Mickie L. Powell, Addison L. Lawrence(1), and Stephen A. Watts. UAB, Birmingham, AL 35294; (1)Texas A&M Univ. System, Port Aransas, TX 78373.

Nutritional supplementation in formulated feeds is an integral part of the aquaculture industry. We are currently researching the dietary requirements of the variegated sea urchin, *L. variegatus*. Ascorbic acid is an essential micronutrient in the diet of most animals, synergistically functioning as an antioxidant with alpha-tocopherol and selenium. Juvenile sea urchins (ca. 0.08 g) were raised in the laboratory and fed one of eight semipurified feeds with the following amounts of ascorbic acid for 10 weeks: 7, 19, 31, 49, 66, 126, 244, 422, and 600 mg ascorbic acid/kg feed. Under the conditions of this study, there were no significant differences in wet weight gain (ANOVA, $p > 0.05$). Additionally, there were no significant differences in test, lantern, gut, or gonad dry weights among treatments under the conditions of this study (ANCOVA, $p > 0.05$). This study suggests that ascorbic acid may not be required in the diet of juvenile *L. variegatus*, and may be produced endogenously. Further studies are needed, as ascorbic acid may have important roles in sea urchins that do not directly affect weight gain. These studies were supported in part by the Mississippi-Alabama Sea Grant Consortium.

EGCG INHIBITION OF NEOPLASTICALLY TRANSFORMED HUMAN MAMMARY EPITHELIAL CELL PROLIFERATION IS ACCOMPANIED BY ALTERATIONS IN METHYLATION PATTERN OF hTERT. Tyson DeAngelis, William Love, and Caroline Watkins, Dept. of Biology, Univ. of Ala, Birmingham, AL 35294.

We sought to determine whether transformed HMECs at two different time points over the course of transformation would respond differently to treatment with the dietary polyphenol,

(-)-epigallocatechin-3-gallate (EGCG), given that EGCG has been shown to affect epigenetic pathways. Here we report for the first time the epigenetic modifications occurring along the hTERT promoter in HMECs during the course of a neoplastic transformation. Using a defined genetic element transformation process, we found that progressive changes in DNA methylation occur along the hTERT promoter. Our results indicate that EGCG treatment of cells at the earlier time point had more of an effect on cell viability than cells at a later time point. We believe that this differential response to EGCG treatment is due to an increase of epigenetic aberration over the course of transformation. This study provides a novel look at the early epigenetic modifications of breast tumorigenesis. Studies of this kind could help to elucidate new therapeutic targets for breast cancer treatment and/or prevention that would go unnoticed in fully developed cancers.

ELEVATIONAL CHANGES IN COMMUNITY COMPOSITION IN MONTANE LONGLEAF PINE FORESTS, OAK MOUNTAIN STATE PARK, ALABAMA.
Ruth A. Hauks and Scot Duncan, Biology Dept., Birmingham-Southern College, Birmingham, AL35254.

Longleaf pine (*Pinus palustris*) forests once covered 37 million hectares but have since been reduced to 3% of the original range due to land conversion, logging, and fire suppression. The montane longleaf pine forest is among the least well known of the longleaf communities. Studies throughout the world have shown that elevation plays an important role in community composition. We sought to determine how elevation affects longleaf community composition within two elevational gradients in Oak Mountain State Park, Pelham, Alabama. The longleaf forests of Double Oak Mountain have endured many decades of fire suppression and extensive logging between the 1930s and 1960s. Twenty-six 20x50m plots were established, 13 on the mountain's slopes and 13 on the peaks of the neighboring foothills. Within each plot, the species and diameter at breast height of adults and basal diameter of juveniles of all trees were recorded. Regression analyses related frequency and size data to elevational data taken from GPS and topographic maps. Preliminary results suggest that several species show significant relationships with elevation but directionality varies among species and age groups. It is hoped that these findings will aid in the planning of longleaf preservation and restoration strategies.

ENERGY ALLOCATION FOR EGG PRODUCTION DURING STARVATION IN SYMPATRIC CRAYFISH, *Procambarus clarkii* and *P. acutus acutus*. *Mickie L. Powell and Stephen A. Watts, Department of Biology, UAB, Birmingham, AL 35294-1170.*

The range of *Procambarus clarkii* and *P. acutus acutus* across North America varies in climate and nutrient availability. One species will usually dominate where their ranges overlap. We hypothesize reproductive strategies may influence species success. *P. clarkii* produces large numbers of small eggs, favoring conditions of high food abundance and stable climate, *P. acutus acutus* produces small numbers of larger eggs better adapted

to climates where nutrient flow is pulsed, energy input is low, and conditions are not predictable. We examined production and energy content of eggs extruded under ad libitum and starvation conditions for both species. Crayfish were removed from ponds at the end of the growing season (May). They were held individually in recirculating raceways and starved or fed ad libitum and monitored for egg production. Extruded eggs were removed from the pleopods, freeze dried, and counted. Energy content was determined by bomb calorimetry (n=10/treatment). Nutritional state did not affect the energy content of the eggs for either species. Energy content and size of eggs extruded by *P. acutus acutus* was twice that for *P. clarkii* eggs (0.019 vs 0.010 kcal/egg respectively). Nutritional state did not affect the number or energy content of eggs extruded by *P. acutus acutus*. *P. clarkii* extruded a significantly greater number of smaller eggs compared to *P. acutus acutus*, regardless of the nutritional state.

EVOLUTIONARY AND CONSERVATION IMPLICATIONS OF MATERNAL INFLUENCE ON EGG SIZE AND HATCHLING FITNESS IN THE MISSISSIPPI DIAMONDBACK TERRAPIN (*Malaclemys terrapin pileata*). Andrew Coleman, Thane Wibbels, Ken Marion, and Yu-hui Huang, Dept. of Biology, Univ. of Ala. Birmingham, Birmingham, AL 35294. John Dindo, Dauphin Island Sea Lab, Dauphin Island, AL 36528. Nicole White, Birmingham Southern College, Birmingham, AL 35254.

Throughout their range, populations of diamondback terrapins, *Malaclemys terrapin*, are experiencing declines from historic levels. Along the Gulf Coast of Alabama, only isolated remnant aggregations currently exist. To address high amounts of nest predation by raccoons, which represent a major threat, a head starting program was initiated. Obtaining hatchlings have offered an opportunity to further study terrapin biology, including relationships between female physiology and hatchling physiology and fitness. In the summer of 2009, twelve clutches (average of 7.75 eggs/clutch) were obtained from females that subsequently were measured, weighed, and tagged. The length, width, and mass of every egg were measured. After hatching, carapace length and width, plastron length, and mass of every hatchling were measured once a week. Each clutch was fed until satiation several times a week. Effects of female age and size on egg size and hatchling growth were examined. Rate of hatchling growth was treated as an indicator of hatchling fitness, but other potential indicators were also evaluated. So do larger or older females produce more fit hatchlings? Different hypotheses have been posed explaining female reproduction strategies and will be discussed. In addition, this evolutionary question has obvious conservation implications for populations facing extirpation. Funding was provided by ALDCNR.

EXPANDED COLIFORM SAMPLING OF FOUR PERRY LAKES PARK AQUATIC ENVIRONMENTS. Katherine Elyse McIntyre, Judson College. Thomas Wilson, Biology Department, Judson College, Marion, AL 36756. Christine Sestero, Medical - Immunology/Rheumatology Department, University of Alabama at Birmingham, AL 35294.

Coliform bacteria colony populations from Perry Lakes Park have been studied at Judson College for many years. The main sources of coliform bacteria are wild and domestic animals, including humans. Coliform bacteria are a normal part of the microflora and are usually harmless unless their populations exceed normal ranges. If the levels of coliform bacteria are too high, the water is considered to be contaminated. Data was obtained by using a Hach sensION156 meter that recorded temperature, time, date, dissolved oxygen levels, pH and percent of saturation. Weekly samples of two Perry Lakes Park oxbow lakes and two creeks produced coliform counts within normal ranges. Probability values (P-values) were used in statistical data analysis to find the following P-values: Dissolved oxygen (0.0199), pH (1.4820), coliform bacteria colonies (0.0311), and total bacteria colonies (0.0345). When compared to the other collection sites, Perry Lake had the highest coliform counts. The P-values for significance of Perry Lake's total bacteria colony counts compared to the other collection sites are as follows: Covered Bridge Creek (0.0738), Middle Lake (0.0215), and Cottonmouth Creek (0.6548).

FACTORS LEADING TO CANNIBALISM IN *Lytechinus Variegatus* (ECHINODERMATA: ECHINOIDIA) IN THE LABORATORY. Cristina M. Richardsou, UAB, Birmingham, AL 35294. John M. Lawrence, University of South Florida, Tampa, FL 33620. Stephen A. Watts, UAB, Birmingham, AL 35294.

With fisheries declining worldwide, intensive sea urchin culture has been proposed. For urchins in commercial culture, any factor that affects survivorship negatively should be addressed to maximize cost benefit. One potential obstacle to optimizing culture of sea urchins is cannibalism. Approximately 2000 adult and juvenile *Lytechinus variegatus* (1g-45g) were collected from Port Saint Joseph Peninsula State Park, FL over the course of five collection trips between June and September 2009. Urchins were held in recirculating tanks at different sizes, densities, and feeding regimes for 4 weeks. Starved, high density conditions contributed to the highest level of cannibalism among small (12-21g) urchins (percent cannibalism = 18.8%), whereas fed, high density conditions contributed to the highest level of cannibalism among large (32-37g) urchins (percent cannibalism = 18.4%). These results suggest that (1) small urchins cannibalize at higher rates than larger urchins, and (2) increased density is an important contributing factor leading to cannibalism. Although stress cannot be easily quantified in sea urchins, we hypothesize increased stress caused by increased contact at high densities can lead to increased cannibalism and decreased growth rates, even when food is not limiting. From an aquaculture standpoint, it is important to determine those factors that contribute to the incidence of cannibalism in *L. variegatus* so that the appropriate culture conditions can be maintained to reduce the incidence of cannibalism.

FIRE SUPPRESSION AND ECOLOGICAL SUCCESSION IN MONTANE LONGLEAF PINE FORESTS, OAK MOUNTAIN STATE PARK, AL. Michelle Maciejewski and Scot Duncan, Biology Dept., Birmingham-Southern College, Birmingham, AL 35254.

Longleaf pine (*Pinus palustris*) ecosystems once dominated the Southeast but now occupy 3% of their original range. *P. palustris* is a shade-intolerant, poor competitor relying on fire to suppress fire-intolerant competitors. Found within the uplands of Alabama and northwest Georgia, the montane longleaf is among the rarest of the longleaf community types. There have been no intensive studies published on succession in these ecosystems and little is known of how topographic variation within the montane system affects responses to fire suppression and logging. We assessed the successional status of the montane longleaf pine forests at Oak Mountain State Park, Pelham, Alabama. The park's forests were logged in the mid-twentieth century and have endured many decades of fire suppression. Twenty-six 20x50m plots were established on the southeast-facing slopes of Double Oak Mountain and adjacent foothills where longleaf still remains. Trees over 1.3m tall were identified and measured (diameter at breast height); trees <1.3m tall were identified and measured (basal diameter) in plots or subplots. Population trends were analyzed to determine whether species were members of the original longleaf community, invading species establishing soon after the advent of logging and fire suppression, or invading species appearing recently. Preliminary results suggest the mountain slope community has been invaded less than the foothills community, suggesting topography should be a major consideration in conservation strategies for montane longleaf forests.

GREENROOFS IN THE SOUTHEAST: DIVERSIFYING PLANT SELECTION AND IMPROVING PERFORMANCE. *Julie G. Price* and *Stephen A. Watts*, Dept. of Biology, Univ. of Ala. at Birmingham, Birmingham, AL 35294. *Jason T. Kirby* and *Robert W. Peters*, Dept of Civil, Construction, and Environmental Engineering, Univ. of Ala. at Birmingham, Birmingham, AL 35294. *Amy N. Wright*, Dept. of Horticulture, Auburn Univ., Auburn, AL 36849.

Green roofs are engineered ecosystems that rely on insulation and evapotranspiration from the substrate and vegetation to provide benefits such as extended life span of roof membranes, reduced stormwater runoff, and improved thermal performance of the building. Roofs represent a distinctly harsh urban habitat in which plants must withstand temperature extremes, high light intensities, strong winds, and shallow soils that are frequently under drought during intervals between rain events. Twenty-one species were planted 15 October 2009 on the roof of Campbell Hall on the UAB campus in 1.2-m x 1.2-m x 0.15-m deep mini-roof systems containing 10 cm of green roof substrate. All species are exposed to irrigated and non-irrigated conditions and will be harvested Fall 2011. Plant performance is evaluated by measuring initial and final shoot dry weight as well as plant survival and two-dimensional canopy coverage each month. Winter 2009-2010 had the most consecutive days on record with temperatures below 3.9°C, and rainfall from October through December was significantly above average. Species that survived to 8 March 2010 included *Antennaria plantaginifolia*, *Bouteloua curtipendula*, *Coreopsis auriculata*, *Eryngium yuccifolium*, *Phlox bifida*, *Sedum album*, *Sedum rupestre*, and *Sedum spurium*. Shoot growth has been greatest in *Sedum album*.

LANTERN RESPONSE TO NUTRIENT AVAILABILITY IN THE SEA URCHIN *Lytechinus variegatus*. Laura E. Hefliu, Victoria K. Gibbs, Mickie L. Powell, Addison L. Lawrence¹, John M. Lawrence² and Stephen A. Watts UAB, Birmingham, AL 35294; ¹Texas A&M Univ. System, Port Aransas, TX 78373; ²University of South Florida, Tampa, FL 33620.

Lytechinus variegatus (20 g wet weight) were fed formulated feeds with eight different protein (ranging from 12 to 36%) and carbohydrate (ranging from 21 to 39 %) levels, with P:E ratios ranging from 39 to 96 mg P/Kcal. For each sea urchin (n = 8 per treatment), a limiting ration of 1.5% of average body weight was proffered daily. Survival was 100% in all treatments. After 9 weeks, total dry matter production was directly related to dietary protein levels ($r^2 = 0.87$) and, to a lesser extent P:E ratio ($r^2 = 0.79$). Test dry matter production was lowest in individuals fed low protein (12%) diets. Aristotle's lantern dry matter production did not significantly ($P < 0.05$) vary with nutritional composition of the diets. However, trend analysis indicated that Aristotle's lantern index (dry lantern/total dry weight) was inversely correlated with protein level ($r^2 = 0.96$) and P:E ratios ($r^2 = 0.87$), with less relation to energy level ($r^2 = 0.82$) and no relation to carbohydrate level ($r^2 = 0.08$), suggesting protein is a primary determinant of the relative size of the Aristotle's lantern under the conditions of this study. These data suggest that there is a differential allocation of resources when dietary protein is limiting and Aristotle's lantern is affected by availability of dietary nutrients.

***Lentinula edodes*: FUNGUS WITH POTENTIAL ANTIMICROBIAL PROPERTIES.** Kaur H., Nyochembeng L.M. and Mentreddy S.R, Department of Natural Resources and Environmental Sciences, Alabama A&M University, P.O. Box 1208, Normal, Alabama, 35762.

Organic farming is one of the fastest growing segments of agriculture in the United States and plant disease control in this system is a significant challenge to growers. This study was conducted to determine the antimicrobial potential of shiitake mushroom mycelial leachate. Shiitake strains used in the study were obtained from the American Type Culture Collection (ATCC) and maintained in the laboratory on YUMBSA media. Mycelial leachate was produced by growing shiitake spawns on sawdust supplemented with YUMBSA broth in plastic culture containers for 45 days. Thereafter, about 100 ml distilled water was added to each culture container and maintained for one week at room temperature. The flooded cultures were decanted and the leachates were lyophilized in order to prepare various concentrations for antimicrobial tests on *Xanthomonas campestris* pv *vesicatoria* (causative organism of bacterial spot of pepper and tomato) and *Clavibacter flaccumfaciens* pv. *flaccumfaciens* (causative agent of bacterial wilt in bean) in vitro. *Lentinula edodes* mycelial leachate successfully inhibited the growth of bacteria even at very low concentrations. Our results show that shiitake mycelia produce potent antimicrobial compound/compounds which could potentially be used to control bacterial

diseases in organic agriculture. Future work will involve the systematic isolation and quantification of the active compound/compounds involved in antibacterial activity.

MODULATION OF TRPV4 CALCIUM ENTRY BY CYTOSKELETAL TENSION.
A.Mayer, M. Mouner, P.Boothe, M.Hashizume, and J.C. Parker, Dept.of Physiology, University of South Alabama, Mobile, AL 36688.

Our laboratory has previously demonstrated that the transient receptor potential vanilloid 4 (TRPV4) non-selective cation channel initiates calcium entry and increased permeability in ventilator induced lung injury. TRPV4 is gated by mechanical stretch, arachidonic acid metabolites, heat and the synthetic phorbol ester, 4 α -phorbol 12,13-didecanoate (4 α PDD). We hypothesized that calcium entry through TRPV4 channels is modulated by cytoskeletal tension during mechanical stress in rat pulmonary microvascular (RPMVEC) and pulmonary artery (RPAEC) endothelial cells. Cells were grown to confluence in coverslip chambers, loaded with fluo-4 dye, and cytosolic calcium transients measured after addition of 4PDD using a Perkin-Elmer spinning disc confocal fluorescence microscope. After 4 α PDD cytosolic Ca⁺² in RPMVEC increased to 2.2 \pm 0.3 times baseline, reached a peak at 36 \pm 10 sec. after adding the drug and the Ca⁺² increased decayed with a T_{1/2} of 65 \pm or 15 sec. However, the Ca⁺² response was completely blocked by 10 μ M ML-7, a myosin light chain kinase inhibitor and removal of calcium from the media. These data indicate a novel role of active actin-myosin tension on the cytoskeletal elements in regulating calcium entry through the TRPV4 stretch-activated cation channels. Supported by NIH grant HL092992.

N-acetyl-L-CYSTEINE PROTECTS FROG EMBRYOS AGAINST ACRYLAMIDE-INDUCED MALFORMATIONS AND MORTALITY. *James R. Rayburn¹ and Mendel Friedman², Biology Department, Jacksonville State university¹, ARS-USDA Western Regional Research Center².*

N-acetyl-L Cysteine Protects Frog Embryos against Acrylamide-Induced Malformations and Mortality. Previous studies with the Frog Embryo Teratogenicity Assay (FETAX) demonstrated that acrylamide, a compound present in processed plant-derived foods such as bread crust and potato fries, is a teratogen. Other studies showed that administration of acrylamide during organogenesis produced maternal and developmental toxicity in mice and maternal, but not developmental, toxicity in rats. The objective of the present study was to determine if N-acetyl-L-cysteine could be used to reduce acrylamide toxicity and teratogenicity. To accomplish this objective, we investigated the effect acrylamide alone and then the effects of N-acetyl-L-cysteine on mortality, malformation and embryo length induced by select concentrations of acrylamide. We determined that the experimental 96-hr LC50 (concentration that kills 50% of the embryos) of acrylamide alone was equal to \sim 0.0024 M. The corresponding value for EC50 (concentration that induced terata in 50% of the embryos) equaled to \sim 0.008 M. The teratogenic index (TI) value equaled to \sim 3.0. These results confirm that acrylamide is strong frog embryo teratogen. We then selected

conditions that induced 100% malformations and mortality to test the anti-teratogenic potential of N-acetyl-L-cysteine. The data indicate that N-acetyl-L-cysteine protected the embryos against acrylamide induced malformations and mortality. These results suggest that N-acetyl-L-cysteine has the potential to protect fetuses of against acrylamide-induced malformation; and demonstrate the potential utility of FETAX for determining protective effects of other dietary ingredients against acrylamide toxicity.

PHOTOPERIOD EFFECT ON HATCHABILITY AND HATCHING TIME OF NORTHERN BOBWHITE QUAIL (*Colinus virginianus*) STRAINS. Jumbo Wisconsin and Georgia Giant. Caroline Price and Thomas Wilson, Dept. of Biology, Judson College, Marion, AL 36756. George Williams, Dept. of Chemistry, Judson College, Marion, AL 36756.

There is evidence that light plays a role in hatchability and hatching time of avian eggs. This experiment compares the effects of egg incubation under constant darkness and under a 20 watt fluorescent plant and aquarium bulb. Two strains of Northern Bobwhite Quail were used per trial to determine if there were any variations in hatchability and hatching time among the strains. When hatching times of the two strains were compared in both light treatment and dark control using the Kruskal-Wallis test, there was significant difference. A p value of 0.005736 was obtained when comparing strains in the dark control and a p value of 0.025 was generated for the light treatment incubation. Within each strain, p value was measured between light treatment and control hatching times also using the Kruskal-Wallis test. The "Georgia Giant" light treatment versus control comparison generated the p value of 0.000088, but the "Jumbo Wisconsin" light treatment versus control comparison generated the p value of 0.62. Overall, 24% greater hatchability was obtained in the control incubation than in the light treatment incubation. The helpful advice given by Moore's Gamebird Farm of Hamburg, AL, and Statistics professor Mr. Brett Stiefel is much appreciated.

PHOTOSYNTHETIC PIGMENT CONCENTRATION PATTERN THROUGHOUT THE YEAR IN SELECTED EVERGREEN AND DECIDUOUS SHRUBS. Walid Chacon, and Safaa Al-Hamdani, Department of Biology, Jacksonville State University, Jacksonville, AL 36265.

This study was designed to evaluate and monitor the photosynthetic pigment accumulation in four selected species during late summer, fall and winter. The selected species were Oleander (*Nerium oleander*), Anise (*Illicium sp.*), Chaste Tree (*Vitex agnus-castus*) and Butterfly Bush (*Buddleja Americana*). The chlorophyll a concentration gradually declined as the cold temperature advanced in the colder winter. A similar pattern was shown for chlorophyll b. The highest chlorophyll accumulation was obtained from Butterfly bush followed in decreasing order by Oleander, Anise, and chaste tree. All the selected plant species maintained similar chlorophyll a to b ratio throughout the examined period. Carotenoids concentrations were very similar to the chlorophyll accumulation in the old

species. The highest significant carotenoid was obtained from the Butterfly bush followed by Anise. However the Butterfly Bush plant was similar in carotenoids accumulation to the chaste Tree. This order was true for the concentration of flavonoids including anthocyanin. The highest photosynthetic rate was obtained from Oleander and Chaste Tree whereas Butterfly Bush Anise was shown significantly low rate.

POPULATION GENETIC VARIATION IN MID-WESTERN AND GREAT PLAINS WALLEYE AND SAUGER. Jiangquan Zhu, Neil Billington, Jamie McDaniel, Sirisha Bethala, Janet Gaston, Mahmoud H. Alami, and Houda El Brak, Dept. of Biological and Environmental Sciences, Troy Univ., Troy, AL 36082.

Walleye (*Sander vitreus*) and sauger (*S. canadensis*) are large predatory, North American percid fishes that are common in the Mid-west and Great Plains of North America. These two species are heavily managed by fisheries agencies because they are popular with anglers, so information on their population genetic structure will be useful in their management. Genetic variation was screened by cellulose acetate gel electrophoresis in 1270 walleye from 13 populations and 1023 sauger from 12 populations. Three polymorphic loci were surveyed in walleye, esterase (*EST*), malate dehydrogenase (*mMDH-3*), and general muscle protein (*PROT-3*), while two polymorphic loci were surveyed in sauger, esterase (*EST*) and super oxide dismutase (*SOD-2*). Highly significant among population heterogeneity was found for both walleye and sauger. Several populations showed significant deviations from Hardy-Weinberg expectations for walleye at *mMDH-3*, and *PROT-3*, and for sauger at *EST* and *SOD-2*, all of which were due to heterozygote deficits. Because samples were mostly collected during the summer or fall, when walleye and sauger are highly mobile, rather than during their spring spawning period when both species exhibit philopatry, such Hardy-Weinberg deviations were likely due to the Wahlund effect. It is likely that walleye and sauger populations that are genetically distinct also exhibit local adaptations. Therefore, fisheries managers are encouraged to manage these populations separately and avoid transferring fish among them.

POPULATION GENETICS OF BALD CYPRESS IN SOUTHEASTERN ALABAMA. Puja Shrestha, Zach Heath, Michael W. Morris, and Neil Billington, Dept. of Biological and Environmental Sciences, Troy Univ., Troy, AL 36082.

Bald cypress (*Taxodium distichum*) is a long lived, deciduous, wetland species that is commonly found in swamp forests of the southeastern United States. This study examined genetic variation among bald cypress populations in southeastern Alabama in order to determine their population structure. Leaf samples were collected from eleven populations of bald cypress from southeastern Alabama; 12-24 trees were sampled from each population. A pond cypress population from Houston County, Alabama was used as an out-group in genetic distance analysis. One bald cypress population, at the Troy University Arboretum, had been established with trees from a tree farm in Madison, Florida. Proteins were

extracted from leaf samples with plant grinding buffer and separated by electrophoresis on cellulose acetate gels with a Tris Glycine buffer system. Eight enzyme systems were screened revealing 14 loci, of which 10 were polymorphic in bald cypress and 11 in pond cypress. The percentage of polymorphic loci in bald cypress was 71.4%, the mean number of alleles was 1.92, and mean heterozygosity was 0.182. The introduced Troy Arboretum population was fixed for a -100 allele, at *AAT*, which was not found in the native southeastern Alabama populations. This information on genetic structure of bald cypress populations has provided information that is important for their genetic conservation and management.

PRELIMINARY DEVELOPMENTAL TOXICITY AND COMPARISON OF THE TARANTULA SPECIES, *Grammostola rosea* and *Haplopelma lividum*, ON EMBRYOS OF *Xenopus laevis*. Kristin Shirey, Sunde Jones, and James Rayburn, Biology Dept., Jacksonville State University, Jacksonville, AL 36265.

Tarantulas are the largest spiders in the world. As they become more common in the pet trade, questions about the effects and components of their venom have arisen. Many types of venom are known to contain toxins which have pharmacological actions. However, the exact mode of action of tarantula venom is unknown. A group of researchers have isolated a single 36-residue peptide, ω -grammotoxin SIA, from the crude venom of *Grammostola rosea*. This peptide is shown to block various ion channels, including, Ca²⁺ channels, which decreases the duration of action potential. To obtain the venom for the experiment, the tarantulas were anesthetized using carbon dioxide. The tips of the fangs were placed into a vial and electric stimulation was applied at their fang base to stimulate venom flow. The venom was stored at -20°C until used. We performed a 96hr test with petri dishes with 20 embryos in each dish. Venom concentrations ranged from 0-0.2% (v/v). We recorded the mortality and the data was analyzed with PROBIT analysis using Tox tools. We were able to generate a 96 hr embryo LC50 and EC50 for both species. The *Grammostola rosea* venom had an approximate 96 hr LC50 of 0.044% (v/v) and an EC50 of 0.029% (v/v). It also showed a consistent spinal malformation and reduction of embryo growth. The *Haplopelma lividum* venom had an approximate 96hr LC50 of 0.06% (v/v) and an EC50 of 0.091% (v/v).

PRELIMINARY INTERACTION STUDY EFFECTS OF WARFARIN AND CAFFEINE ON THE EMBRYOS OF *Xenopus laevis*. Sunde M. Jones, Kristin D. Shirey, George R. Cline, Mark E. Meade, James R. Rayburn, Department of Biology, Jacksonville State University, Jacksonville, AL 36265.

Coumadin also known as warfarin is a medication that is used as an anticoagulant to prevent strokes and heart attacks. Coumadin also prevents blood clots from forming in the veins and lung of humans. Caffeine is an ingredient that is present in many drinks. For example, caffeine is located in Coca-Cola and Pepsi products as well as hot drinks like coffee and tea. These chemical compounds are known to affect both humans and aquatic animals. The objective of this research is to identify the interactions that alter the

toxicity and determine the toxicity effects of the pharmaceuticals Coumadin and Caffeine on *Xenopus laevis* when combined together. *Xenopus laevis* embryos are a standardized test organism for testing developmental toxicity in both human and environmental health. A Standardized Frog Embryo Teratogenesis Assay (FETAX) was used to determine the 96 hr LC50, EC50 malformation and Teratogenic Index (TI) of the two medications. Each test concentration had 2 or 4 replicates per concentration with 20 added embryos at small cell blastula stage to each dish. Each day dead were recorded and solutions were changed. The results indicated a significantly higher malformation and death rate in the dishes containing both Coumadin and Caffeine. Caffeine alone gave the highest malformations compared to Coumadin.

ROAD - KILL SURVEY OF ALABAMA RED - BELLIED TURTLES ON THE MOBILE BAY CAUSEWAY - IX. *David H. Nelson*, Department of Biology, University of South Alabama, Mobile, AL 36688 and *Cynthia Scardamalia-Nelson*, Providence Hospital, Mobile, AL 36608.

A systematic, road-kill survey was conducted on the Mobile Bay Causeway (US 90, 98) from April 2001 to December 2009 to assess the numbers of Alabama red-bellied turtles (*Pseudemys alabamensis*) that were killed by automobile traffic. A total of 603 of the endangered, Alabama red-bellied turtles was recorded over the nine-year study: 454 hatchlings, 132 adult females (most gravid), 13 juveniles, and 4 males. A majority of the hatchlings (96%) over-wintered in their nests to emerge during the following springs (March-May). Mortality of adult females was greatest during nesting seasons: May, June, and July. Each year, from 5 to 34 nesting females (mean = 14.7, most gravid) were killed by vehicular traffic on the highway. Because of the limited availability of favorable nesting sites in the lower Mobile delta, each year some gravid females are attracted to elevated roadsides where they deposit eggs (and may incur mortality). In 2008, sections of chain-link fencing (totaling 4.1 km [2.6 miles]) were financed and installed by the Alabama Department of Transportation to reduce roadway mortality of turtles along the eastern causeway. Since the construction of the fencing, turtle mortalities have declined significantly: from a total of 109 in 2007, to 28 in 2008, to 21 in 2009. The weekly monitoring of the fences and turtle mortalities is continuing. Research funding was provided by the Alabama Department of Conservation and Natural Resources: Division of Wildlife and Freshwater Fisheries and the U. S. Fish and Wildlife Service.

STUDY OF THE MICROBIAL DIVERSITY IN A NEWLY DISCOVERED EAST ANTARCTIC FRESHWATER LAKE L27C USING BOTH CULTURE-INDEPENDENT AND CULTURE-DEPENDENT METHODOLOGIES. *Jonathan P. Huang* and *Asim K. Bej*, Department of Biology, University of Alabama at Birmingham, Birmingham, AL 35294.

Due to the extreme conditions found in terrestrial Antarctica, there has been very little to no information about the diversity and distribution of microorganisms in different freshwater lakes located in Schirmacher Oasis in East Antarctica. The objective of this study was to assess the microbial biodiversity and distribution using culture-independent and culture-dependent methodologies based upon bacterial 16S rRNA gene and *rpoB* gene analyses on a newly discovered freshwater land-locked lake L27C. Direct culturing on R2A media exhibited a variety of microbes including: *Janthinobacterium*, *Hymenobacter*, *Sphingomonas*, *Subtercola*, *Deinococcus*, *Arthrobacter*, and *Duganella*. While culture-independent methodology of the land-locked lake L27C identified a rich microbial diversity consisting of six different phyla of bacteria. The majority of bacteria (56%) belong to the Class γ -proteobacteria within the phylum Proteobacteria. Within the Class γ -proteobacteria, *Acinetobacter* dominated (48%) the total microbial load. Characterizations of the microbial diversity using both culture-dependent and culture-independent methodologies with different genetic markers are important because these characterizations give a fuller understanding on the community structure and survival mechanisms of microbes found in freshwater Antarctic lakes.

SURVIVAL OF WHITE-TAILED DEER FAWNS AT FORT RUCKER, ALABAMA.
Angela M. Jackson and Stephen S. Ditchkoff, School of Forestry and Wildlife Sciences, Auburn University, AL 36849.

In the last 40 years, coyote (*Canis latrans*) populations have increased substantially in the Southeast. Significant changes in the predator community will potentially affect juvenile survival of white-tailed deer (*Odocoileus virginianus*). Recent studies indicate that coyotes are affecting population dynamics of white-tailed deer and Fort Rucker, Alabama has noted a decrease in the white-tailed deer population which may be attributed to low rates of juvenile survival. Using techniques to monitor fawns from birth until transition into the adult age class, we examined age- and sex-specific rates of mortality of white-tailed deer fawns at Fort Rucker. First year results indicated that juvenile recruitment at Fort Rucker was below 20%, with only one of six individuals surviving to six months of age. All five deaths occurred between 21 and 41 days of age; an age when white-tailed deer fawns are particularly vulnerable to predation due to increased activity without the ability to outrun predators. Mortality on all accounts was caused by probable or definite coyote predation. We also monitored doe survival; three of nine captured does died of disease, poaching, or unknown causes.

SYSTEMATICS OF THE TENNESSEE RIVER ENDEMIC BLENNY DARTER
Etheostoma blennius. Logan S. McDaniel, W. Patrick McKinney, Damien J. Simbeck and Jeffery M. Ray Dept. of Biology, Univ. of North Alabama, Florence, AL 35632.

The blenny darter (*Etheostoma blennius*) is a non-game riverine species distributed in

tributaries to the Tennessee River in Tennessee and Alabama. Morphological analyses have identified two subspecies, a widespread nominal form and *E. b. sequatchiense*, from the Sequatchie River, with intergrade populations from the Elk River system and Second Creek. In addition, a detailed phylogeographic study on the greenside darter indicated a close relationship with the blenny darter, likely due to hybridization and introgression. To examine the systematics of the blenny darter and further understand its relationship to greenside darters, a dataset was generated for a mitochondrial and nuclear marker with samples from both subspecies, hypothesized intergrades and greenside darters. Phylogenetic analyses of mitochondrial data recovered a sister relationship between all blenny darters and greenside darters from the Tennessee River system supporting the hypothesis of a historical mitochondrial replacement by greenside darters. Since the replacement is complete and historical, mitochondrial data is of systematic utility and identified three major groups corresponding to stream drainages: Duck and Buffalo rivers, southern bend Tennessee River streams (*E. b. blennioides* including intergrades) and Sequatchie River samples (*E. b. sequatchiense*). Nuclear data was less variable, but revealed that blenny darters and greenside darters as reciprocally monophyletic based on one nuclear marker. A thorough reexamination of morphological characters in light of these findings should be conducted to update the taxonomic status of this species.

THE EFFECT OF HONEY HYDROGEN PEROXIDE (H₂O₂) AND ANTIOXIDANTS ON SMALL HIVE BEETLE (*Aethina tumida*) REPRODUCTION AND SURVIVAL.
Lydia McCormick, Jefferson County International Baccalaureate School, Birmingham, AL 35210.

Honeybees are the number one pollinator and essential for agriculture. Recently, the small hive beetle (SHB) has become a widespread problem throughout the Southeast. Various chemical treatments to control SHB have been employed, however, honeybees most likely have natural stress defenses, such as H₂O₂. This oxidant is produced by the honeybee enzyme glucose oxidase. Previous observations (Science Fair 2008) revealed that honey H₂O₂ was highest in beehives infected by SHB. Follow-up studies revealed that SHB survival decreased as H₂O₂ concentrations increased, suggesting that honey H₂O₂ may be a natural defense. The hypothesis that antioxidants will reverse the detrimental effect of H₂O₂ content on SHB survival and reproduction was tested. Three antioxidants were studied: catalase, alpha linolenic acid (ALA) from flaxseed oil, and N-acetyl cysteine (NAC). Groups of 10-15 SHB (field collected (f-SHB) and experimentally grown (exp-SHB)) were incubated at room temperature in containers with beeswax comb, pollen, and experimental honey (+/- hydrogen peroxide and +/- antioxidants) for several weeks. The habitats were observed through metamorphosis and survival at each stage was measured. Results showed that both f-SHB and exp-SHB underwent complete metamorphosis. In both SHB groups, catalase promoted the highest beetle survival, larvae production, and # of pupated beetles per larvae. In contrast, ALA and NAC were ineffective. Results

confirmed previous work indicating 15-63% inhibition of exp-SHB survival with 400-1600 $\mu\text{g/ml}$ H_2O_2 . In conclusion, honey H_2O_2 is a defense mechanism against SHB at all stages of metamorphosis. Future studies could explore the balance between honey catalase and glucose oxidase activities and H_2O_2 content.

THE POTENTIAL USE OF KUDZU AS A PHYTOREMEDIATOR FOR LEAD.
Kristin Schwarzauer, Safaa Al-Hamdani, Nixon Mwebi, and James Rayburn. Dept. of Biology, Jacksonville State University. Jacksonville, AL 36265.

Kudzu (*Pueraria montana* var. *lobata*) is a legume vine well adapted to the Southern region of the United States with a growth rate exceeding 30 meters per year. Kudzu was evaluated in the remediation of the heavy metal Pb in a greenhouse under controlled environmental conditions. Kudzu was shown to continue to grow and photosynthesize at relatively high concentrations of lead (100 mg/L and 200 mg/L). The accumulation of lead was shown to be the highest in the root with over 11 $\mu\text{g/g}$ DW accumulation at Pb concentration of 200 mg/L. Therefore, kudzu can be considered as a rhizofiltrator because most of the Pb accumulation occurred in the root. When measuring the hydroponic media, it was found that the plant had a 34.5% uptake of the total contamination in the 200 mg/L treatment and a 29.8% uptake of the total contamination in the 100 mg/L treatment.

TRACKING LANDSCAPE CHANGES IN THE UPPER CAHABA RIVER WATERSHED (1974-2007) BY ANALYZING MULTISPECTRAL SATELLITE IMAGE DATA. *Steve Padgett-Vasquez, Robert Fischer, Sarah Parcak, Ken Marion, UAB Birmingham, AL 35294.*

Alabama's Cahaba River is a biodiversity hotspot. The Upper Cahaba River watershed is located in close proximity to Birmingham, the largest metropolitan region in Alabama. Eutrophication and rapid urbanization of Birmingham are two serious threats to the river's ecological value. Concern has resulted in studies on changes of the river's water quality and fauna. Landscape studies are lacking and are important for conservation and management purposes, since a watershed influences the dynamics, structure, and health of its stream. Multispectral satellite remote sensing data provides information about the distribution of urbanized and vegetated areas within in the Upper Cahaba River watershed. In this study, Landsat MSS/TM imagery acquired in 1974, 1984, 1993, 2003, and 2007 was analyzed using Normalized Difference Vegetation Index (NDVI) ratio to track changes in landscape over time. ASTER imagery, with a higher resolution than Landsat MSS/TM, acquired in 2004 was also analyzed using NDVI ratio. Two common biotic indicators of stream health, Index of Biotic Integrity (IBI) and EPT (an index of pollution sensitive insect larvae), were significantly correlated with ASTER data. IBI was negatively correlated with impervious surfaces, defined by negative NDVI values ($r=-.620$; $df=16$; $p=.006$) and positively correlated with surfaces with NDVI values ranging from 0.30–0.39 ($r=.616$;

df=16; p=.007) and 0.50-0.59 ($r=.490$; df=16; p=.039). EPT was significantly correlated with surfaces with NDVI values ranging from 0.30–0.39 ($r=-.608$, df=9, p=0.47) and 0.50-0.59 ($r=.683$; df=9; p=.021).

USE OF A SEDIMENTATION RISK INDEX TO ASSESS UNPAVED ROAD-STREAM CROSSINGS IN THE UPPER PEA RIVER WATERSHED, ALABAMA. Suman Chitrakar, Neil Billington, Paul M. Stewart, Dept. of Biological and Environmental Sciences, Troy Univ., Troy, AL 36082, and Christopher K. Metcalf, U.S.F.W.S., Panama City, FL 32405.

A dominant source of sedimentation in southeastern Alabama streams is unpaved road-stream crossings, but studies on sedimentation risk at these crossings are limited. To rank unpaved road-stream crossings based upon their sedimentation potential, a sedimentation risk index (SRI) was developed at Troy University in 2007. This SRI prioritized unpaved road-stream crossings at different sub-watersheds in the Choctawhatchee-Pea River basin based upon their sedimentation risk. For this SRI, stream crossings were evaluated for 12 risk metrics; for each metric, high risk was assigned a 1, medium risk a 3, and low risk a 5. Scores were summed for each site and sites with the lowest SRI scores had the highest sedimentation risk. In this study, 118 unpaved road-stream crossings were surveyed for sedimentation risk potential in the upper Pea River watershed with the SRI model. This survey found 15% of unpaved road-stream crossings were in poor condition (high risk), 49% were in fair condition (moderate risk), and 36% were in good condition (low risk). Sites with a high sedimentation risk had low channel stability, improper crossing structure installation, high potential eroded road approach volume, or improperly managed road approach drainages and outlets. Use of this index will assist road departments in the development of an effective watershed management strategy to maintain stream habitat in this watershed.

VASCULAR FLORA OF MARENGO COUNTY, ALABAMA. J. Kevin England and Brian R. Keener, Dept. of Biological and Environmental Sciences, University of West Alabama, Livingston, AL 35470.

A survey of the vascular flora of Marengo County, Alabama is being conducted. Marengo County includes 254,576 ha as is located in the East Gulf Coastal Plain. Physiographic districts found to be part of the county include Blackland Prairie, Chunnennuggee Hills, Flatwoods, Southern Red Hills, and associated alluvium deposits. Collecting began in August 2009 and will continue through July 2011. In addition to field collections, surveys of relevant herbaria for county records will be conducted in order to be thorough and include the efforts of previous botanists. So far ca. 550 collections have been made of which 430 have been identified yielding just over 400 unique species. Of those 400 species, 112 families and 276 genera are represented. Seven species have been discovered which

are included on the current Alabama Natural Heritage tracking list. Habitats and general plant communities will be discussed based on early results. Research supported in part by Blanche Dean Wildflower Scholarship through the Alabama Wildflower Society.

Biological Sciences Poster Abstracts

A SURVEY OF THE BACTERIA AND FUNGI IN ALAMUCHEE CREEK. Ryan Woods, Matt Miller, and Brian Burnes, Dept. of Biological and Environmental Sciences, Univ. of West Ala., Livingston, AL 35470.

The microbial content of Alamuchee Creek in Sumter County, AL was monitored at three sampling sites. This was accomplished by collecting water from the three sites, plating the samples on three different types of media (ColiScan Easygel, Sabouraud Dextrose agar, and Nutrient agar), and tabulating the microbes that grew after incubation. A test site on County Road 13 showed an increase in all the types of microbes examined, especially the coliforms. In general, the concentrations of microbes increased as the creek flowed down stream toward the Sucharnochee River; further testing would be needed to determine the cause of the increase.

ANALYSIS OF THE RENIFORM NEMATODE GENOME USING MASSIVELY PARALLEL 454 MICRO-BEAD SEQUENCING. Seloame Tatu Nyaku, Venkateswara Sripathi, Sarah Cseke, Govind Sharma, and Ramesh Kantety, Centre for Molecular Biology, Department of Natural Resources and Environmental Sciences, Alabama A&M University, Normal AL 35762.

The reniform nematode (RN) is found in the southern parts of United States and known to attack at least 300 plant species. Although the RN can be used in genetic applications, the lack of sequence data for this organism limits understanding of resistance mechanisms, and developing host-plant resistance strategies for this economically devastating pest. Our objective was to sequence and characterize the reniform nematode genome using the Genome Sequencer FLX system which is a massively parallel pyro-sequencing system. Four adult female RN were surface-sterilized and used for genomic DNA isolation. Extracted DNA was initially amplified using reniform-specific and 18S primers to confirm the identity of the nematodes. A RN library was developed using a whole genome amplification technique from pooled genomic DNA and sequenced. A total of 350Mb of sequence was generated and assembled into 80,500 contigs using the GS De Novo Assembler. Contig sizes ranged from 100bp to 16535bp. Initial comparative genomic analysis was made with *Meloidogyne incognita* genome, *Caenorhabditis elegans* genome, RN Expressed Sequence Tags (ESTs),

RN 18S variants, and other nematode ESTs for sequence similarities. Other comparative analysis with sequences in GeneBank is in process for identification of genes within the RN genome, and especially those that play roles in parasitism.

ANNOTATED CHECKLIST OF THE VASCULAR PLANTS OF ALABAMA. *Brian R. Keener*, Dept. of Biological and Environmental Sciences, Univ. of West Alabama, Livingston, AL 35470. *Alvin R. Diamond, Jr.* Dept. of Biological and Environmental Sciences, Troy University, Troy, AL 36082, and *Curtis J. Hansen*, Dept. of Biological Sciences, Auburn University, Auburn, AL 36849.

The first comprehensive statewide checklist of vascular plants for Alabama in over 100 years is soon to be published. State and regional herbaria were surveyed for voucher specimens to represent each taxon on the list. This effort revealed that 3,740 species and 387 infraspecific taxa in 1,117 genera comprising 203 vascular plant families were found to represent the Alabama flora. Of the 4,127 unique taxa (specific and infraspecific), 137 were considered historical and 23% were found to be non-native. We acknowledge other coauthors of the full document, Robert Kral (lead author), Steve Ginzburg, Robert R. Haynes, Michael LeLong, Daniel D. Spaulding, and Michael Woods.

ANTIMICROBIAL ACTIVITY OF BIOSYNTHETIC SILVER NANOPARTICLES AGAINST POND WATER MICROORGANISMS. *Candis Johnson* and *Ibukun Kusimo* –undergraduate Students *Florence Okafor, Tatiana Kukhtareva* And *Florence Okafor*. Alabama A&M University, Normal AL 35762.

Previous studies have shown that Silver nanoparticles are effective antibacterial, antifungal, anti viral and also anti-inflammatory agents. The recent research has suggests a distinct increase in the effectiveness of silver nanoparticles in combination with plant extracts such as *Actaea racemosa* (Black Cohosh) and *Chrysophyllum albidum* (African Udala). Black Cohosh is known and was commonly used, by Native Americans, amongst many others as an analgesia and anti-inflammatory medication. The purpose of this research is to produce silver nanoparticles from the reaction of silver nitrate and *Actaea racemosa* and *Chrysophyllum albidum* extracts and compare their antimicrobial effectiveness. The herbal extracts (*Actaea racemosa*) were produced using the standard Soxhlet and evaporation method. A solution of *Actaea racemosa* extract was heated to 800 C and was then induced with 10⁻³ M of AgNO₃. An immediate reaction took place. The results showed that substantial amounts of silver nanoparticles (AgNP) were produced. This was verified using UV-Visible Spectroscopy, Infrared (FTIR) spectroscopy, and Atom Force Microscope. We observed appearance of Surface Plasmon Peak, which corresponds to the silver nanoparticles - 417 nm in 1 minute. Pond water samples were treated with varying amounts of the nano-silver colloids and the microbial counts were determined. We found that 20ul of the Udala-based AgNP was enough to inhibit the growth of both Gram positive and gram negative microorganisms resident in pond water. However, further investigation is needed to quantify the antimicrobial effectiveness of the AgNPs.

APPLICATION OF POWER ULTRASOUND TO IMPROVE ADHESION OF HONEY ON ROASTED PEANUTS. *Henock Tegete, Peter Wambura and Martha Verghese, Dept. of Food and Animals Sciences, Alabama A&M University, Normal, AL 35762.*

Adhesion of honey coating to hydrophobic food products like peanut is often poor because of the difference in chemical properties. The use of power ultrasound (sonication) as a processing aid to extract lipid from peanuts has been widely explored. The extent of honey coating retention on the surface of untreated and sonicated peanuts was studied to evaluate the efficacy of sonication to improve adhesion of honey on the peanuts, as penetration of oxygen through the honey coating depends, among other factors, on how much honey is retained on the peanut surfaces. Valencia type peanut samples, 150 g each, were subjected to sonication in 450 ml petroleum ether for 5, 10, and 15 min. After sonication 25 ml of honey was poured and stirred over the 50 g peanuts, then roasted in an oven at 178°C for 10 min. Samples were removed from the oven and sprinkled with 25 g of sugar. Honey coating adhesion was determined by measuring the weight of peanuts before and after coating. All samples were stored in chamber at 40°C. The effect of honey coating and sonication on storage oxidative stability was monitored by oxidative stability instrument. The results showed that the weight of honey coating was 7, 16, 19, 21, and 21 g on the control, dipped, 5, 10 and 15 min sonicated sample, respectively. Thus, honey coating adhesion was improved by 64, 68 and 67% for 5, 10 and 15 min sonicated samples, respectively, in relative to the control. Meanwhile, oxidative stability of dipped, 5, 10, and 15 min sonicated samples was improved by 34, 45, 54, and 34%, respectively, as compared to the control. Therefore, it was observed removing some lipids from peanut surface by power ultrasound improved adhesion of honey coating and the storage oxidative stability.

CHEMOPREVENTIVE EFFECTS OF BITTER MELON. *David Asiamah, Martha Verghese, Lloyd T. Walker and Louis Shackelford. Dept. of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.*

Bitter melon (BM) *Momordica Charantia* is used to treat Diabetes Mellitus. However studies on its role in chemoprevention are scarce. Purpose of study was to investigate chemopreventive properties of BM on Azoxymethane induced colon tumors in Fisher 344 rat model and its effect on detoxification and antioxidant enzymes. Fisher 344 rats were randomly assigned to 3 groups (n=8); control (C) (AIN-93G) and 2 groups (n=8) were assigned C+2% BM and C+4% BM. All rats received 2 s/c injections of AOM at 7 and 8 wk of age @ 16mg/kg body weight. At 45 weeks of age rats were killed by CO₂ asphyxiation. Total phenolics, free radical scavenging activity (DPPH) and ferric reducing antioxidant power (FRAP) of BM were determined. Tumor incidence (%) in C, 2% BM and 4% BM were 100, 87.5 and 57.1. Tumors/tumor bearing ratio (TBR) was 3.9, 1.57 and 1.4 for C, 2% BM and 4% BM. Tumor size (mm) was larger in C compared to rats fed treatment diets. Detoxification and antioxidant enzymes; Glutathione-S-transferase, superoxide dismutase

(U/ml) and catalase activities ($\mu\text{mol/ml}$) were significantly ($p < 0.05$) higher in BM groups compared to C. Total phenolics (35.16 mg/GAE/g), DPPH (%) (26.32) and FRAP activities (0.775 $\mu\text{mol Fe}^{2+}/\text{g/ml}$) were higher compared to other vegetables (published literature). Bitter melon reduced Azoxymethane-induced colon tumors. Consumption of bitter melon may have implications in prevention of chronic diseases such as colon cancer with significant implications for food product development by the food industry.

CHEMOPREVENTIVE POTENTIAL OF ALMONDS AND PECANS AGAINST THE DEVELOPMENT OF AZOXYMETHANE INDUCED TUMORIGENESIS IN FISHER 344 MALE RATS. *Antonio Miller, Martha Verghese, J. Boateng, Lloyd T. Walker, Louis Shackelford and La-tonya Dukes, Department of Food and Animal Sciences, Alabama A & M University., Normal, AL 35762.*

Almonds (*Prunus dulcis*) and pecans (*Carya illinoensis*) contain a variety of naturally occurring phytochemicals such as phytosterols, isoflavones, ellagic acid. The objective was to test the chemopreventive potential of almonds and pecans on Azoxymethane (AOM) induced colon tumors. 30 rats were randomly divided into 3 groups and fed AIN93G/M as control (C) diet, and treatment groups fed almond (A) and pecan (P) diets (5% + C). At 7 and 8 wk of age rats received AOM (s/c) at 16mg/kg body weight and were euthanized by CO₂ asphyxiation at 46 wks of age. Cecal weight, cecal pH, tumor incidence, activity of selected enzymes; glutathione-s-transferase (GST), catalase (CAT), superoxide dismutase (SOD) were determined. Tumor incidence (%) in rats fed P & A was lower (78 & 70) than those fed the C (100). Tumor numbers were lower in rats fed A (11) compared to the P fed (17) group with C having (34) tumors. TBR ratio was lowest in A at (1.57 mm) compared to P fed group (2.42mm), with the highest ratios seen in C (5.8mm). Activity of selected enzymes ($\mu\text{mol/mg}$); GST, CAT and SOD were significantly higher in rats fed A and P compared to C. Consumption of nuts rich in phytonutrients and omega 3 fatty acids may play a beneficial role against various chronic diseases.

CHEMOPREVENTIVE POTENTIAL OF COFFEE AND COCOA AGAINST AZOXYMETHANE-INDUCED ABERRANT CRYPT FOCI IN A RAT MODEL. *Louis Shackelford, Martha Verghese, David Asiamah, J. Boateng, Lloyd T. Walker. Dept. of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.*

On a per capita basis in the U.S., chocolate is third behind coffee and tea as a daily source of antioxidants. Although antioxidant properties of chocolate and cocoa have been known for some time, there has been no examination of its place in the U.S. diet as a chemopreventive agent. Purpose of this study was to investigate chemopreventive potential of cocoa (CC) and coffee (CF) on Azoxymethane-induced aberrant crypt foci (ACF) in Fisher 344 rat model and to determine Glutathione S-transferase (GST) and Catalase (CAT) activities. Rats were randomly assigned to 5 groups after a 1 week acclimatization period to a control

diet (C) (AIN-93G) and 4 groups (n=5) and fed CF and CC as drink and meal (0.5% and 1%). Rats received 2 s/c injections of AOM @ 16mg/kg body weight and were killed by CO₂ asphyxiation at 17wk. ACF in rats fed C was significantly (p<0.05) higher (120) compared to rats fed 0.5% and 1% CF (69.5,62.3) and CC (100.8, 71.2) as meal and CF (60,44.52) CC as drink (79,64). GST ($\mu\text{mol}/\text{min}/\text{ml}$) was significantly (p<0.05) higher in rats fed CF and CC compared to C. CAT activity ($\mu\text{mol}/\text{ml}$) was also higher in the treatment groups compared to C (0.2). Consumption of CF and CC reduced Azoxymethane-induced ACF and may have implications in prevention of chronic diseases such as colon cancer.

COMPARISON AND IDENTIFICATION OF MICROBES OBTAINED FROM TAP WATER ON UWA CAMPUS. John McCarter and Markita Watkins The University of West Alabama – Livingston, AL.

Water – it comprises roughly 70% of an adult's body mass and covers between 70% and 75% of the earth's surface. Water is also one of the best natural solvents, carrying with it, wherever it flows, chemicals, minerals, and nutrients. These facts prompted our research because we wanted to find out what exactly is in the tap water on The University of West Alabama campus. Specifically, we wanted to see what kinds of microbes would grow when the tap water was observed under controlled laboratory circumstances. To accomplish this, we obtained tap water samples from six dormitories on UWA's campus – Selden, Speith, Hoover, Reed, Stickney, and Sisk Halls. One milliliter samples of the tap water were spread on Petri dishes containing nutrient agar. This was done with each of the 12 samples of tap water. The Petri dishes were incubated at room temperature and were photographed at 72 and 120 hours post inoculation. To provide visual confirmation of fungal growth, samples of the growth were observed and photographed at the 40x level of magnification. Microbial growth was observed in 8 out of the 12 samples taken and documented in the results chart on our poster. No bacterial growth was observed, and this was in line with our expectations, as UWA is served by water from the city of Livingston which is equipped with a standard water treatment facility. The only growth observed was of the fungal variety, confirmed visually.

DARTER DISTRIBUTION AND ENVIRONMENTAL FACTORS IN SUMTER COUNTY, ALABAMA STREAMS. Tyler Earwood, Katherine Lemay, Kyle Wiggins, and John McCall. Dept. of Biological and Environmental Sciences, University of West Alabama, Livingston, AL 35470.

Darters (Percidae) are abundant and diverse in the streams of Sumter County in western Alabama, in part because of the diversity of stream systems found in the region. As part of an ongoing program investigating factors controlling darter distribution, we sampled darter communities in a number of Sumter Country streams. Sampling was conducted by seining diverse microhabitats at road crossings. Streams were sampled across the breadth of the

county and included those traversing a variety of landforms, with limestone-bottomed streams predominant in the northern part of the county and sandy, tannin-rich streams more common to the south. When possible, collected darters were field identified and returned to the stream. In those cases where field identification was not possible, specimens were returned to the laboratory for identification. A diverse group of darters was found to exist in Sumter County streams with the most abundant species including the rock darter (*Etheostoma rupestre*), the redbfin darter (*E. whipplei*), the johnny darter (*E. nigrum*), and the blackbanded darter (*Percina nigrofasciata*). Substantial differences were observed in darter assemblages between stream systems, with current velocity and substrate playing a major role in determining community composition.

DETERMINING THE GENERA AND SPECIES OF BACTERIA IN THE FAMILY ENTEROBACTERIACEAE THROUGH THE OBSERVATION OF BIOCHEMICAL DIFFERENTIATION. *Cressida Cowan, Erika Winters, and Brian Burnes, Dept. of Biological and Environmental Sciences, The Univ. of West Ala., Livingston, AL 35470.*

The API-20E Identification System was used in this experiment to identify bacteria in the family Enterobacteriaceae which were isolated from the Fish River, Alabama. Isolated bacteria (H5K1:D, C1A1:4, H5K1:E, C1-B-11, H10K3:B, H10K3:E, C1-B:12, H10K2:F) were streaked onto an agar plate, incubated for 24 hours, then placed into a nutrient growth broth within test tubes. When growth was visible in the test tubes, a sample was taken and added to each of the twenty API-20E reaction tubes. The reactions test for fermentations (glucose, galactopyranoside, citrate, mannitol, inositol, sorbitol, rhamnose, melibiose, arabinose), decarboxylation (lysine, ornithine), reduction (hydrogen sulfide), hydrolysis (gelatin, urea) and indole/Voges-Proskauer production. The tubes labeled: ADH, LDC, ODC, H₂S, and URE were treated as anaerobic environments; created by adding a layer of immersion oil to the bacteria. The results were observed approximately 18 hours later. After comparing the results to “Bergey’s Manual of Determinative Bacteriology,” it was concluded that the unknown enteric bacteria used in this experiment were *Escherichia coli*.

DRIFTING AQUATIC INVERTEBRATES OF ESTILL FORK, JACKSON COUNTY, ALABAMA. *Brittany N. Holmes and Bruce W. Stallsmith, Dept. of Biological Sciences, Univ. of Alabama in Huntsville, Huntsville, AL 35899.*

This study examines the community structure of drifting macroinvertebrates in a stream riffle system in pristine Estill Fork of the Paint Rock River in Jackson County, Alabama. Monthly samples were made within two days of the new moon using a drift net between July, 2009 and January, 2010. Living individuals and their exuviae were identified to Order. Measurements were made on-site of stream temperature, flow rate and total dissolved solids, and lab measurements were made of sampled stream water phosphates, ammonia, alkalinity and pH. Statistical analysis using chi-square tests showed that most months

differed significantly from expectation in the number of invertebrates per water volume, and each month showed a deviant maximum or minimum from expected in one or more taxonomic Orders. Ordination analysis using Principle Components Analysis of number of individuals collected per Order and stream physical parameters for each month showed that each Order responds in a different way to changes in stream physical parameters. Monthly collections of drift net samples and water samples will continue through this June to complete a year's observation of fluctuations in macroinvertebrate community structure at this site.

EFFECT OF FERMENTATION CONDITIONS ON INDIVIDUAL PHENOLICS IN CRANBERRIES DURING WINE MAKING. *Vijaya Bhaskar Poreddy*, Alabama A&M University, Normal, AL; *Lloyd T. Walker*, Alabama A&M University, Normal, AL; *Yvonne C. Chukwumah*, Alabama A&M University, Normal, AL; *Martha Verghese*, Alabama A&M University, Normal, AL; *Simon Ogutu*, Alabama A&M University, Normal, AL 35762.

Cranberry (*Vaccinium macrocarpon*) belongs to the group of berries categorized as super fruits due to their nutritional richness and associated health benefits. They are rich sources of bioactive polyphenols such as flavonoids, anthocyanins and proanthocyanidins which have antioxidant properties that are reported to be beneficial to human health. The objective of the study is to determine the effect of fermentation on individual phenolic compounds in cranberries during the process of wine making. Frozen cranberries were obtained from Decas Botanical Synergies, MA. Cranberry juice was extracted from frozen cranberries and subjected to fermentation at pH 3, 4 and 5 with each pH treatment subjected different temperatures (25, 27 and 30 °C). Cranberry juice was ameliorated by addition of cane sugar to increase the total soluble solids (20° brix) to achieve desirable ethanol yield for wine (9 – 15%). Catechin, epicatechin, benzoic acid, quercetin and myrecetin were the compounds detected in the wine samples. The results showed that both pH and temperature were critical in the retention of phenolic compounds during the fermentation of cranberries. The highest concentration for catechin (186.94 mg/L), epicatechin (18.1mg/L) and benzoic acid (182.52 mg/L) were at 25°C and pH 4, 3 and 5, respectively while the highest values for myrecetin (30.5 mg/L) and quercetin (20.4 mg/L) were obtained at 27°C and pH 3 and 5, respectively. Individual concentration of all detected phenolics varied significantly ($p < 0.05$) among the treatments. Therefore, the phenolic content of cranberry wine is affected by fermentation parameters.

Effect of pH on Hydroponically grown Plants (Bush Bean). *Megan Harris*, Alabama A & M University Normal, AL 35762.

Numerous environmental factors can influence the viability of plants. Several studies have shown that acidic and basic pHs have a noticeable effect on different types of plants when

grown directly in soils. However not too many studies have been done on hydroponically grown plants with respect to pH. This study was conducted at the Botany laboratory and Green house at Alabama A & M University with bush beans. Five nutrient solutions with pH values ranging from 5 - 9 were used. Observations on plant height and number of leaves were done for six weeks after nutrient solutions with the different pH values were introduced to the plants 7 days after the seed germinated. Plants grown in nutrient solutions with high alkalinity levels (8 & 9) were significantly shorter compared to those grown in nutrient solutions with pH 5, 6 and 7. Leaf number and size strongly correlated in a manner expected with plant height, plants in high alkalinity nutrient solutions had fewer and smaller leaves. Plants grown in neutral or near neutral nutrient solutions appear healthier with green leaves and strong stems. Key words: Effect, hydroponically, pH, bush beans

EFFECT OF PROCESSING ON CHEMOPREVENTIVE POTENTIAL OF GRAPES AND BEETS IN AZOXYMETHANE-INDUCED FISHER 344 MALE RATS. *Stephen Appiah, Martha Verghese, J. Boateng, Belinda Kanda and Louis Shackelford, Department of food and Animal Sciences, Alabama A & M University, Normal, AL 35762.*

The objective of this experiment was to determine the effects of selected processing techniques (freeze drying, cabinet drying) on phytochemicals in grapes and beets and their chemopreventive potential in a Fisher 344 rat model. Fisher 344 male weaning rats were assigned into 11 groups and fed diets containing AIN- 93G (C), 2 & 4% beets and grapes processed as indicated above and 2 & 4% beet and grape juice. At 17wks of age, rats were killed by CO₂ asphyxiation and Aberrant crypt foci (ACF) and enzymes were determined using standard protocol. Highest ACF incidence among treatment groups was seen in groups fed 4% freeze dried grapes (61 in distal and 34 in proximal (total 95)); however, this was lower compared to the C, which developed a total ACF of 90 in the distal and 38 in the proximal (total 128). CAT (0.084-0.10 umol/mg) and SOD (0.13-0.15 umol/mg) activities in the treatment groups were higher compared to C (0.055umol/mg and 0.05 umol/mg). Similar results were seen with GST activity with treatment groups having higher activity compared to the C. The results of this study will contribute to the search for efficient processing techniques to maximize the bioavailability of nutrients and phytochemicals in fruits and vegetables in the food industry to enable the development of healthy food products.

EFFECT OF ROASTING ON THE QUALITY OF PEANUT BUTTER. *Jordan Moore, Peter Wambura and Martha Verghese. Dept. of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.*

Approximately 35 to 50% of shelled peanuts produced in the U.S are used for making of peanut butter. Production of commercial peanut butter involves roasting of raw peanuts.

removal of the skins (blanching) and grinding. Peanut roasting aid in development of color, flavor and improve texture of peanut butter which is central to consumer acceptability. Roasting inactivate natural enzymes (increase shelf life of peanut butter) as well. The objective of this study was to determine the color, viscosity and shelf life of peanut butter made from peanuts roasted for 10, 20 and 30 min. Three batches of shelled peanuts (ca. 1 kg each) were dry roasted in the oven at 350°F for 10, 20 or 30 min. Following roasting, each batch of roasted peanuts was used to make peanut butter. There results indicated that, peanut butter made from the samples roasted for 20 min (lower L = 31) and 30 min (lower L = 30) was darker than butter made from sample roasted for 10 min (upper L = 32) and a commercial sample (upper L = 43) (as a control. Sample roasted for 30 min consisted of lower viscosity (41 cP) as compared to other samples. Sample roasted for 20 min was projected to have longer residual shelf life (19 months) as compared to other samples, this could be attributed to the formation of antioxidant Maillard reaction products. Therefore, increasing roasting temperature and time, could increase the rate of oxidation which causes rancidity, decrease viscosity and color change and influence the shelf life of peanut butter.

EFFECT OF SELECTED SPICES ON ANTIOXIDANT ACTIVITY AND INHIBITION OF COLON CANCER. *Latonya Dukes, Martha Verghese, J. Boateng, Lloyd Walker and Louis Shackelford, Department of food and Animal Sciences, Alabama A & M University Normal, AL 35762.*

Colon cancer is a highly preventable disease; however, it remains among the leading causes of deaths for Americans. The correlation between the consumption of phytochemicals present in fruits, whole-grains, and vegetables and the reduction of disease has been well established. The purpose of the study was to test chemo preventive effects of selected spices/herbs: cinnamon (CM), clove (CL), rosemary (RM) and oregano (OR) at 150ppm on azoxymethane (AOM)-induced colon tumors in Fisher 344 male rats during initiation + promotion (IP) stages of carcinogenesis. Following a one-week acclimatization period, rats were divided into a control(C) and four treatment groups and fed an AIN93G based diets. Tumor incidence (%) in colons of rats fed C, CM, CL, RM and OR were 100, 90, 0, 30 and 77.7 respectively. Tumors per tumor-bearing rat ratios for rats fed C, CM, CL, RM and OR were 3.9, 2.66, 2.0, 1.9 and 2.25. Tumor numbers and size (mm) in rats fed C, CM, CL, RM and OR were lower than in control. GST and SOD activities ranged from a low of 16.59 and 4.98 in the OR fed rats to a high of 32.18 and 10.13 in CM fed rats. A similar trend occurred with the catalase (CAT) activity. Consumption of spices may offer protection during the carcinogenesis process and may have aid in the prevention of chronic diseases.

EFFECTS OF POSTHARVEST PROCESSING ON TOTAL PHENOLIC AND FLAVONOID CONTENT OF IN RED APPLES (*Malus domestica*) AND GRAPES (*Vitis vinifera*). *Santosh Kumar chintapandu, Lloyd T. Walker, Yvonne C. Chukwumah, Martha Verghese, Simon Ogutu, Alabama A&M University, Normal, AL 35762.*

Fruits are a source of phenolic compounds with antioxidant properties. These compounds are reported to assist in the reduction of degenerative diseases. However, postharvest preservation treatments such as freezing and drying may have an impact on their phytochemical composition. The objective of this study is to determine the effect of postharvest processing on total phenolics (TP) and total flavonoids (TF) in red apples and grapes. Red apples and grapes, obtained from a local market, were subjected to oven drying (60°C), vacuum-oven drying (60°C), freeze-drying, freezing (-20°C) and ultra-freezing (-80°C) for 24 hours. Phenolic compounds were extracted and analyzed. Frozen (663.11 mg GAE/100g) apple extracts, which had the highest TP content was significantly ($p < 0.05$) higher than oven (377.8 mg GAE/100g) and vacuum-oven (557.1 mg GAE/100g) dried extracts. TF content of ultra frozen apples (66.0 mg CE/100g) was similar to fresh and frozen apples (65.1 and 64.2 mg CE/100g, respectively). However, dried apples had significantly ($P < 0.05$) lower TF content than frozen apples. Ultra-frozen grapes had the highest TP content (567.6 mg GAE/100g) while fresh and frozen grapes had similar TP content (565.1 and 564.4 mg GAE/100g, respectively). Drying significantly ($p < 0.05$) reduced the TP content of grapes especially oven (465.02 mg GAE/100g) and vacuum-oven (504.03 mg GAE/100g) dried samples. Similar trends were observed for TF content in grapes. Postharvest freezing resulted in higher retention of phenolic compounds in grapes and apples compared to drying.

EXTRACTING DNA FROM RICE, CORN, WHEAT AND OATS: WHICH SPECIES HAS MORE DNA? *Vinoona Kantety*, Columbia Elementary School, Madison AL 35758.

Cereals make up major component of the food pyramid, as 6-11 servings/day are needed to make up a healthy diet. Corn, rice, wheat and oat make up about 90% of world's annual cereal production. My objectives in this study were to i) isolate DNA from rice, corn, wheat and oats; ii) estimate the quantity and quality of the isolated DNA and iii) determine which species has most DNA. Three leaflet samples from each of the four species were collected and ground to powder in frozen condition using liquid nitrogen. The leaf powder was placed in a clean centrifuge tube, mixed with lysis solution, incubated in warm waterbath, added with concentrated salt solution and then centrifuged to precipitate proteins and other cell debris into a pellet at the bottom of the tube. The DNA solution was transferred into a new tube and isopropanol was added to separate the DNA from the solution. Another centrifugation resulted in DNA pellet at the bottom that was resuspended in distilled water. The quantity and quality of isolated DNA was measured using the Spectrophotometer. The species comparisons revealed that rice had lowest amount of DNA while Wheat and Oat yielded highest amount of DNA. The Corn sample yielded DNA five times greater than Rice and six times lower than that of Wheat or Oat. Therefore, the hypothesis was proven wrong. I learnt that bigger plants don't necessarily mean that they have higher DNA content.

FAST EXTRACELLULAR BIOSYNTHESIS OF SILVER NANOPARTICLES AND THEIR CHARACTERIZATION USING ACTAEA RACEMOSA EXTRACT.

***Ibukun Kusimo, Candis*, Students *Florence Okafor, Tatiana Kukhtareva*, Alabama A&M University, Normal, AL 35762.**

Motivation for this investigation is the development of non-toxic methods for nanoparticles production for medical and environmental application. The previous studies have shown that Silver nanoparticles are effective antibacterial, antifungal, anti viral and also anti-inflammatory agents. The recent research has also suggested a distinct increase in the effectiveness of silver nanoparticle in combination with plant extracts such as *Actaea racemosa* (Black Cohosh) and *Chrysophyllum albidum* (African Udala). Black Cohosh is known and was commonly used, by Native American, amongst many others as an analgesia and anti-inflammatory medication. Black Cohosh has also been found to treat many menopausal symptoms such as lowered estrogen levels. The purpose of this research is to produce silver nanoparticles from the reaction of silver nitrate and *Actaea racemosa* extract. The herbal extracts (*Actaea racemosa*) were produced using the standard Soxhlet and evaporation method. A solution of *Actaea racemosa* was heated to 800 C and was then induced with 10⁻³ M of AgNO₃. An immediate reaction took place. The results showed that substantial amounts of silver nanoparticle have been produced. Reaction process has been controlled by UV-Visible Spectroscopy. We have observed appearance of Surface Plasmon Peak, which corresponds to the silver nanoparticles - 417 nm in 1 minute. The nanosilver colloidal was characterized by various physical methods including UV-Visible, Infrared (FTIR) spectroscopy, and Atom Force Microscopy. However, further investigation is needed in order to understand the nature of the stabilizing biological molecule after the reaction process.

GENETIC VARIATION WITHIN THE RIBOSOMAL DNA REGION OF THE RENIFORM NEMATODE.

***Ramesh Kantety*, Dept of Natural Resources And Environmental Sciences, Ala A&M Univ., Normal, AL, 35762. *Seloame T. Nyaku and Siddhartha Nanda*, Grissom High School, Huntsville, AL 35802.**

The reniform nematode (*Rotylenchulus reniformis*) attacks and infests over 300 species of crops, among which is cotton, a very important agronomic crop in the United States (US). In combating this nematode, the molecular nature of this organism needs to be thoroughly understood. To achieve this aim, the 18S and the first transcribed spacer region (ITS1) of the ribosomal DNA will be sequenced to identify any variants occurring within the nematode. Reniform nematodes will be extracted from soil samples obtained from regions in Alabama, and their DNA isolated using a DNeasy blood and tissue kit (Qiagen, Maryland, USA). Amplification using 18S and ITS1 primers will then be performed on ten male and female nematodes and PCR fragments cloned and then sequenced if found to be monomorphic.

GENOME-WIDE EXPRESSION PROFILING WITHIN THE RENIFORM NEMATODE GENOME. *SELOAME Tatu Nyaku* and *Ramesh Kantety*, Alabama A & M University, Department of Natural Resources and Environmental Sciences, ARC Building, Normal, AL, 35762. *Sid Nanda*, Grissom High School, Huntsville, AL, 35802. *Leland Cseke*, University of Huntsville, Huntsville, AL, 35899.

The reniform nematode (RN) causes a lot of damage to upland cotton because of the lack of resistance in these genotypes. Sequencing of the RN parasitome which is made up of all the parasitic gene products secreted during the nematode parasitic cycle is of importance for understanding the parasitism in this nematode. High throughput sequencing techniques such as 454 sequencing technology in transcriptome profiling, generates full length transcripts greater than 5kb in length. Currently the GS FLX titanium series for transcriptome sequencing generates read lengths between 400bp-500bp. These long reads enable de novo assembly of transcripts much more easily, characterization of genomes with less reads, and coverage of more exonic regions, and splice junctions. Our objective was to characterize the RN transcriptome for identification of candidate parasitism genes and their functions through sequencing of cDNA libraries using the Genome Sequencer FLX system. The cDNA libraries were made using a mixed population of eggs and all stages of the reniform nematodes which were surface-sterilized and pooled together. Sequences were assembled into contigs using the GS De Novo Assembler and these were analyzed using the universal Gene Ontology annotation, visualization, and analysis tool BLAST2GO (<http://www.blast2go.org/>) for the identification of genes within the RN genome and those involved in parasitism within this organism.

GROWTH RATES OF CAPTIVE REARED YEARLINGS IN THE ALABAMA DIAMONDBACK TERRAPIN RECOVERY PROGRAM. *Nicole White*, Birmingham-Southern College, Birmingham, AL 35254. *Andrew Coleman*, *Thane Wibbels*, and *Ken Marion*, Dept. of Biology Univ. of Ala. Birmingham, Birmingham, AL 35294. *John Dindo*, Dauphin Island Sea Lab, Dauphin Island, AL 36528.

Diamondback terrapins throughout their range have experienced population declines due to a number of threats. This decline has been observed in Alabama where once the largest terrapin farm in the nation existed. Thousands of terrapins were shipped annually to the markets of the Northeast for human consumption. Unfortunately, the decline in Alabama has been to such an extent as to warrant the status of "Priority 1 Species of Highest Conservation Concern." To address the threat of high nest predation, the Alabama Diamondback Terrapin Recovery Program was initiated in 2008. Eggs were obtained from females, incubated, and reared at University of Alabama at Birmingham (UAB). The purpose of head-starting is to expedite the growth of individuals so that their survival chances increase. The growth rates of yearlings' mass were analyzed relative to interclutch and intraclutch variation, as well as incubation temperature. These data are currently being

utilized to develop optimal methodology for this recovery program. Funding was provided by Alabama Department of Conservation and Natural Resources.

IDENTIFICATION OF CONSERVED MICRORNAS IN THE GENOME OF RENIFORM NEMATODE, ROTYLENCHULUS RENIFORMIS. *Venkateswara R. Sripathi, Seloame T. Nyaku and Ramesh Kantety, Natural Resources & Environmental Sciences, Alabama A & M Univ., Normal, AL 35762.*

The female reniform nematode is a semi-endoparasite that causes significant yield loss in cotton. The genes and mechanism responsible for its parasitism on cotton roots is still in infantile stage. Sequencing reniform nematode genome not only aids in identifying parasitism related genes but also in understanding the genome architecture and regulatory mechanisms. MicroRNA (miRNA) are small, regulatory, non-coding RNA of about 17-23 nt in length and are known to be involved in post-transcriptional gene silencing in plants and translational inhibition in animals. As miRNAs are highly conserved across the species, using homology alignment, they can be identified in the genomes of other related species. Conserved miRNAs in reniform were identified using native genome sequences generated from 454 sequencing platform available at AAMU. All previously known miRNAs in other animal species were blasted against reniform genome sequences including contigs and singletons. The best hits thus obtained were subjected to thermodynamic analysis for identifying secondary structures by using mfold software. The potential microRNAs were identified and compared with results of insilico prediction tools such as miRanda and TargetScan. From a total of hundreds of miRNAs, only conserved microRNAs that were capable forming clusters were identified and regions were mapped as hot spots. The hot spots were mainly located on 3'UTR region of the targets, suggesting that most of the genes undergo translational inhibition. The putative miRNA targets were genes and transcription factors that were involved in growth and development of nematode. This study will aid in identifying potential miRNA targets in reniform nematode, which can be further employed in gene knock-out studies.

IMPACT OF DIFFERENT PROCESSING METHODS ON THE PHYTOCHEMICAL CONTENT AND ANTIOXIDANT POTENTIAL OF CAPSICUM ANNUUM. *Lisa Disney, Martha Verghese, J. Boateng, S.R. Mentreddy, G. Mayalagu, Louis Shackelford, Peter Wambura* Dept. of Food and Animal Sciences, Alabama A&M University, Normal, AL 35762.

Capsicum annuum, specifically banana peppers are an excellent source of phytochemicals, such as quercetin and luteolin. These phytochemicals may have significant role in prevention of chronic diseases. This study was to determine the variation of phytochemical contents and antioxidant potential of Capsicum annuum following selected processing methods. Peppers were grown and harvested from Alabama A&M University's Agricultural Research Station (Hazel Green, AL). Processing methods included freeze drying (FD), oven drying (OD),

canning (C), and Ultra-low freezing (-80°C). Fresh blanched (FB) and fresh unblanched (FU) peppers served as the control. Total phenolic content (TPC) using the Folin-Ciocalteu colorimetric method (Gallic Acid Equivalents/100 g fresh and dry weight), total flavonoid content (TFC) (Catechin Equivalents/100 g fresh and dry weight), and (%) DPPH radical scavenging ability was determined. TPC ranged from 30.46 to 54.98 (GAE/100 g fresh and dry weight), with FU retaining the lowest amount and OD containing the highest amount of phenolics. TFC ranged from 23.34 (FD) to 31.34 (OD) (CE/100g fresh and dry weight). % DPPH ranged from 73.49 (FU) to 84.25 (FD). study revealed that *Capsicum annuum* cultivar is an abundant source of phenolics and flavonoids, and show antioxidant activity with free radical scavenging properties. Processing improved antioxidant potential. Since these peppers have a short shelf life, processing could have major implications in their phytochemical content and nutritional benefits.

MICROBES ON PROFESSOR'S SHOES. *Brittany Wilson, Keshonda Summerville, Dept. of Biological and Environmental Science, Univ. of West Ala., Livingston, AL 35470.*

Have you ever wondered what professors have in common besides teaching? In this study we found that professors have more in common than we might suspect. The shoes of eleven professors from different academic departments at the University of West Alabama were swabbed and cultured for microbes. The different microbes were characterized by morphology, tabulated, and then a representative colony of each microbe was identified using standard staining and biochemical techniques. We found that professors who work in the same departments, sharing the same floor spaces, have similar populations of microbes on their shoes. These differences are apparent even when the different departments are in close proximity to one another.

PHENOTYPING OF VARIATIONS IN PROGENIES OF BIPARENTAL CROSS OF SWEETPOTATO (*Ipomoea batatas*) FOR STORAGE ROOT YIELDS AND INSECT-PEST DAMAGES. *Shambhu Prasad Katel and Srinivasa Rao Menterreddy, Alabama A&M University. Arnold Caylor, Auburn University. Padma Nimmakayala and Umesh Reddy, West Virginia State University. David. M. Jackson, USDA Vegetable Research Laboratory, South Carolina.*

Phenotypic characteristics of 94 genotypes of sweetpotato were assessed in 2007 and of 62 selected genotypes in 2008 and 2009 in the segregating F1 population from a cross between Excel and SC 1149-19 for the purpose of identifying genotypes for better insect-pest tolerance and root yields. In 2007 and 2008, stem cuttings from plants in the greenhouse which were raised from tissue culture plantlets obtained from USDA ARS Vegetable Research Station, Charleston, SC were transplanted onto raised beds at the Auburn University Horticultural Research Center, Cullman, AL (in 2009, the experiment

was conducted at Charleston, SC). In 2007, each genotype was planted in single-row plots for initial screening whereas randomized complete block design was used with three replications in 2008 and 2009. Data on plant morphological traits were recorded and visual symptoms of drought tolerance were scored. At harvest, storage root fresh yield was recorded and storage roots were graded as per USDA charts. They were also scored for insect damages and other root qualities. There were significant variations for several phenotypic traits such as number of branches, petiole length, internode length, fresh shoot biomass, fresh storage root yield, storage root flesh dry weight and storability. Five lines produced between 60 and 66 Mg/ha of Jumbo and No.1 Grade storage root yields. About five lines produced only culls and no marketable yield. Some genotypes showed more tolerance to the most damaging pests, the wireworm (*Conoderus* sp.) and white grubs (*Phyllophaga* ephilida).

POTENTIAL OCEAN ACIDIFICATION IMPACTS ON REGENERATION AND BEHAVIOR OF THE SOFT BOTTOM SEA STAR. *Luidia clathrata* Julie B. Schrau and James B. McClintock, Dept. of Biology, Univ, of Ala, Birmingham, Alabama 35294.

Ocean acidification (OA) is triggered by the absorption of excess anthropogenically-derived atmospheric carbon dioxide that reacts in seawater to elevate free hydrogen ion concentrations. This process can cause a wide range of impacts on marine organisms. To date no studies have focused on the sub-lethal effects of ocean acidification on aspects of sea star regeneration, growth or behavior. As sea stars exhibit high regenerative capacity, arm loss provides an excellent model to evaluate the effects of OA on regenerative processes. In the present study, replicate individuals of *Luidia clathrata* had two of their arms excised, and then maintained in seawater either bubbled with air alone (pH = 8.2, control treatment) or with a mixture of air/CO₂ (pH 7.8, experimental treatment) for a period of 97 days. Individuals in both treatments were fed a maintenance diet. We measured regeneration (arm length), growth (total body wet wt), righting response times, and feeding behavior. We found that the reduced pH treatment did not inhibit arm regeneration rates, whole body growth, or feeding activity. However, righting times were significantly longer in the reduced pH treatment. Thus, OA inhibits behavioral activity in *L. clathrata* and suggests that foraging efficiency and flight from predators may be compromised. Supported by an Endowed University Professorship in Polar and Marine Biology provided to JBM by the University of Alabama at Birmingham.

PRELIMINARY EVALUATION OF HISTOLOGICAL METHODS EXAMINING EFFECTS OF PINE TREE EXTRACT (from *Virginia Pine, Pinus virginiana*) on African Clawed Frogs (*Xenopus laevis*). Lindsey M. Mintou and James Rayburn. Jacksonville State University, Biology Department. Jacksonville, AL 36265.

Amphibians are highly reliable environmental indicators, with the genus *Xenopus* being ideal test subjects on a wide variety of environmental problems. Estrogenic compounds are introduced into amphibian habitats through a multitude of mediums, the majority of which are influenced or created through human mechanisms, including (but not limited to) water treatment facilities and multiple areas within the field of logging and lumber/pulp mills. Some naturally occurring estrogens are found in the environment as compounds in some pine tree species have been determined to cause estrogenic changes in fish. For our test, we will expose groups of *X. laevis* in tanks to concentrations of pine tree extract (from *Virginia Pine*, *Pinus virginiana*) from 96hrs after fertilization until metamorphosis, including the stage of gonadal differentiation. Dosages of the pine tree extract will be done on a per weekly basis using test concentrations of differing percentages. Throughout our experiment, the frogs will be kept in tanks of 20L with a controlled temperature range of 20-23° Celsius. Any effects from this pine tree extract will be determined by looking at factors such as: time to metamorphosis, malformations, mortality, and histological observations. The study will be focusing on determining the best techniques to observe gonadal mutations and malformations of male and female African Clawed Frogs after metamorphosis. These evaluations will be examined using histological slides, staining, and light microscopy and will focus on looking for mutations or malformations at the major sites of primary sexual characteristics, such as the ovaries and testes.

PROCESSED DRY BEANS REDUCED AZOXYMETHANE-INDUCED COLON TUMORS IN FISHER 344 MALE RATS. Reuel Field, M. Verghese, J. Boateng, L. Shackelford, L.T. Walker, Department of food and Animal Sciences, Alabama A & M University, Normal, AL 35762.

Dry beans, (*Phaseolus vulgaris* L.) are rich in fiber and phytochemicals (flavonoids, and anthocyanins) and may have significant implications in health and disease. Objective was to determine effects of feeding processed (cooked (C), toasted (T), fermented (F), and germinated (G)) dry beans (kidney beans (KB) and navy beans (NB)) (5%) on Azoxymethane (AOM) induced colon carcinogenesis in Fisher 344 male rats. Selected hepatic enzymes were determined using standard protocol. Following 1wk period of acclimatization, rats were assigned to 6 (n=10) treatment and 1 control group (C) (fed AIN-93G). At 7 and 8 wk of age rats received AOM (s/c) at 16mg/kg body weight. Rats were killed at 46 wk (CO₂ asphyxiation). Tumor incidence in rats fed beans was 50-81% compared to C (100%). Lowest tumor numbers were seen in KBC (10) and KBG (10). Tumor numbers were lower in rats fed processed KB (10-14) compared to NB (18-23) accounting for 50-78% reductions compared to C (46). Tumor size (mm) and TBR ratio was lowest in rats fed KBG and NBC. Cecal weight (g) and pH were significantly higher (p<0.05) in rats fed beans compared to C, as were hepatic enzymes activities (SOD, CAT and GST). Processed dry beans offered protection against AOM- induced colon tumors. Flavonoids, anthocyanins, and fiber played a synergistic role in reducing colon carcinogenesis in rats fed selected processed beans.

PROCESSED PEACHES REDUCED AZOXYMETHANE-INDUCED ABERRANT CRYPT FOCI IN FISHER 344 MALE RATS. *Belinda Kanda, Martha Verghese, J. Boateng, Stephen Appiah, Louis Shackelford and L.T. Walker,* Department of food and Animal Sciences, Alabama A & M University, Normal, Al 35762.

Polyphenols, vitamin C and carotenoids contribute to the health benefits associated with peaches. The aim of the study was to investigate the effects of processed peaches (dried, frozen and juice) on Azoxymethane-induced Aberrant Crypt Foci (ACF) in Fisher 344 male rats. Blanched (Steam (STB) and boiling water (BWB)) peaches either freeze dried (FDP) or frozen (CFP) and juice (PJ) (2 and 4%) were fed to Fisher 344 male rats. The rats were administered AOM injections s/c at 16mg/kg body weight during the 7th and 8th wk of age. The experiment was terminated after 13 wks and rats were killed by CO₂ asphyxiation. Tissue samples (liver, colon, cecum) were collected for analysis (ACF and enzyme activities (Glutathione-S-transferase -GST) and (Catalase-CAT) using standard protocol. Rats fed 2% (100) and 4% (59) PJ had the lowest number of ACF compared to 2% FD (59-94) and 4% FD (68-85). Rats fed 2 and 4% CF peaches (SB) had lower ACF (62-71) compared to those fed BWB CF peaches. GST (74-78) and CAT (0.128-0.144) activities ($\mu\text{mol}/\text{min}/\text{ml}$) were significantly higher in rats fed treatment diets, compared to those fed the control diet. The results from this study show that processing of fruits could impact its role in chemoprevention. Since peaches are highly perishable, optimum processing methods are required to minimize losses during and after processing.

A PROPOSED COMPARATIVE STUDY OF O,P DDT VS PP DDT. *Fatu Jammeh and James Rayburn.* Jacksonville State University, Biology Department. Jacksonville, AL 36265.

Malaria has killed and is still killing millions of people in developing countries. During the Second World War, DDT was used to kill mosquitoes and other insect causing diseases. This was a success but the effect outweighed the benefits, so its use was banned in USA 1972. Research has indicated numerous harm caused by this chemical; such as egg shell thinning, almost distinction of bald eagles, endocrine destruction, cancer etc. The proposed objective of this study is to determine the teratogenic effect of o,p'-DDT vs. p,p'- DDT using the Frog Embryo Teratogenic Assay Xenopus (FETAX). Kyoto Prefectural Institute had performed a similar experiment with Xenopus but did not use o,p'- DDT. In this experiment, both the two forms of DDT will be used and comparison will be made based on their LC₅₀s and EC₅₀s. Xenopus bred with hCG will be allowed to mate, fertilized and eggs harvested. Embryos from one mating pair will be used in each experiment. The FETAX assays will be carried out with the jelly coats removed. A stereo microscope will be used to sort embryos that cleaved normally. Embryos will be placed in 60mm acid-washed glass petri dishes (20 embryos per dish) with disposable plastic pipettes. Embryos will then be exposed to various concentrations of p,p'-DDT and o,p'-DDT. LC₅₀s and EC₅₀s will be obtained. This will help determine the teratogenic effect of the DDT. At the end of

each assay, surviving embryos will be fixed in 3% formalin and assessed for abnormalities. Frogs embryos will be generated at JSU biology department.

SCREENING OF HEAVY METAL ACCUMULATION IN SELECTED CRUCIFEROUS VEGETABLES AND THEIR IMPACT ON ANTIOXIDANT ENZYMES IN HUMAN CELLS. *Rhona Miller-Cebert, M. Verghese and J. Boateng, Department of food and Animal Sciences, Alabama A & M University., Normal, AL 35762.*

Some heavy metals are needed in the diet in trace amounts however, when consumed at toxic levels may result in neurological disorders and degenerative diseases such as Alzheimers disease. A potential source of these heavy metals is the cruciferous family of vegetables. Therefore, in this study, we investigated aluminum (Al) and selected heavy metal (chromium (Cr), copper (Cu), zinc (Zn), cadmium (Cd), arsenic (As), iron (Fe)) accumulation in canola (*Brassica napus* L.) leafy greens, turnip greens (*Brassica Campestris* var *rapifera*), cabbage (*Brassica oleraceae* L. var. *capitata*) and collard greens (*Brassica oleraceae* var. *viridis*), and their impact on antioxidant enzymes in human cells. The minerals/heavy metals were determined using Inductively Coupled Plasma (ICP) following ashing. Turnip greens had significantly higher ($p < 0.05$) levels (mg/g) of Al (0.084) and Fe (0.055) compared to the other greens evaluated, but its Cu content was significantly different (0.002) only from collard (0.001). Zn levels (mg/g) in collard greens were significantly ($p < 0.05$) higher (0.037) compared to the other mineral/heavy metals. There were no significant differences in As, Cd and Cr levels among all the greens analyzed. The variations in metal composition in edible tissues of *Brassica* vegetables are dependent on their species. The effect of these metals on antioxidant enzymes in normal human cells is discussed.

THE INVOLVEMENT OF SCL3 IN SALT TOLERANCE IN ARABIDOPSIS THALIANA. *Omowunmi A Owoseni, Kun Yuan, Joanna Wysocka Diller, Department of Biological Science, Auburn Univeristy, Auburn, AL, 36830.*

Salinity is a major stress factor that results in reduced crop productivity. As much as three hectares of arable land is lost due to salinity per minute. With an increasing world population and rapidly shrinking arable land, world crop production must increase by at least 20% to avoid global food crisis. It is imperative to investigate and develop salt tolerance in plants so that saline land can be reclaimed for agricultural use. Much study has been done to understand the mechanism of salt stress detection and response; however, most of the intermediates in the stress signaling process have not been identified. We investigated the role of a member of the GRAS family of transcription factors called SCL3 (scarecrow-like 3) on salt tolerance in *Arabidopsis thaliana*. We used four SCL3 mutant alleles, each having a T-DNA insertion at different positions in the gene to investigate the subsequent phenotype and RNA expression pattern. By exposing mutants to high NaCl concentrations,

we demonstrated that the mutants exhibited a delay in germination and stunted root length phenotype. Using reverse transcription PCR, we observed a change in the transcription levels of the mutant alleles during salt stress. We also demonstrated that the severity of the mutant phenotypes correlates to the presence or absence of a complete RNA transcript. Our work indicates that SCL3 is involved in salt tolerance during both germination and during early seedling states.

THE PREDICTED TERTIARY STRUCTURE OF THE α -DOMAIN FROM MATA1 OF SACCHAROMYCES CEREVISIAE REVEALS AN EVOLUTIONARY CONSERVATION TO THE HMG-BOX FAMILY OF TRANSCRIPTIONAL REGULATORS. *Tarnisha Lawson, Sam Griffin, Angelica Trammell, Doba Jackson, Department of Chemistry and Biochemistry, Huntingdon College, Montgomery, AL 36106.*

MAT α 1 works in coordination with MCM1 and other transcriptional regulatory proteins (ie. STE11) to activate transcription of α -specific genes and ultimately determine a yeast cells mating type. Although structural knowledge exist for MCM1, MAT α 2 and MATA1, for MAT α 1 and all other mating-type homologues of MAT α 1, they are non-existent. Here we have analyzed hundreds of sequences starting with a consensus sequence of MAT α 1, to find a similiar domain where protein structures are available. We took the most conserved region of MAT α 1 which has been classified as the α -domain by the PROSITE domain database. The analogy we used is that critical amino acids will remain conserved. In our studies we found the HMG-box proteins as the most closely related to the α -domain mating-type proteins. Secondary structure predictions of the α -domain reveal that it contains 3 conserved α -helices which is consistent as well with the HMG-box class of DNA binding proteins. Most of the homology between the α -domain and HMG-box exist in the first helix. This helix makes the most contacts with DNA in the crystal structure. Ultimately we hope that a model structure will aid future attempts to determine the three-dimensional structure of the MAT α 1 protein. Previous attempts to determine the structure of MAT α 1 by X-ray crystallography and NMR-spectroscopy have been hampered by MAT α 1's limited of solubility in solution.

VITAMIN NUTRITION IN THE VARIEGATED SEA URCHIN, LYTECHINUS VARIEGATUS. *Warren T. Jones, Anthony Siccardi III, Addison L. Lawrence¹, and Stephen A. Watts. UAB, Birmingham, AL 35294; ¹Texas AgriLife Mariculture Research Project, Port Aransas, TX 78373.*

SPECIAL INSTRUCTIONS: *Lytechinus variegatus* - please italicize

Nutritional supplementation in formulated feeds is an integral part of the aquaculture industry. Vitamins are essential micronutrients required for numerous metabolic functions. Our laboratory conducted several vitamin requirement studies in both juvenile and adult *L.*

variegatus. Formulated feeds containing varying levels of a vitamin premix and/or vitamin supplements were prepared to examine the effect on growth: a) 0, 0.2, 0.4, 0.6, 0.9% vitamin premix, b) 7, 19, 31, 49, 66, 126, 244, 422, and 600 mg ascorbic acid/kg feed, c) 27, 56, 90, 123, 193, and 249 mg alpha-tocopherol/kg feed. In a 16-week vitamin premix study (a), *L. variegatus* (11 g. wet weight) fed 0.6% vitamin premix had significantly higher weight gain than those fed no supplemental vitamin premix. In a 15-week nutritional trial (b) using large (22 g. wet weight) *L. variegatus*, growth was not significantly affected by ascorbic acid supplementation. In a 12-week nutritional trial (c), small (15 g. wet weight) *L. variegatus* fed supplemental alpha-tocopherol did not differ significantly from urchins fed no supplemental alpha-tocopherol. These studies suggest that a balanced premix of vitamins result in enhanced growth. Further studies are needed, as vitamins may have important roles in sea urchins that do not directly affect weight gain. These studies were supported in part by the Mississippi-Alabama Sea Grant Consortium.

WATER DEPTH AND DENSITY OF NYSSA BIFLORA AS GROWTH FACTORS FOR THE RARE CYPRESSKNEE SEDGE, CAREX DECOMPOSITA. *Kirk Carver, Mason Cooner, and L. J. Davenport, Dept. of Biology, Samford University, Birmingham, AL 35229.*

This study examines water depth and density of *Nyssa biflora* (*swamp tupelo*) as potential growth factors for the threatened wetland species *Carex decomposita* in a tupelo swamp near Tarrant, Alabama. It was hypothesized that as each factor increased, the density of *C. decomposita* would also increase. Grids were established around the edge of the swamp, where densities of both species of plants and water depths were recorded. The recorded data were used to construct graphs and calculate percent ratios of plant densities (RPD's). As both *N. biflora* density and water depth increased, so did the density of *C. decomposita*. As density of *N. biflora* decreased, the RPD's increased up to 100%. These predicted results are due to *N. biflora*'s ability to grow under harsh conditions and its buttresses providing suitable growing platforms for *C. decomposita*.

“SEQUENCING INDIVIDUAL CHROMOSOMES” – A NOVEL APPROACH TOWARDS COMPLETING COTTON GENOME. *Venkateswara R. Sripathi, Tashundra J. Bryant, Govind Sharma and Ramesh Kantety, Natural Resources & Environmental Sciences, Alabama A & M Univ., Normal, AL 35762.*

In the past two decades, an array of sequencing technologies has been emerged in reducing the cost and improving the quality. However, most of them are limited to model organisms and they have not been proven in complex plant genomes such as *Gossypium hirsutum* (~2.5 Gb). To sequence such complex genomes better strategies need to be developed and employed. Here we report a novel approach that specifically target sequencing individual chromosomes coupled with Laser Capture Microdissection (LCM) and Genome Amplification procedure, which can become a logical complement in next-generation

and massively parallel DNA sequencing technologies. In the current study, two-hundred randomly picked individual chromosomes by LCM were screened using fifty chromosome specific, PCR-based markers. The chromosomes that were amplified by more than three markers were selected for sequencing. Many cotton chromosomes including 11, 4, and homeologous chromosomes 12 and 26 were identified and sequenced using 454 sequencing platform. The sequences thus generated were assembled and analyzed to obtain contigs and singletons, which were further analyzed for the presence of molecular markers, unigenes, ESTs, transposons and retrotransposons. This approach can be used in many downstream sequencing processes such as generating comprehensive genetic maps, analyzing the individual chromosomes for variants and minimizing the problems associated with sequence assembly. This can be applied in both de novo and re-sequencing projects.

Chemistry Paper Abstracts

COMPARATIVE STUDY OF BITTER GOURD (*Mormodica charantia*) AND TURMERIC (*Curcuma longa*) USING HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC). Sunde M. Jones, Nagarajan Vasumathi, Nixon Mwebi, Mijitaba Hamissou. Department of Chemistry and Biology, Jacksonville State University, Jacksonville, AL 36265.

The bitter gourd (*Mormodica charantia*) or melon is a plant that has many properties and uses in the medical field. It is part of the family cucurbitaceae. This plant is native to Southeast Asia, China, Africa, and the Caribbean countries. Turmeric (*Curcuma longa*) or *Curcuma longa* is also a plant that has similar medicinal properties. Turmeric is a rhizome type herb that is a perennial plant of the ginger family. The main ingredient present in the turmeric is curcumin, found to be an antioxidant. It is mostly produced in India. It is used as a spice and called the Indian saffron. In this research experiment, the bitter gourd properties were tested and compared to turmeric to see how they were related. We prepared three different extracts of bitter gourd fruit using water for one, methanol and hexane for the other two. For turmeric, a solution of turmeric powder was prepared using methanol. The aqueous solution of bitter gourd and its residue were extracted and separated into different fractions using different solvents. Each fraction was analyzed by HPLC (High Performance Liquid Chromatography) and compared with that of the turmeric solution. The HPLC analysis confirmed that there is no curcumin present in bitter gourd. The preliminary results suggest that both the bitter gourd fruit and turmeric seem to contain a similar protein or a lipoprotein. To conclude, the bitter gourd fruit and turmeric are indeed different, but both have an unidentified protein. Future research will be conducted to see these differences and discover the type of protein seen in these two types of plants.

COMPRISON OF ALUMINUM AND ITS FORMS IN THE ASH, ASH-SOIL AND SOILS OF MONTSERRAT, WEST INDIES. *Kamala N.Bhat*, Chemistry Section, Department of Natural & Physical Sciences, Alabama A&M University, Normal AL 35762. *Robert W.Taylor, Thilini D.Ranatunga and Z.Senwo*, Department of Natural Resources and Environmental Sciences, Alabama A& M University, Normal, AL 35762.

Soufrière Hills volcano is an active volcano that lies in the south-central part of the volcanic island, Montserrat West Indies. Our preliminary studies indicated that ash emitted from the Soufrière Hills volcano is highly acidic and rich in aluminum (Al). The high Al content in ash may have potential impacts on the soil and plant environment of Montserrat. The acidity and the total Al content of the ash varied with the year of deposition. The pH and total Al in the ash samples were in the range of 3.77 to 4.06, and 1093mg/kg for ash deposited during the years 1995 to 1997, collected in 2003 to 1593 mg/kg for unexposed ash from 1995-1997, respectively. The ash collected the day after an eruption in Summer 2005 had Al in the amount of 2093mg/kg, while the sample collected in 2007 had Al in the amount ranging between 223 to 422mg/kg. Thus, a preliminary investigation was carried out to identify different Al forms in ash and volcanic ash derived soil from areas severely and minimally affected by volcanic activity. Aluminum forms were extracted using extractant such as 1M potassium chloride (pH 5.5), 1M ammonium acetate (pH 4.8), 1M hydrochloric acid, and 0.5M sodium hydroxide to identify and quantify exchangeable Al, organically bound Al, and amorphous Al, respectively. In ash and ash/soil mixtures from the severely affected areas, highest amount of Al was detected as HCl extractable Al. Aluminum forms extracted from the minimally affected areas indicate that high percentage of Al exists as amorphous aluminum followed by organically bound Al, and exchangeable Al. Key words: Soufrière Hills, Aluminum forms, Montserrat

EFFECT OF SOLVENT ON THE FLUORESCENCE PROPERTY OF BENZENE AND ITS DERIVATIVES. *Nagarajan Vasumathi, Caterina Lazzaroni and Ajibola Dawodu*, Dept.of Physical and Earth Sciences, Jacksonville State Univ., Jacksonville, AL 36265.

Factors influencing the fluorescence property of benzene and its derivatives are explored. In our previous study using cyclohexane as solvent, fluorescence spectrum of benzene solutions to toluene, bromobenzene, and aniline were studied. In this study, the spectra of these solutions in ethanol were analyzed and compared with previous results to determine which one of these solutions would best serve as labeled marker in fluorescence microscopy. The spectra were run using the Hitachi F-2500 spectrophotometer. Fluorescence is an electronic phenomenon and is primarily concerned with the light of wavelengths in the region of 200 to 800 μm . Molecules of compounds that absorb light in this wavelength region become excited and reach the higher energy excited state. The molecule returns to the ground state emitting some of the absorbed energy as fluorescence. The emission

spectrum appears in the longer wavelength region than the absorption spectrum allowing us to study the differences in their properties. Both the excitation and emission spectrum were collected for each solution at two different speeds. The fluorescence spectra of these solutions were examined using two different concentrations. Electron donating groups on the benzene ring increase the electron density and the delocalization on the ring and the compounds fluoresce more. Whereas electron withdrawing groups decreases the electron density and localizes on the substituent and the compounds do not fluoresce.

RECOLLECTIONS OF A HYDROGEN CYANIDE CHEMIST. *Richard C. Sheridan*, Tennessee Valley Authority (Retired), Muscle Shoals, AL 35661.

This paper reviews the experiences of a shift chemist in a hydrogen cyanide and acrylonitrile chemical plant in the 1950s. Then it discusses research done at Muscle Shoals, Alabama, in the 1960s on the synthesis of oxamide, a potential slow-release nitrogen fertilizer, from hydrogen cyanide (HCN). HCN was oxidized to cyanogen which was hydrolyzed to oxamide in concentrated hydrochloric acid. The oxidizing agents, nitrogen dioxide and cupric oxide, were regenerated for recycle. After studying the individual steps, including the synthesis of HCN from methane and ammonia or formamide, the four-step procedure was combined and operated in the laboratory. The use of a plasma torch to make HCN and the formation of oxamide from HCN and hydrogen peroxide were also investigated. No economical method was found for the production of oxamide as a fertilizer and the project was discontinued.

ROTATORY POWER OF ISOBORNEOL AND (S)-(-)-ENDO BORNEOL AT DIFFERENT WAVELENGTH REGIONS. Nagarajan Vasumathi, Kristin Shirey, and *Sani Brah*, Department of Physical and Earth Sciences, Jacksonville State University, Jacksonville, AL 36265.

The specific rotation of Isoborneol and (S)-(-)-endo borneol was studied under six different wavelengths: 365nm, 405nm, 436nm, 546nm, 589nm, and 633nm. The concentrations used were 0.1M and 0.01M, and solvent used was 95% ethanol. Measurements were made using the Rudolph Automatic Autopol IV Polarimeter. At room temperature, the specific rotation of 0.1 M isoborneol was different at different wavelength regions. At lower wavelengths it started out positive and dropped to negative at higher wavelengths. But, for 0.01 M solution, specific rotation remained almost the same. For (S)-endo-borneol, solutions of both concentrations showed different specific rotations at different wavelengths starting with higher negative values (~ -115 to -100) at lower wavelength (365 nm) and with lower negative values (~ -30 to -25) at higher wavelength side (633 nm). This variation is possibly due to the fact that at different wavelengths different amount of energy is being absorbed by the sample solution leading to conformational and/or configuration changes. At -5°C, the specific rotation varied within a narrow range for isoborneol at both concentrations and also at 10 minutes intervals for an hour of experiment. However, the 0.01 M solution

of (S)-endo-borneol showed large differences in specific rotation at different wavelengths at different time intervals for the same one hour experimental time period. The specific rotation became unexpectedly high positive changing from 185 at 365 nm to 269 at 633 nm.

SYNTHESIS AND CHARACTERIZATION OF TEMPERATURE-RESPONSIVE POLYETHYLENE GLYCOL DENDRIMERS. Amanda Lynn Hofacker and *Michelle Gabriel*, Dept. of Chemistry and Industrial Hygiene, Univ. of North Alabama, Florence, AL 35632.

First generation dendritic wedges consisting of pyridine 2,6-dicarboxylate and pyridine 2,6-dicarboxamide repeating units were synthesized. These dendritic structures were functionalized with tetra(ethylene)glycol terminal groups to impart water-solubility. The amphiphilic nature of these compounds contributes to an entropic solubility in aqueous media, where the compounds are soluble at lower temperatures in aqueous solution. This lower critical solution temperature was analyzed via UV spectroscopy. Due to their amphiphilic nature, entropic solubility, and dendritic architecture these products could lead to interesting advances in drug delivery systems. These dendritic structures are precursors to dendrimers; hyperbranched radial polymers, consisting of a single core, branching repeating units, and multiple terminal groups. Monodispersed dendrimers can be synthesized with relative ease and are highly attractive molecules because the multitude of terminal groups allows for many places of functionality to a single structure. The dendritic architecture can also contain inner pockets capable of holding small molecules. In addition, building a temperature-responsive dendrimer could dramatically increase its potential for highly controlled drug delivery.

Chemistry Poster Abstracts

CHEMICAL COMPONENTS OF FRAXINUS SPECIES IN NORTHERN ALABAMA. William N. Setzer, Behnard Vogler and *Twaskia S. Johnson*, Department of Chemistry, University of Alabama, Huntsville, AL 35899.

The Fraxinus species of North America is a native to most locations, which includes river bottoms, mountainous regions, and drained upland sites. The scientific name for these two species of trees is Fraxinus americana and Fraxinus pennsylvanica also known commonly as white ash and green ash. The two species of tree is in the olive family (Oleaceae). High performance liquid chromatography (HPLC) was used to determine the difference in chemical components over a five month period to see if there are any significant changes in the crude extract samples. A comparison of chemical components between male and

female species was also conducted. Bioassays were conducted to measure the polyphenolic content, free radical scavenging capabilities, and the inhibition of cruzain in each type of species of Fraxinus. The criteria for study for these trees were not taken from remote areas, but at one time was used by native american Indians for medicinal purposes. Tropical plants would have more ecological pressures than the Fraxinus species selected from North Alabama. The pure compounds of the Fraxinus species were isolated using HPLC and identified by Nuclear Magnetic Resonance.

DEVELOPING OF NMR SPECTROSCOPIC METHODS TO PROBE THE BINDING OF SMALL MOLECULES TOWARDS ALBUMIN PAPAINE, AND CRUZAIN. *Can Tan, Bernhard Vogler.* Department of Chemistry, University of Alabama in Huntsville, Huntsville, AL, 35899.

During the binding of small molecules towards large proteins characteristic NMR parameters, like T1, T2, and diffusion constants, undergo a change. Various methods probing the aforementioned parameters and their changes are employed and evaluated under the constraint that smallest amount of protein shall be used.

EFFECT OF BUFFERS ON AGGREGATE STRUCTURE FORMATION IN TPPS SOLUTION. *Anjelica Rivers, Donald Higgins and Kamala N. Bhat.* Department of Natural and Physical Sciences, Alabama A& M University, Normal, AL 35762.

The compound TPPS (tetraphenyl sulfonate porphyrin) occurs widely in nature, the most well known form is the heme molecule, and chlorophyll. The molecules of TPPS when deposited on films develop J and H-aggregates, which are characterized by having linear and non-linear optical properties due to uneven charge distribution. A mixture of TPPS and PDDA Poly (diallyldimethylammoniumchloride) in different mole proportions gives a variety of colors ranging from auburn to green, due to the presence of monomers and dimers in solution. This is a result of the stacking of TPPS and PDDA molecules causing aggregation. The morphology and internal arrangement of nano rod shaped aggregates was investigated by ultra-violet spectroscopy, micro fluidic depositions, fluorescence microscopy, and atomic force microscopy for solutions of TPPS and PDDA in HCl and phosphate buffer. UV-Vis spectra shows a blue shift in HCl 620nm- 780nm a sign of aggregation. A red shift occurs at 440nm - 490 nm but no aggregation was observed in the phosphate buffer solution. Fluorescence images for both samples showed no alignment. AFM results clearly differentiate the tubular nano structures present in the HCl samples as compared to the TPPS in phosphate buffer. Key words: TPPS, porphyrin, aggregate structure.

INVESTIGATING THE PRESENCE OF MERCURY IN THE SEA BOTTOM SEDIMENT SAMPLES COLLECTED FROM THE CONTINENTAL SHELF OF EASTERN GULF OF MEXICO. *George Kiplagat, David Steffy, and Al Nichols.* Department of Physical and Earth Sciences, Jacksonville State University, Jacksonville, AL 36265.

ABSTRACT An investigation is being conducted on the occurrence of mercury in sea bottom sediment collected from the continental shelf in the eastern Gulf of Mexico. Samples were collected during a cruise of the NOAA R/V Gordon Gunther during the Fall 2009 from eight sites chosen along a transect from Pascagoula to the Tortoga Islands. Six samples are gray, calcareous medium-grained sand and two samples were gravelly sand, both with varying amounts of biogenic material. In addition, pore water quality was measured immediately upon retrieval of the sample. The sediment was visually described, photographed, and grain-size analysis was conducted. Triplicate sediment samples of each site were then processed for mercury content using a cold vapor mercury analyzer. Mercury concentrations range in this eastern portion of the gulf from $0.007 \pm 0.004 \mu\text{g/g}$ to $0.054 \pm 0.023 \mu\text{g/g}$ and averages $0.029 \pm 0.013 \mu\text{g/g}$.

MERCURY LEVELS IN ROUGH SCAD, TRACHURUS LATHAMI, COLLECTED IN THE EASTERN GULF OF MEXICO. *Meriem Zettili, Alfred Nichols and David Steffy,* Dept. of Physical and Earth Sciences, Jacksonville State Univ., Jacksonville, AL 36265.

Scad mackerel, *Trachurus lathami*, were collected from the eastern Gulf of Mexico during the third leg of the NOAA Small Pelagics Survey in November, 2009. Fish were frozen and transported to laboratory facilities at Jacksonville State University for mercury (Hg) analysis. Freeze-dried fish tissue samples were analyzed for total Hg using cold vapor atomic absorption spectrometry. Mercury levels in fish varied with collection sites, with statistically significant differences in Hg levels observed between fish from high Hg level sites and fish from low level sites.

SYNTHESIS AND UTILITY OF 4-ALKOXY-DITHIONAPHTHOIC ACIDS. *Anna C. Worth, Catherine E. Needham, Katherine E. King, and Andrew J. Lampkins,* Dept. of Chemistry and Biochemistry, Samford University, Birmingham, AL 35229.

This poster will present our syntheses of amino acid derived thionaphthylates as CNS-permeable scaffolds for drug discovery applications. We will highlight robust, scalable methodology to construct 4-alkoxy-dithionaphthoic acids as key synthons toward these targets. This work has shown dithioacids to be ideal intermediates for subsequent functionalization as they are efficiently synthesized and purified, stable to storage, and easily derivatized to facilitate thioacylation chemistry. Specifically, we demonstrate how

these derivatives undergo aminolysis under mild conditions with both protected and unprotected amino acids, giving rise to stable thioamide species. This poster will also discuss the highlights (and pitfalls) of alternative synthetic approaches attempted in our laboratories. Finally, we will discuss how this molecular scaffold can be customized to exhibit biological activity against beta-secretase, a key enzyme involved in Alzheimer's disease.

THEORETICAL STUDIES OF THE PROPERTIES OF HIGH ENERGY DENSITY MOLECULES. Mary Hayes, Andrea Tolbert, Jong Hwa Kim, and Jamiu A. Odutola, Department Natural and physical Sciences/Chemistry, Alabama A. & M. University, Normal AL 35762.

Several isomers of poly-nitrogen molecules ranging from N₂₆ through N₆₀ were constructed and calculations carried out. The computational approach involves a quantum mechanical method to determine their stability and properties. The most stable conformation for each of the poly-nitrogen clusters is determined by geometry optimization and confirmed by frequency calculations using a DFT method (B3LYP) with the 6-31G(d,p) basis set. 6-311+G(3df,3pd) is used to calculate the single point energy for each optimized structure.

Chemistry (Alabama Undergraduate Research Symposium)

EFFECT OF STORAGE ON THE ANTIOXIDANT POTENTIAL OF BLACKBERRIES AND RASPBERRIES. *Samantha Gacasan* and Nixon Mwebi, Dept of Physical & Earth Sciences, Jacksonville State University, Jacksonville AL 36265.

Several advances in epidemiological studies depict a link between a diet rich in vegetables and fruits to decreased incidences of cancer and coronary diseases. This is thought to be due to the presence of phenolic compounds such as gallic acid, ellagic acid, caffeic acid in these fruits. Raspberries and blackberries have been found to be rich in these polyphenols. These berries are also widely used as flavoring and coloring agents. Raspberries and Blackberries are however not as widely cultivated as other fruits such as grapes. As a result, they are often need storage or long transportation and are not always served fresh. It is postulated that the storage and long transportation may alter the antioxidant value of these berries: this postulation forms the basis of this study. A spectrophotometric technique involving the ferric reducing antioxidant power (FRAP) was used to quantify the antioxidants (reductants) in the dry, frozen and freeze dried berries. UV-vis spectra was calibrated with ferrous ions measured under similar conditions.

HEAVY METAL CONTENT OF MEDICINAL BASIL (*Ocimum* spp). *Tabitha Robbins and Kamala N.Bhat, Chemistry Section , Department of Natural and Physical Sciences, Alabama A^M University, Normal, AL 35762. S.R. Mentreddy and Z.Senwo, Department of Natural Resources and Environmental Sciences, Alabama A&M University, Normal AL 35762.*

Heavy metal pollution of agricultural land and irrigation systems poses a health hazard to humans and animals. One possible mode of decontamination is using phyto-remediation by growing medicinal crops as alternate crops without contaminating the final product. Preliminary studies conducted using only one species of holy basil *Ocimum tenuiflorum* grown on acidic soil at the Winfred Thomas Agricultural Research (WATRS) station showed high accumulation of a wide range of heavy metals in the order leaves> roots, or stems or inflorescence of *Ocimum tenuiflorum*. Extractions for the samples will be performed to obtain as tea, infusion .and complete destructive products by acid digestion. Preliminary results based on acid destruction indicate the order for some heavy metals are as follows: Fe: Iron: leaf> root> inflorescence> stem and Mn: leaf> stem> inflorescence> root (136 words) [Abstract for the poster presentation # 766]

HEAVY METAL SPECIATION AND AVAILABILITY IN COMPOSTED SLUDGE. *Cain Eric Kirk and Nixon Mwebi, Dept of Physical & Earth Sciences, Jacksonville State University, Jacksonville AL, 36265.*

Land filling or has been the most popular recycling method for composted sludge. This is because the material is inexpensive yet rich in nitrogen, phosphorus, organics and other micronutrients that help to both enrich and condition the soils. Presence of heavy metals in the biosolids however has always been a great concern as some of these metals are toxic to humans even at trace amounts. Several methods have been devised to study the heavy metal content of these materials but the most used one has been sequential extraction. This is due to the fact that the toxicity of the metal sand its bioavailability depends on the nature of the metal species contained. In this study, sequential extraction is used to determine the speciation and bioavailability of heavy metals in the composted material used as manure for lawns and gardens in northeast Alabama. The total heavy metal content in the various fractions ranging from the exchangeable to the complexed and residual fractions as determined by atomic absorption spectroscopy are presented.

INVESTIGATING THE EFFECT OF ADDING MILK ON THE ANTIOXIDANT POTENTIAL OF TEAS. *Jennifer Brown, Nixon Mwebi, Dept of Physical & Earth Sciences, Jacksonville State University, Jacksonville AL 36265.*

Tea, *camellia sinensis* is the most consumed beverage across world, next to water. Tea consumption has been linked to increased health benefits which are mainly attributed to the antioxidant potential of the various compounds such as polyphenols in the tea. In many parts of the world, tea is consumed with milk; the milk is added after brewing. In this case,

whole milk, reduced percent milk, skimmed milk or powdered non dairy milk is used. Several studies have looked at the effect of adding milk on the antioxidant potential of tea. These studies have been inconclusive and differed widely; with some studies indicating that addition of milk has minimal or no effect on the antioxidant potential of tea; other studies indicate that milk addition enhances the antioxidant potential of tea, yet others argue that the milk addition inhibits the antioxidant potential of tea. This controversy forms the basis of this study which methodically addresses the effect of adding milk on black and green tea under the optimized conditions used in other studies. The employs the FRAP technique which involves the reducing of the ferric complex to the ferrous complex by the reductant (antioxidant in the teas). Our results indicate that milk addition has an effect on the antioxidant potential of tea and the effect depends on several factors including the fat content of the milk added.

QUANTITATIVE DETECTION OF ALKANETHIOLS AS ALKANESULFONATES BY NEGATIVE-ION ELECTROSPRAY-IONIZATION MASS SPECTROMETRY.

Sagar H. Amin, Danielle M. Brown, and Brian W. Gregory, Department of Chemistry & Biochemistry, Samford University, Birmingham, AL 35229-2236.

Electrospray ionization mass spectrometry (ESI-MS) in negative-ion mode is currently being used in the direct quantitative analysis of binary and ternary mixtures of simple n-alkanethiols. The use of ESI-MS is advantageous since one can easily distinguish between different alkanethiols and determine quantitatively the amount of each type that is present from their mass spectral intensities. These investigations are part of a wider project in our group to study multicomponent alkanethiol self-assembled monolayers (SAMs), where MS is being used to determine the surface mole fractions of each component contained in the mixed SAMs. Given their propensity to spontaneously oxidize and in order to facilitate detection, all alkanethiols are purposely and completely oxidized to sulfonates using a slight stoichiometric excess of hydrogen peroxide. With this method, alkanethiol concentrations as low as 1 micromolar can be detected with a high degree of accuracy by direct infusion. Using an alkanethiol internal standard, highly linear mass spectral calibration curves for various binary and ternary alkanethiol mixtures have been obtained over the micromolar to millimolar concentration range. Quantitative calibration data obtained from this mass spectrometric approach will be presented, and the importance and relevance of this work to highly accurate determinations of surface mole fractions in mixed SAMs will be discussed. This research was supported by the National Science Foundation (MRI Program, Award ID 0619217) and the ACS Petroleum Research Fund (PRF# 49516 -UR 5).

THEORETICAL STUDY OF TWO TAUTOMERS OF LOSARTAN IN GAS PHASE AND AQUEOUS SOLUTION. ***Andrea Tolbert and Jong Hwa Kim, Department of Chemistry, Alabama A&M University, Normal, AL 35762.***

Two tautomeric forms of losartan, an angiotensin II receptor antagonist, are studied by using a hybrid Hartree-Fock density functional theory (DFT) method at B3LYP/6-31+G(d)

and 6-311+G(2d,p) levels. In gas phase, one tautomer is energetically favored over the other by a difference of 1.7 kcal/mol. The less stable tautomer, however, shows a considerably larger decrease in Gibbs free energy upon transfer from gas phase to water. Deprotonation of these two tautomers in aqueous solution is also investigated.

Earth Sciences Paper Abstracts

ADAPTIVE WET SEASON WATER HARVESTING IN ALABAMA, THE GEOLOGIC-GEOMORPHOLOGIC PERSPECTIVE. *Mezemir Wagaw, Wubishet Tadesse, Tommy Coleman, Girma Kebede.* Department of Natural Resources and Environmental Science, Alabama A&M University, Normal, AL-35762.

The state of Alabama is located in the southeastern region with one of the highest average annual precipitation in the Nation. This natural resource can potentially transform agriculture in Alabama into the most productive sectors of the economy. The critical issue in this regard is the supplemental water availability to bridge the irregularly occurring "short" dry spells in the growing season. This would require a new approach to capturing wet season surplus water for dry season usage across the state as an "on-farm water security". As a prelude to site-specific water access and use, in this study a holistic and adaptive approach is presented to facilitate the capturing of wet season surplus water for dry season usage across the state as an "on-demand-on-farm water harvesting enabler". Water harvesting is a complex technical process, also could be at times environmentally sensitive. Hence such an investigation would demand an input from various natural and social science disciplines. The scope of this investigation is to explore the potentials and challenges in statewide introduction of the praxis of cool-season run-off impoundment for dry season irrigation purposes. Dry season irrigation across the state is predicated on a set of natural and environmental situations. For this study, historic flow recordings, multi-temporal/scale satellite imageries, meteorological data, reports, and thematic maps from water resource agencies were available. The ESRI GIS, ERDAS Imagine, and MIKE SHE modeling tools were used. As a preliminary finding, various basin-wide approaches such as surface impoundments, more integrated use of underground localized micro-aquifer systems, tectonic lineaments, fractures, and other regional and sub-regional geological and geo-morphological features as inexpensive mechanisms of water retention are discussed. The potential unintended environmental side-effects of such small but frequent undertakings were also addressed. As a prelude to site-specific water access and use, this study provides a thorough understanding of the surface water bearing and hydrogeologic conditions based on the prevailing structural and geomorphologic features across the state. This investigation will assess broader irrigation potentials based on the precipitation trend, geology, and hydrogeology with a special emphasis on northern and central region of Alabama.

IRRIGATION WATER WITHDRAWAL MODEL BASED ON ENVIRONMENTALLY SUSTAINABLE CRITERIA. *Cameron Handyside and Richard McNider* ESSC, UA
Huntsville, Huntsville, AL 35899.

This project builds a hydrology model using a combination of Geographical Information, historic stream flow data and statistical analysis to determine the environmentally safe withdrawal limits from a river (in this project, the Sipsey River Swamp). The withdrawals are intended for irrigation to increase agricultural production in Alabama; where rain-fed farming fails to compete with western, irrigated farms. The environmental limits are based on the principle of not altering river floodplain inundation levels, which are considered more sensitive to withdrawals than in-stream flows. In addition, withdrawals would take place during the winter, when stream flows are high and other demands on water are low. The hypothesis is even a small river like the Sipsey River Swamp has so much variability that a certain amount of water may be withdrawn without any perceptible change in floodplain inundation. The results of this project show that even during a drought year, the Sipsey River Swamp provides 29,000 acre-feet of water that could be used for irrigation. Further historic data show that on average, the Sipsey River could provide 48,000 acre-feet per year and based on crop models, Alabama agriculture would greatly benefit from just 1 foot of irrigation per acre.

PALEOBIOGEOGRAPHICAL AND PLATE TECTONIC SIGNIFICANCE OF LATE CRETACEOUS OSTRACODES (CRUSTACEANS) FROM CHIAPAS, MEXICO: A PRELIMINARY REPORT. T. Markham Puckett and *Bradley Arnett*, Dept. of Physics and Earth Sci., Univ. of North Ala., Florence, AL, and Gerardo Carbot-Chanona, Museo de Paleontología, Tuxtla Gutiérrez, Chiapas, México.

Ostracodes, which are small (~1 mm), bivalved crustaceans with a nearly 500-million-year fossil record, are one of the most useful fossil groups for use in paleobiogeography, and thus can contribute to understanding ancient plate tectonic configurations. This utility is due primarily to their provincial distributions. Many groups of ostracodes cannot cross deep water barriers, and thus, if the same shallow-water ostracodes occur in regions now separated by deep water, it indicates that the regions were once together and have subsequently rifted. It is this paleobiogeographical utility that is being applied to understanding some of the complex plate tectonic movements in the Caribbean and Central American regions. Six samples were collected from the Late Cretaceous (Maastrichtian) Ocozocoautla Formation near Tuxtla Gutiérrez, state of Chiapas, southern Mexico, to compare the ostracode species to samples previously collected in coeval deposits of Jamaica. Other fossil taxa are known to occur only in Chiapas and in Jamaica (including certain corals, larger foraminifera, decapod crustaceans and rudistid bivalves), but this is the first known study and comparison of ostracodes from each region. All six samples contained ostracodes, although abundance ranged from very rare to abundant and preservation ranged from poor to fair. Analysis of ostracodes from Chiapas indicates that many of the species are indigenous only to

that region and Jamaica. This result is in agreement with plate tectonic models that show Jamaica attached to southern Mexico during the Late Cretaceous and rifting away during the Eocene by movement along the Cayman Trough.

WATER USE SUSTAINABILITY AND GLOBAL CLIMATE CHANGE TRENDMODELING OF NORTHERN ALABAMA REGION. *Girma Kebede, Mezemir Wagaw, Wubishet Tadesse.* Alabama Cooperative Extension System Office at Alabama A&M University, P.O. Box 1208 Normal, AL-35762. Department of Natural Resources and Environmental Sciences, Alabama A&M University, Normal, AL35762.

Huntsville City is experiencing a high rate of expansion. The land use/land cover across the Madison and Limestone Counties is being rapidly transformed from a predominantly cotton-farm or pastoral-land to a new urban, suburban one. The completely new ramifying conditions for surface water flow and groundwater recharging are part of the permanent transformations induced by such rapid dynamics. This process combined with global climate change is posing a challenge to secure sufficient water resource for a healthy eco-system and balanced regional economic growth. The recent past recurrent agricultural drought had shown the vulnerability of North Alabama's water system to induced weather-regime fluctuation and change. In this work we analyzed multi-temporal Landsat TM images and weather observations at five different stations across the region. Historical trends of water supply, rain-fall and temperature distribution over the past seven decades is discussed and future research direction presented.

Earth Sciences Poster Abstracts

DIURNAL AND SEASONAL CARBON AND ENERGY FLUX OVER NO-TILLAGE FARMING. Hwan Hee Han, Maheteme Gebremedhin, and Teferi Tsegaye. Department of Natural Resources and Environmental Sciences. Alabama A&M University, Normal AL 35762.

This research seeks to understand diurnal and seasonal carbon, water, and energy flux and its function of soil-vegetation-atmosphere dynamics. A long term investigation of energy and water balance, and carbon dioxide measured under a no-tilled system on humid environment of the southeastern part limited. Our objectives are to quantify carbon, water and energy partition for no-tillage system and understand the carbon, water and energy change as a function of environmental and biological controls between soybean and

winter wheat growth cycle. The study was conducted at the Winfred Thomas Agricultural Research Station (34 54' N, 86 32' W) located at Hazel Green, AL. A micrometeorological station was installed at the center of the field (18 ha field, 400X400m) and included eddy covariance system, and open path gas analyzer were used to make long-term continuous measurements during two complete soybean and winter wheat growth cycle. Our preliminary results indicate that the longest diurnal carbon uptake rates were observed during the warmer months (May to August, 2007). Large differences in daily carbon dioxide uptake were observed during the cooler months (January to April) over winter wheat canopy while differences were small during summer time. The trend in carbon dioxide uptake was consistent with changes in day length. Over winter wheat canopy, the carbon assimilation values ranged from a maximum of $-14.5 \mu\text{mol m}^{-2} \text{s}^{-1}$ (11:00 -12:00 local time) in March, to a minimum of about $-5 \mu\text{mol m}^{-2} \text{s}^{-1}$ in January. During the warmer months, soybean carbon dioxide flux reached a maximum of $-15.5 \mu\text{mol m}^{-2} \text{s}^{-1}$ in May during the early morning hours to a minimum of $-8.5 \mu\text{mol m}^{-2} \text{s}^{-1}$ in August. Mid-summer drought occurred during the main growing season (June-August) had a strong impact on canopy carbon dioxide uptake which resulted in reduced day time carbon assimilation.

GERMICIDAL EFFECTS OF ULTRAVIOLET-C LIGHT ON COLIFORM FOUND IN POND WATER. *Emily A. Duke*, Jefferson County International Baccalaureate School. Birmingham, AL 35210.

According to Dooge, Rodda, and Young, authors of Global Water Resource Issues, over one-third of the world's population lacks sanitary drinking water. Fecal contamination is the greatest contributor to waterborne illnesses like cholera, typhoid fever and diarrhea. Therefore, the purpose of this experiment is to find a better way of disinfecting contaminated water to make it safer to drink. For this experiment, I chose to test the effects of Ultraviolet-C light in reducing coliform, an indicator of fecal contamination in water. I hypothesized that exposing 460 milliliters of pond water to Ultraviolet-C light for two minutes would completely eliminate the coliform. To test my hypothesis, I created a small treatment chamber composed of a Styrofoam cooler with an Ultraviolet-C light fixture attached to the lid. I measured the amount of coliform initially in the pond water, then compared it to the amount of coliform left after the water had been exposed to Ultraviolet-C light for 2 minutes. The coliform count was measured using Petrifilm strips which were incubated for 24 hours to gain a total coliform count and then incubated for an additional 24 hours to obtain a total *Escherichia coli* count. Results from the experiment partially supported my hypothesis. Although a complete elimination of coliform in the pond water did not occur, the Ultraviolet-C light treatment did decrease the total coliform by 87 percent and the total *E. coli* colonies by 95 percent. This means that Ultraviolet-C light has the potential of providing potable water to people who are in need.

MODES OF OCCURRENCE OF SIDERITE IN THE BARNSDALL FORMATION, NORTHEASTERN OKLAHOMA: RELATIONSHIPS TO FOSSIL PRESERVATION AND IMPLICATIONS FOR DEPOSITIONAL DYNAMICS. *James R. Thomka, Dept. of Geology and Geography, Auburn University, Auburn, AL 36849.*

Siderite within the Barnsdall Formation of northeastern Oklahoma occurs in four varieties: (1) large nodules lacking a distinct central nucleus, concentrated in horizons bearing articulated crinoids; (2) small concretions with distinct skeletal nuclei consisting of infaunal bivalves and inarticulate brachiopods occurring in horizons relatively lacking in articulated crinoids and crinoid material; (3) large sideritized burrows occurring above crinoid horizons; and (4) concretions nucleated around former sites of soft tissue in large crinoids and productid brachiopods. Analysis of siderite occurring within the section under study reveals: (1) precipitation of large nodules began very early after sediment deposition in the upper, fluid-rich layers of the sediment profile; (2) exhumation and exposure at the sediment-water interface did not occur following precipitation; (3) sedimentation rate following deposition of crinoid-bearing layers was sufficiently slow to allow nodule growth; (4) infauna, particularly those with aragonitic skeletons, are preferentially preserved in certain horizons relative to others; (5) some crinoids and brachiopods were rapidly buried alive or prior to substantial decay; and (6) firmer substrates were present at certain periods, indicating either periods of winnowing and exhumation or deep, localized excavation by burrowing organisms. Summarily, these data indicate that this oxygenated marine shelf environment, characterized by an increasing, but still relatively low sedimentation rate punctuated by rapid burial (and possible winnowing) events, provided conditions that were ultimately necessary for preservation of articulated crinoid fossils.

NET ECOSYSTEM EXCHANGE OF SOYBEAN/WINTERWHEAT CROPPING ON RAINFED ZERO-TILLED SOIL IN NORTHERN ALABAMA. *Maheteme Gebremedhin and Teferi Tesgaye, Department of Natural Resources and Environmental Sciences, Alabama A&M University, Normal, AL 35762.*

Minimum tillage, as best soil management practice, has been suggested as potential alternative option for short term carbon (C) mitigation and sequestration strategies. Yet, the exact magnitude of carbon uptake and the factors deriving this apparent sink are largely unknown. Here, we present the results of measurements (2007-2009) of net ecosystem exchange (NEE) for a soybean (summer crop) and winter wheat (winter cover crop) cropping system on zero-tilled soil using the eddy covariance (EC) technique. The study was conducted near the city of Huntsville, at Winfred Thomas Agricultural Research station (WTARS), in Hazel Green, AL, (34°54'N and 86°32'W). Integrated sums of NEE across the growing seasons for the observation period was variable and the site acted from small C source in summer of 2007 to a large carbon sink in 2008 and 2009. The summer growing season (DOY 152-215) of 2007 was a net C source (+ 220 g C m⁻²), in large due to the prolonged drought conditions (totalized annual rain fall amount was 572 mm,

67% lower than the long term average) and severe soil water stress ($\theta < 0.05 \text{ m}^3 \text{ m}^{-3}$) that persisted for much of the year. In contrast, the annual magnitude and direction of NEE was reversed for both the cover crop and soybean canopies and became net C sinks as evidenced by seasonally integrated average values of -285 (winter) and -467 g C m^{-2} (summer) in 2008. The site was both a net C source (2007) and sink (2008 and 2009); the status of which is strongly dependent on soil moisture availability. Our result and other related EC measurements highlight the importance of long term examinations of soil management practice (e.g. zero-tillage) in light of a changing climate, particularly of soil moisture perturbations, before adopting and implementing such option as crop based C sequestering alternatives.

OCCURRENCE OF PESTICIDES IN SOIL AND SURFACE WATER OF THE TENNESSEE RIVER BASIN. Karnita F. Golson-Garner, Teferi D. Tsegaye, Paul S. Okweye, and Dirk Spencer, Department of Natural Resources and Environmental Sciences, Alabama A&M University, Normal, AL 35762.

The persistence of organochlorine pesticides (OCPs) in terrestrial and aquatic ecosystems of the Indian Creek (ICW) and Huntsville Spring Branch (HSBW) watersheds is a major concern for North Alabama. The objectives of this study were 1) to examine the spatio-temporal distribution patterns of OCPs in water, soil and alluvial sediment of selected areas within these watersheds, 2) to ascertain whether concentrations exceeded established water and sediment quality criteria, and 3) to examine the impact of various factors on pollution levels. Soil and sediment samples were collected from upland, bank and in-stream depositional areas and investigations were conducted to characterize soil and water physicochemical conditions. The concentrations of 22 pesticides were determined through dual-column analysis using GC-ECD. OCP concentrations ranged from undetectable to $5080 \mu\text{g/kg-dw}$. The most predominant occurrences were observed for DDT, DDE, DDD, heptachlor, toxaphene and various endrin compounds. Results showed significant differences in spatio-temporal distribution patterns and revealed that OCP levels often violated permissible water and sediment quality criteria, indicating ecotoxicological risk to organisms in both aquatic and terrestrial ecosystems. In addition, an obvious trend was observed for DDT and its metabolites, $\text{DDT} > \text{DDE} > \text{DDD}$, respectively. OCP concentrations tended to be higher at the upland positions and in the HSBW. The findings were attributed to variations in absorption, volatilization, plant uptake, microbial degradation, land use, and other processes that affect pesticide degradation. Overall, the findings were in line with those reported by a number of researchers and substantiate that impairments within the ICW and HSBW continue to be a result of organic compounds and less than optimal physicochemical conditions.

SPATIAL DECISION SUPPORT SYSTEM (SDSS) DEVELOPMENT FOR URBAN STORMWATER MANAGEMENT AND WATER QUALITY ASSESSMENT. Nally Kaunda (Alabama A&M University Huntsville, AL) Wubishet Tadesse, (Alabama A&M University Huntsville, AL), and Barnes Tim (City of Huntsville,AL).

The goal of this project is to examine the effect and contribution of urbanization to water quality and develop a customized spatial decision support system (SDSS) that will assist municipal officials fulfill environmental legislations and better manage sewer infrastructure. The study area includes the highly urbanized portion of the Wheeler Lake watershed (HUC 06030002), specifically the Huntsville, Alabama. Across the nation, land-use decisions are made by elected and appointed officials at the county and municipal or town level. Because of the critical importance of their work, and because they deal with land-use planning and regulation on a daily basis, local officials need decision tools that can allow them to place case-by-case land-use decisions within the broader context of the community, region, or watershed, assisting them to project environmental degradation and evaluate alternative scenarios, minimizing the impact of pollution on their communities. The specific objectives are: 1) Develop an enterprise geographic database schema for keeping an inventory of storm water and sanitary sewer infrastructure. 2) Develop a method using object-based image classification and subdivision development data to extract impervious surface cover (ISC) and land use/land cover (LULC) from one-foot color ortho-photography and other temporal imageries. 3) Develop a spatial decision support system that incorporates objectives 1-2 to be used by municipalities for pollution master planning, environmental legislation compliance, and for minimizing the impact of urbanization on the environment.

Engineering and Computer Science Paper Abstracts

A STATISTICAL APPROACH TO DSL LEARNING. Marjan Mernik, Dept. of Computer and Information Science, Univ. of Maribor, Slovenia, Barrett Bryant, Alan Sprague, Thamar Solorio and Upendra Sapkota, Dept. of Computer and Information Sciences, University of Alabama at Birmingham, 35294.

Grammar induction, also referred to as syntactic pattern recognition is the process of extracting syntactic structure from given sample data. Context Free Grammars (CFGs) constitute an important class of grammars which are extensively used in various applications such as description and design of programming languages and compilers and analyzing the syntax of natural languages. Grammar Induction to infer CFGs for general purpose programming is still a forbidding problem but research on inferring Domain Specific Languages (DSLs) has achieved satisfactory results. In the cases where the DSL specification has been lost and there are only DSL samples, the grammar induction can be

used to generate the specifications. Applying genetic algorithms to the given samples is one approach to inferring grammars. In contrast, this work performs statistical analysis on the given samples. Similar to current unsupervised approaches for grammar induction in the field of natural language processing we perform a clustering of tokens and then infer the grammar from these clustered tokens, thereby increasing the efficiency and ease of grammar induction.

AN OPTIMIZED IMAGE CLUSTERING AND FEEDBACK-BASED RETRIEVAL FRAMEWORK. *Liping Zhou*, Dept. of Computer and Information Science, University of Alabama at Birmingham, AL 35294-1170.

Most object-based image retrieval systems are based on single object matching, with its main limitation being that one individual image region (object) can hardly represent the user's retrieval target especially when more than one object of interest is involved in the retrieval. This work presents an innovative image retrieval system which improves the image retrieval accuracy and efficiency by using a novel image clustering algorithm and integrating it with Integrated Region Matching (IRM) and relevance feedback (RF). In the proposed framework, images are first segmented into objects (regions/segments). The proposed clustering algorithm is then applied to clustering image segments, resulting in clusters of images with similar segments, to reduce the search scope and, therefore, reduce the time-complexity in the subsequent retrieval step. The Integrated Region Matching is then adopted with a new region-matching scheme that is suitable for relevance feedback, which measures the overall similarity between two images based on weighted region similarities. In addition, relevance feedback is adopted in this framework to reduce the semantic gap, which helps to progressively learn the user's preferred query regions based on the user-selected positive images in the query results. The performance of the system is evaluated on a large image database, showing improved accuracy and Normalized Modified Retrieval Rank (NMRR) when compared with IRM without feedback.

ANODE MATERIALS FOR H₂S SPLITTING IN ELECTROLYTIC CELL. *Jonathan Mbaha*,^{b,d} *Burton Krakow*^b, *Elias Stefanakos*^{b,c}, *John T. Wolana*,^b. ^aDepartment of Chemical & Biomedical Engineering, College of Engineering, University of South Florida, Tampa, FL 33620, USA ^bClean Energy Research Center, College of Engineering, University of South Florida, Tampa, FL 33617, USA ^cDepartment of Electrical Engineering, College of Engineering, University of South Florida, Tampa, FL 33617, USA ^dDepartment of Chemical Engineering, College of Engineering, Tuskegee University, AL 36808.

We present a novel electrochemical decomposition process of H₂S to hydrogen and sulfur from existing IGCC power plant emissions. A large amount of energy is required to electrolyze water as compared to that needed to electrolyze H₂S. The test-bed is an electrochemical cell having an anode chamber of a solid proton conducting membrane and

a cathode chamber on the other side of the membrane. This study describes the development of a novel thin membrane exchange assembly (MEA) from a solid acid material, cesium hydrogen sulfate (CsHSO₄), and from a composite anode electrocatalyst for electrolytic splitting of (100 %) H₂S feed content gas operating at 135 kPa and 150 °C. A new class of anode electrocatalyst with the general composition, RuO₂/CoS₂, and an improved proton conductor, CsHSO₄, have shown great stability and desired properties at typical operating conditions. This configuration demonstrated stable electrochemical operation for 24 h with a (100 %) H₂S fuel stream at 423 K. This same system showed a maximum current density of (19 mA/cm²) at 900 mV. The performance of this new anode electrocatalyst when compared to that of Pt black investigated in a previous study showed an overall superiority in application. We have achieved a 30 % reduction in the overall system performance by fabricating a thin (200 μm) CsHSO₄ electrolyte, which reduced the whole MEA thickness from 2.3 mm to 500 μm. The result of permeability measurements proved that this thin solid electrolyte is impermeable to H₂S gas and physical integrity was preserved throughout the experimental period. Further resistance losses were compensated by using a high energy planetary milling system to enhance the ionic conductivity of CsHSO₄. The difference in stability and electrochemical performance of these cells compared to that of Pt anode based systems is directly attributable to the anode materials developed in this project.

CLASSIFICATION, LIGHTWEIGHT MALICIOUS URL CLASSIFICATION. *Jason R Britt and Daniel P Mills, Dept. of Computer and Information Science, University of Alabama at Birmingham, Birmingham, AL 35205.*

Today websites are not always benign. They can deliver malicious software or host pages designed to coax personal information out of users. Classifying a page as a malicious or benign page can be difficult and take time. To speed the identification process a program to automatically classify URLs as malicious or benign can be of great use as a tool to aid in the identification of malicious websites. An extremely lightweight classification process has been created utilizing a supervised artificial intelligence learning algorithm. The learning process focuses on attributes parsed from the URL such as country of origin (if available in IANA's country code format in the domain name), file extensions, length of the entire URL and several other attributes. Attributes determined by actual content of the site or any host information were purposefully left out. By leaving any information not found in the link itself out, the program is more lightweight than implementations using host-based or content-based attributes.

CLUSTERING IMAGES USING VARIABLE BIN WIDTH HISTOGRAM. *Song Gao, Dept. of Computer & Information Sciences, Univ. of Alabama at Birmingham, Birmingham, AL, 35205 and Chengcui Zhang, Dept. of Computer & Information Sciences, Univ. of Alabama at Birmingham, Birmingham, AL, 35205.*

In image clustering, digital images can be represented with many features, such as color code, texture, corresponding to a high dimensional data space. Traditional clustering algorithms

have difficulty in processing image dataset because of the curse of dimensionality. Moreover, the similarity between two images may exist in a subspace of feature space. To discover clusters existing in different subspace is known as the projective clustering problem. In this paper, two techniques are proposed in our projective clustering algorithm. First, the variable bin width histograms which correspond to the lower dimensional subspaces are constructed automatically to estimate the distribution of original data. Compared with fixed bin width histogram used in previous projective clustering algorithms, such as Efficient Projective Clustering by Histograms (EPCH), variable bin width histogram keeps a tradeoff between accuracy of underlying distribution and execution performance. Second, relative entropy is used as density threshold in order to iteratively detect dense bins in each histogram. The input parameters are robust and easy to understand by users. Cluster candidates can be described as the intersection of projective areas that consist of dense bins with large number of data objects. . Experiments on image segmentation dataset show that our algorithm has better clustering quality than EPCH according to v-measure.

COMPRESSIBLE FLOW OVER RECTANGULAR CAVITIES. *Jungwook Goldsmith, Billy A McConathy, Balaji Venkatachari, and Gary Cheng, Dept. of Mechanical Engineering, Univ. of Ala. Birmingham, Birmingham, AL 35294.*

With continued growth in air and ground traffic, flow generated noise (e.g. noise from aircraft engines) has become a major source of noise pollution. Additionally, it can also interact with structures around it causing damage to them (stores and electronic equipments in aircraft weapon bays) and also affect vehicular behavior (stealth operation of submarines and aircrafts); thereby continuing to remain as a challenging area in engineering. The study of these flow induced noises is termed as aeroacoustics. Computational aeroacoustics (CAA) deals with computational simulation of sound generated from unsteady flows. However, unlike computational fluids dynamics (CFD), CAA technology has not matured enough to perform complicated studies and still requires various improvements. Delicate nature of acoustic waves calls for the use of numerical algorithms having very low numerical dissipation/dispersion in CAA simulations. In this work, we will be studying aeroacoustic problems associated with weapon bays, using a simplified two dimensional rectangular cavity configuration. The simulations will be performed using the novel conservation element and solution element (CESE) framework that holds a lot of promise for CAA. The influence of cavity aspect ratio and inflow Mach number on the flow physics and noise generation mechanism will be studied in detail and compared with experimental/theoretical studies in this work. Additionally, the influence of numerical mesh on the computational results will also be verified.

DEVELOPMENT OF A TRANSVERSE ISOTROPIC MATERIAL MODEL FOR BRAIN TISSUE TO MODEL THE RESPONSE OF HUMAN HEAD TO IMPACT LOADS. *Sandeep Kulathu and David L. Littlefield, Dept. of Mechanical Engg., University of Alabama, Birmingham, AL 35294.*

The development of a finite element model capable of predicting brain injury sustained as a result of an impact load to the head is of considerable importance not only for the development of adequate protection systems but also in deciding an appropriate mode of treatment for an individual. With advancements in imaging technologies, it is now possible to visualize the neuron fiber structures in the brain. A composite material model was developed from the individual isotropic behaviors of the CSF and brain tissue present in the brain such that the resultant behavior of the material is transverse isotropic. To capture the presence of neuron fibers in the brain, the data obtained from Diffusion Tensor MRI(DTI) was incorporated into the finite element model so that, based on the fiber direction in each voxel, the material model was suitably applied to behave as a transverse isotropic material. The use of DTI data in conjunction with the transverse isotropic material model is a novel method that has not been attempted so far because the material data available for brain tissue are mostly isotropic in character. As a first step towards achieving our goal of having an anatomically correct and detailed finite element model, we have used our solver on a simplified geometry of the brain. Loading conditions from literature where experiments have been done on cadavers were used as a means of comparing predicted pressures with the observed values.

METAMODEL RECOVERY FROM MULTI-TIERED DOMAINS USING EXTENDED MARS SYSTEM. *Qichao Liu*, Marjan Mernik, Barrett Bryant Dept. of Computer and Information Sciences, Univ. of Ala., Birmingham, AL 35294.

With the rapid development of model-driven engineering (MDE), domain-specific modeling has become a widely used software development technique. In MDE, metamodels represent a schema definition of the syntax and static semantics to which an instance model conforms (i.e., a model conforms to its metamodel in a similar manner to how a program conforms to a grammar). However, in order to address new feature requests of the domain and language, the metamodel often undergoes frequent evolution that may result in the inability of users to load and view previous model instances. MARS (MetAmodel Recovery System) has been developed to address the problems of metamodel evolution, which could infer a metamodel from a collection of instance models. The system works fine with single-tiered domains but not very well with multi-tiered domains. Our work focuses on extending MARS to infer metamodels for multi-tiered domains. As a result, a new XSLT translator has been developed to generate a domain-specific language (DSL) called MRL (model representation language) for the domain instances and the metamodel transformer has been revised to translate the MRL back into a metamodel.

MODEL-BASED IMPLEMENTATION OF AUTOMATED WEB-BASED INFORMATION SYSTEM. *Sriharsha Jasti*, Department of Computer Science, Alabama A&M University, AL 35762.

It is well-known that UML is used to support object oriented system analysis and help the development of large scale software systems. The strong impact and ubiquity of Internet

has revolutionized transitional applications and web-based systems are widely developed and adopted in daily life. In addition, UML has been widely used to model business problems of a distributed concurrent system to improve software quality and get accuracy and efficiency. Several features are increased in UML2, especially for behavioral diagrams. This paper presents how Unified Modeling Language (UML) can be used for modeling and design of Web-based Information System. In this paper, we used class diagram and sequence diagram to model a web based application in a dynamic environment where business and technology strategies converge. This application runs on different machines with interactive well designed GUI interface to the user. We believe that UML is good at modeling and representation of business process for quality and requirement analysis. In this project, to validate the idea, we considered "Automated Vehicle Management System" as a case study.

MULTICORE ARCHITECTURE AND PERFORMANCE CONSIDERATIONS. *Srinivasarao Krishnaprasad, Dept. of MCIS, Jacksonville St. University., Jacksonville, AL 36265.*

The advent of multi-core processor chips is made possible by continued help from Moore's law that doubles logic resources every two years. The effect of multi-core architecture on the overall performance of the computing resource has recently been gaining the attention of researchers. Fred Pollack, a Fellow of Intel, suggested that the performance increase of a processor is roughly proportional to the square root of the increase in logic resources. Mark Hill and Michael Marty, in a recent IEEE Computer article, outlined their thoughts on Amdahl's law in the multi-core era. Assuming that a single base core equivalent (BCE) of logic resources implements a baseline core, they have proposed ways to organize a multi-core architecture that has n BCEs. These include symmetric, asymmetric, and dynamic organizations. A symmetric chip will have cores that are all equivalent. Thus, a chip with n BCEs can have (n/r) r -BCE cores. In an asymmetric chip, individual cores can be of different powers. For example, we may have one r -BCE core and $(n-r)$ 1 -BCE cores for a total of $n-r+1$ cores. In a dynamic multi-core architecture one can combine dynamically several cores to improve the performance of a sequential code. Amdahl's law applied to these three organizations depicts different performance trends. For example, with a 256 BCE chip and a highly parallel application (99% of parallelism), Amdahl's law gives an upper bound in speedup of 72, and corresponding speedups for symmetric, asymmetric, and dynamic organizations are 80, 166, and <223 respectively.

OPTIMIZATION OF MULTI-LAYERED CASINGS FOR ENERGETIC MATERIALS. *Kenneth C. Walls, Dept. of Mechanical Engineering, University of Alabama., Birmingham, AL 35294. David L. Littlefield, Dept. of Mechanical Engineering, University of Alabama, Birmingham, AL 35294. David E. Lambert, Air Force Research Laboratory, Eglin AFB, FL 32542.*

Multi-layered casings are often used to encase explosives in order to maximize the lethality

of the device while also protecting the explosive from ballistic impacts. A multi-layered case thickness optimization was performed by coupling the commercial optimization software LS-OPT with the multi-material Eulerian hydrocode CTH. The optimization consisted of two separate simulations conducted during each iteration of the optimizer. The first simulation was a modification of a standard benchmark called the *cylinder* expansion test in which kinetic energy and wall velocity were maximized for four alternating layers of Lexan and titanium surrounding the explosive PBXN-9. The thickness of each layer was varied, while the outer radius of the casing was fixed at 2.5". The second simulation tested the ability of the casing to prevent unwanted reactive detonations by impacting the casing with a standard fragment at 8600 ft/sec. Casings that failed to protect against detonation were flagged as inadmissible. A series of thickness and velocity constraints were applied to the problem and two objective functions were implemented to optimize the kinetic energy and velocity of the casing. Optimization results also compared favorably to an analytical solution for maximized kinetic energy, producing the relation $r_1=0.813*r_2$, while the analytical solution was $r_1=0.835*r_2$, where r_1 is the inner radius and r_2 is the outer radius of the casing.

SIMULATION OF TARGET LOCALIZATION IN WIRELESS SENSOR NETWORKS THAT USE MULTIBIT QUANTIZATION. *Thomas Anthony and Thomas C Jannett, The University of Alabama at Birmingham, AL, 35294.*

Technological advancements have made the development of low-cost, low-power, and multifunctional sensors feasible. However, individual sensors may have limited accuracy, range, computational capability, storage capacity, energy reserves, or communication bandwidth. These shortcomings may be overcome by organizing sensors into networks in which sensors report data to a fusion center that utilizes advanced algorithms to process received information and to manage the network. Locating the position of a target or other entity is a very important application of sensor networks for commercial, military, and homeland security applications. Many applications use battery powered sensors that have finite battery life. The loss of sensors can lead to deterioration in the localization performance of the network. Performance-guided reconfiguration (PGR) is an algorithm that activates redundant sensors to allow a specified localization performance to be maintained, even when active sensors fail. This work aims to extend the current PGR concept, which employs sensors that use binary quantization, to permit the use of sensors that employ multibit quantization. This paper describes simulations that verify a theory for maximum-likelihood target localization in two-tier networks based on quantized signal strength measurements received from sensors having known positions. These simulations are the first step in development of PGR for a multitier sensor network that uses multibit quantization. Future work includes dividing the sensor field into clusters that run PGR locally to attain desired localization performance even in case of sensor failure.

SPAM CLUSTERING BASED ON SENDER INFORMATION. *Soma Halder, Alan Sprague, Chun Wei.* University of Alabama, Birmingham, AL 35294.

Spam is the bulk of unsolicited emails that consume significant network bandwidth, server resources and huge amount of memory. Today 90% of the emails flooding the mailboxes happen to be spam from advertising agencies like quasi-legal services, sellers of pharmaceuticals, and sometimes from malicious sites that try to infect the computer with malicious software. An effective way to combat spam is tracing the spammers by deriving useful information from the sender information. This work proposes a way of clustering based on sender information like senders name, sender email id, etc. We observe that similar sender information is repeated in the spam emails. This happens because botnets are using same template to generate fake sender name and email addresses. We are utilizing the UAB spam database as the source of data and the results suggest relationships within the dataset. Thus the project utilizes datamining as the tool to prevent cyber crime.

Engineering and Computer Science Posters Abstracts

AN OBJECT-ORIENTED SOFTWARE APPROACH FOR THE DEVELOPMENT OF A LIBRARY MANAGEMENT SYSTEM. *Ashlee Gray,* Dept. of Computer Science, Alabama A&M University, Normal, AL 35762.

Object-Oriented design is a major type of programming language that is being used to develop many state-of-the-art software products for several types of companies. This approach helps to eliminate the many faults produced in the traditional procedural programming approach. Object-oriented allows the breakdown of a problem into a number of entities called objects and then builds the program around these objects. For this project, object-oriented programming techniques were used to produce a library management system that reflects the uniqueness of the traditional libraries and multimedia center provided world wide. An additional advantage of an object-oriented approach is that it allows for the reusability of code modules. The software was written using the Microsoft C# object-oriented programming language and object classes were created to access the library data stored in a Microsoft Access database. All the objects in the system were identified by using UML use case diagrams. The interactions between the various objects were identified by using UML sequential and state diagrams. The software project required less time to complete and had fewer errors than similar projects using conventional procedural programming techniques. In addition, the UML notation mapped well to the C# programming language environment. **KEY WORDS:** Object-Oriented Programming, Library System, C#

CARBON NANO FIBER REINFORCED CEMENT COMPOSITE MATERIALS FOR SMART MATERIALS, SENSORS AND ENERGY HARVESTING. Jacob Cain, Justin Allen and Brian Crutcher, Department of Civil Engineering, Alabama A&M University, Normal, AL, 35762.

Energy harvesting (also known as power harvesting or energy scavenging) technology allows capturing unused ambient energy such as solar, wind, thermal, strain and kinetic, energy of gas and liquid flows and converting the energy into another form of usable energy. The goal of this study was to determine if there is a possibility of capturing thermal energy from pavements and storing the energy and using it as alternative power source to other devices. In this paper, a smart material based on regular available Portland cement has been developed which can capture ambient thermal energy available from pavements. The cement composite material acts as a pyroelectric material. The characteristic of pyroelectric material is that a change in temperature creates current flows in the material. Specimens of Portland cement with and without carbon nano fibers have been prepared in the laboratory and tested for various properties, such as, pyroelectric coefficient and dielectric constant. It has been found that plain Portland cement acts as pyroelectric material. Addition of carbon nano fibers increases the pyroelectric behavior of the cement material. Both dielectric constant and pyroelectric coefficient increases with increase in temperature. The present research indicates that simple material such as Portland cement can be used to capture thermal energy from pavements, which can be stored in capacitor for the use of power source to other sensor electronics.

TRAFFIC SIGNAL DESIGN. Rama K Nagalla and Yujian Fu. Alabama A&M University, Normal, AL, 35762.

In object oriented design, it is important to work on projects that use a variety of design patterns, interaction between objects, and provide the opportunity to explore design options in a realistic setting. Originally, object oriented languages have been designed for use in building simulations. We use a familiar simulation of traffic through an intersection, controlled by a traffic light as a framework for understanding various aspects of object oriented design. We present this project and show how it illustrates a variety of object oriented design problems. To study complex traffic flow and associated vehicular interactions, simulation is considered as an effective tool. An object-oriented methodology (OOM) for traffic simulation is proposed in this paper with focus on mid-block and intersection flow modeling. The paper presents the basics features of object-oriented programming (OOP) in detail in the context of traffic flow.

Geography, Forestry, Conservation, and Planning Paper Abstracts

CERULEAN WARBLER: DOES ALABAMA PROVIDE A GOOD BREEDING GROUND FOR A DECLINING SPECIES? *Yong Wang*¹, John Carpenter², and ³Callie J. Schweitzer. ¹Dept. of Nat. Res. and Env. Sci., Alabama A&M University, Normal, AL 35762, ²Dept. of Nat. Res. and Env.Sci.,Alabama A&M University, Normal, AL 35762, ³Upland Hardwood Ecology and Management Unit, Southern Research Station, USDA Forest Service, Normal, AL 35762.

Cerulean Warbler (*Dendroica cerulea*) is one of songbird species that had the highest population decline during the past decades in United States. Alabama represents a portion of its southern-most breeding range where they were once considered common and even numerous in several counties. Today, Cerulean Warblers are rarely encountered in Alabama and are classified as a Priority One species (highest conservation concern). We conducted a study of this species in Alabama between 2004 and 2008 with the objectives to 1) determine distribution and relative abundance, 2) examine habitat use and avian associations, 3) quantify microhabitat characteristics, 4) investigate landscape associations, 5) locate potential breeding habitat, and 6) measure home ranges using radio-telemetry. Cerulean Warblers occurred in three disjunct locations: one in Bankhead National Forest, Lawrence County; and two in Jackson County along Larkin Fork and in Walls of Jericho along Hurricane Creek. Density of Ceruleans was low at all three locations. The species was associated with habitats of a variety of tall, large diameter deciduous tree species with a high percent canopy cover, sparse understory, and a moderately complex canopy structure. The species bred in contiguous tracts of deciduous forest close to streams but far from areas experiencing human development. Cerulean Warblers associated most often with deciduous forest-dwelling Neotropical migrants. Radio-tracked males (10) had an average home range of 5.36 ± 0.89 (SE) ha with an average core area of 0.55 ± 0.1 (SE) ha.

ECOLOGICAL MONITORING OF ENHANCED OIL RECOVERY (EOR) ACTIVITIES. *Kathleen A. Roberts* and Xiongwen Chen, Dept. of Natural Resources and Environmental Sciences, Alabama A & M University, Normal, AL 35762.

Maintaining energy demands in the United States while reducing negative effects of greenhouse gases requires that the oil industry and government agencies are mindful of supplying energy using environmentally safe practices. By injecting CO₂ into known oil reserves oil companies can recover a significant portion of the remaining oil in place while reducing atmospheric CO₂. As oil fields in the United States age, the practice of CO₂ enhanced recovery will likely increase. However, the ecological consequences of this process on surrounding ecosystems are largely unknown. Long term ecological monitoring and modeling are necessary to assess and predict the impact of this procedure on ecological

processes over time. This study was designed to assess the ecological effects of CO₂-mediated enhanced oil recovery (EOR) initiated at the Citronelle oilfield in Citronelle, AL. The major components of the study include: Establishing a baseline of common air gas concentrations (CO₂, SO₂, O₂, H₂S, CO and CH₄) and aerosol levels prior to CO₂ injection. Continued post-injection monitoring to determine if CO₂-mediated EOR effects ambient air gas concentrations and aerosol levels. Assessment of microclimate variables and their influence on detected gas concentrations. Assessment of vegetation characteristics such as NDVI for areas within the oilfield compared to those surrounding the oilfield using remote sensing. Additional characterization of vegetative growth by monitoring vegetation plots prior to and post CO₂ injection and through the use of tree ring study.

Forest MANAGEMENT PRACTICES REVEAL SPECIES GRADIENTS IN SOUTHEASTERN LIZARDS. *William B. Sutton, Yong Wang, Dept. of Nat. Res. and Env. Sci., Alabama A&M University, and Callie J. Schweitzer, USDA Forest Service, Southern Research Station.*

The documentation of worldwide biodiversity declines has made it important to understand organismal response to anthropogenic disturbances. We examined lizard community response to prescribed burning and thinning in 18 forest stands of the William B. Bankhead National Forest, Alabama, U.S.A. Our experiment consisted of a before-after, control-impact 2 x 3 factorial complete block design. Forest treatments consisted of three thinning levels (no thin, 11 m²/ha residual basal area [BA], and 17 m²/ha residual BA) and two burning levels (burn and no burn). Forest treatments were replicated three times across the landscape and were generally 9 ha in size. We collected one year of pre-treatment data and two years of post-treatment data from 2005-2008. We captured 718 individual lizards representing six species in 2,862 trap nights. Lizards exhibited species-specific responses, where Eastern Fence Lizards (*Sceloporus undulatus*) increased in thin & burn interaction plots and Green Anoles (*Anolis carolinensis*) increased in thin-only plots. Large skinks (*Plestiodon* sp.) were generally unaffected by forest management treatments and were associated with percent coarse woody debris. Little Brown Skinks (*Scincella lateralis*) were negatively impacted by all treatments during the first post-treatment year, but appeared to be recovering during the second post-treatment year. Total heliothermic lizards increased in all thinned plots and were highly correlated with increased air temperatures. Our study illustrates that multiple management strategies are necessary to benefit southeastern lizard communities.

Geography, Forestry, Conservation, and Planning Posters Abstracts

CASTANEA DENTATA (*American Chestnut*) GROWTH IN RESPONSE TO OVERSTORY DENSITY AND FERTILIZER SUPPLEMENT. *Clint T. Patterson and Luben D. Dimov, Alabama A&M University, Normal, AL 35762.*

American chestnut (*Castanea dentata*) was once a major component of eastern North American forests. It provided more food and habitat for wildlife than oaks. Blight resistant hybrid chestnuts share most morphological characteristics with *C. dentata*, so studying *C. dentata* establishment and early growth will help develop more effective methods for establishing blight resistant hybrids. This study examined the effect of shade levels (open, 33% tree canopy cover, and 50% canopy cover) and a novel leaf spray fertilizer supplement, Accele-Grow-M™ (Accelegrow Technologies), on the first year growth of *C. dentata* seedlings. The fertilizer supplement has demonstrated promising results from agriculture, but no studies have been published on hardwoods. About 65% of the trees were alive and unbrowsed at the end of the 2009 growing season. Survival and browsing did not differ significantly among fertilizer or shade levels. Marginal means were used to compare growth. Relative basal area and root collar diameter growth of seedlings treated twice with fertilizer supplement was approximately 25% greater than control trees. The relative basal area and root collar growths were about 60% greater in the open than under the 50% canopy cover. The effects were non-significant for relative height growth. Control and single application trees did not differ significantly in any growth measures. There was some root collar swelling due to disease that was not distinguished from growth. Funding was provided by USDA CREES.

COMPARING SPECTRAL AND OBJECT-ORIENTED BASED APPROACHES OF LAND USE/LAND COVER CHANGE BASED ON LANDSAT SPECTRAL BANDS. *Sharadha Seerla, Wubishet Tadesse, Dawn Lemke and Joe Gardinski, Alabama A&M University, Normal, AL 35762.*

Increasing demand for timely and accurate Land use/land cover change data by land resource managers and urban planners creates the need to study land use change. Study was conducted in the three adjacent sub watersheds of Madison County. The three sub watersheds are experiencing severe anthropogenic changes, resulting conversion of agricultural and wetlands into developed lands. These sub watersheds always were of major concern for their water quality issues associated with change in land use changes. Landsat thematic data of four time periods was utilized to study land use land cover

changes. Comparative study was done between per pixel and object based classification techniques. Per pixel classification was performed using maximum likelihood algorithm through ERDAS 9.2 software. While the Object based classification was evaluated by using Definiens Professional V5. Image segmentation techniques and standard nearest neighbor algorithm were used for classification. Results showed that object based classification gave better results in identifying different classes compared to per pixel classification.

DEVELOPING A DECISION SUPPORT TOOL BY INTEGRATING FOREST STAND PROJECTIONS WITH WILDLIFE OCCUPANCY MODELS. *Michelle F. Tacconelli* and *Edward F. Loewenstein*. Graduate Research Assistant and Associate Professor of Silviculture, Respectively, School of Forestry and Wildlife Sciences, Auburn University, Alabama, 36849.

Natural resource managers must often balance multiple objectives on a single property. When these objectives are seemingly in conflict with each other, the manager's job can be extremely difficult and complex. This research was designed to develop a decision support tool to aid land managers in optimizing wildlife habitat needs while accomplishing other objectives including ecosystem restoration, carbon sequestration, and timber production. A growth and yield model, the Forest Vegetation Simulator, will be used to project stand structure into the future, at five year time steps, based on three selected management scenarios, including a no management scenario, an active manipulation of species composition through harvesting and underplanting, and single tree selection based on the Proportional-B method. At each five-year interval, predicted forest structure will be input into species specific wildlife occupancy models to estimate probability of occurrence of focal species. This in turn will allow us to quantify the response of these species to the applied vegetative management over time. With the integration of the two tools (stand projection and occupancy models) we will provide a unique tool to land managers, allowing them a method to gauge the efficacy of their management plans before their implementation.

INVASIVE PLANT SPECIES CONTROL METHODS, IMPACT ON BIODIVERSITY, AND COST OF CONTROL. *Jeanette R. Williams*, Dept. of Plant and Soil Sciences, Alabama A&M University, Normal, AL 35762.

Invasive plant species are widely recognized as a serious environmental problem. They can take over habitat and reduce available resources for the native species, which can lead to local extinction and loss of biological diversity. Most methods for controlling invasive plant species involve the use of herbicides, which have been shown to be highly toxic to humans and non-target organisms. Some of these herbicides are commonly used in forestry and are usually glyphosate formulations. Invasive plant species are hard and expensive to control once established. Invasive non-indigenous species are documented to cause an

estimated \$138 billion / year in harmful effects. Methods for control of invasive plant species are needed that are efficient as well as feasible, and at the same time will not depend on the use of toxic chemicals.

URBANIZATION EFFECT ON STREAM HABITAT IN THE FLINT RIVER WATERSHED. *Stephanie A. Whitaker* and *Webishet Tadesse*, Department of Natural Resources and Environmental Science, Alabama A&M University, Normal, AL 35762.

The Flint River, with an area of 568 square miles, is a tributary to the Tennessee River. Much of the watershed is contained in Madison County, Alabama. The land within this watershed is predominantly agricultural and has experienced significant recent residential growth from the City of Huntsville, Alabama. Land-use/cover change (LUCC) is a general term for the human modification of Earth's terrestrial surface, which is used to determine urban development in a landscape. Urbanization is associated with a proliferation of impervious surfaces, such as paved roads, parking lots, and rooftops. LUCC can contribute to natural hazards such as drought and flooding. There is growing evidence that developed urban landscapes negatively impact water quality in streams. This study investigates the impact of urbanization on water quality of the Flint River Watershed. Basic stream water quality measurements have been taken from sites throughout the watershed, during periods of normal to high flow. Preliminary data from water quality measurements and measurement of LUCC for the watershed modeling of the Flint River watershed are presented here.

Health Science Paper Abstracts

AN OVERVIEW OF PROCEDURAL ISSUES. *Beverly Myers*, *Kathleen C. Brown*, *Andres Azuero* , *Nataliya V. Ivankova*, *Henry Robertson*. University of Alabama, Birmingham, AL 35294.

Aim: The aim of this paper is to discuss procedural issues related to the collection and analysis of quantitative and then qualitative data in two consecutive phases within a single study. **Significance:** A methodological overview of issues including decisions on priority given to the quantitative and qualitative data analysis and collection, the sequence of data collection and analysis, and the stages in the research process at which quantitative and qualitative data were mixed (integrated) offers practical guidance in addressing issues common to the mixed-methods design. **Analysis:** Quantitative data were analyzed with SAS program version 9.2 and findings were verified with SPSS program version 17.0. Descriptive statistics, multiple linear and logistic regressions models were calculated. Qualitative interview data were analyzed with the nine step typological analysis procedures described by Hatch (2002). **Results:** The significant predictors of psychiatric

nurse intent to turnover in the two consecutive phases were perceived support from the health care organization, family social support, age, gender, level of education, years of nursing experience, hours worked each week, and years in current job position. Discussion: Quantitative data used alone was inadequate to provide an explanation of psychiatric nurse intent to turnover. A more complete picture of psychiatric nurse intent to turnover was obtained by using the second phase qualitative data to elaborate on the initial quantitative findings more in-depth in the words of the psychiatric nurses.

PROMOTING HEALTH LITERACY AMONG DIVERSE POPULATIONS. *Leigh Anne Minchew, College of Nursing, University of South Alabama, Mobile, AL 36688.*

A compelling link between health literacy and health outcomes exists. The 2003 National Assessment of Adult Literacy health component appraisal revealed only 12% of Americans possess adequate health literacy (Kutner, Greenberg, Jin & Paulson, 2006). Although literacy has long been a factor in society's general welfare, health literacy is influential in determining public health and personal wellness across the lifespan. Americans with poor health have often been shown to have Basic or Below Basic health literacy status, subsequently influencing the persistence of health disparities. Health care providers play an important role in establishing health literacy levels in order to promote health and reduce chronic disease. Although ethnicity, culture, socioeconomic status, and life experiences influence health literacy, determination of health literacy status is fundamental in providing culturally diverse health care and facilitates patient understanding.

TWO-PHOTON BIOPHOTONIC MATERIALS FOR CANCER DIAGNOSTICS AND TREATMENT. *Michael J. Curley, Tania Kukhtareva, Dept. of Physics, Univ. Alabama A&M, Normal, AL 35762.*

The recent research objective in Alabama A&M University was focused on development materials, which can find application in medical research and are responsible for environmental cleaning. It is provided for your consideration the development of environmentally friendly ways to produce nanomaterials using biosynthesis. Fungi, leaf extract, plant extract were used as reduction agents to fabricate noble metal nanoparticles – silver and gold nanocolloid. Nanoparticles of silver are well known as antibacterial, antifungal, anti-viral and anti-inflammatory agent. On the other hand nanoparticles of gold are a well known as biocompatible material. Production of noble nanoparticle colloids, were characterize them by various physical methods: UV-Visible, Infrared, Raman, Fluorescent spectroscopy, Atom Force Microscopy, Transmission Electron Microscopy. In addition, testing and demonstration of the antibacterial effect of nanoparticles of silver produced by green technology will be performed for Bacillus, E-coli, Salmonella, etc. New cytotoxic two-photon fluorescent molecular probes were also studied. Combination of these two features in a single compound brings significant benefits. This work is being supported by an NSF Rise grant.

Health Science Posters Abstracts

THE UTILIZATION OF REAL PROPERTY INTERESTS HELD BY LAND TRUSTS FOR CARBON SEQUESTRATION AND MITIGATION PROCESSES. *Daniel B. Gossett, Gallet and Associates, Birmingham, AL 35203. Daniel E. Smith, Energen Corporation, Birmingham, AL 35203 and Ronald N. Hunsinger, Department of Biological and Environmental Sciences, Samford University, Birmingham, AL 35229.*

The primary purpose of terrestrial carbon sequestration is to enhance the rate at which carbon is sequestered in a forest and to preserve that captured carbon. For a sequestration project to be of significant value, carbon must be accumulated beyond what would have been the case through business as usual (BAU) forest management. For example, timberland is managed to optimize forest biomass. This management will sequester more carbon than if the forest were left to naturally mature and evolve. However, there are management practices to optimize carbon beyond the BAU forest management. The credits generated from a project depends on how much more carbon can be sequestered beyond BAU; therefore it stands to reason that a poorly managed forest or property to be re-forested can generate more credits than undertaking carbon management of a pre-existing, well-managed timber stand. This presentation explores a model for the use of real property interests held by land trusts for carbon sequestration and associated mitigation processes. Various factors relating to optimization of the process, steady state saturation attainment and forest management principles to bring about mitigation will be presented.

Industry and Economics Paper Abstracts

THE ECONOMICS APPROACH: AN ASSESSMENT OF SULFUR DIOXIDE AND NITROGEN OXIDE POLLUTION REDUCTION IN THE UNITED STATES, 1993-2008. *Teshome Gabre, Rory Fraser, Constance Jordan and Gete Bekele, Dept. of Community Planning and Urban Studies and Dept. of Natural Resources and Environmental Sciences, Alabama A&M University, Normal, AL, 35762.*

In 1990, Congress revised the Clean Air Act of 1970 and created Sulfur Dioxide and Nitrogen Oxide emission trading program, to reduce acid rain. Each year following that revision, allowances were allocated for all electric generating plants in the country, and other sources of Sulfur Dioxide and Nitrogen Oxide emitters. Electric generating plants can reduce Sulfur Dioxide and Nitrogen Oxide emissions by employing pollution control technologies, switching to lower sulfur fuel, or developing other alternate strategies.

Between 1993-2008 Sulfured Dioxide emissions were reduced by 8.1 million tons (51.6%) and Nitrogen Oxide by 3.7 million tons (55.2%). This paper assesses the cost effectiveness of the allowance trading system, compared to command and control system to reduce Sulfur Dioxide and Nitrogen Oxide pollution from its inception 1993 to 2008 in the United States. Also the research findings indicate that the electric generating industry has saved annual operating costs of \$677,000,000 by using the market based approach of Sulfur Dioxide and Nitrogen Oxide emission control system than the command and control system.

ALCOHOLICS ANONYMOUS AS A RESOURCE FOR BUSINESS AND INDUSTRY. *R. Bryan Kennedy and Maureen J. Chemsak, Athens State University, Athens, AL 35611.*

Human resources departments in business and industry often find it necessary to provide employee assistance programs for workers with a variety of addictions. The 12 Steps of Alcoholics Anonymous, influenced by Carl Jung, can be used as a healing tool. By neutralizing the Archetypal Evil (ego or false self) within the addict, the first phase (Steps 1-3) of spiritual conversion begins with the desire to change and quite the addiction. The addict surrenders in humility to a Higher Power, taking personal responsibility for a positive plan of action. In the second phase of recovery (Steps 4-10), the addict takes action through honest and sometimes painful self-examination, pays back debts owed, and integrates this inventory as part of a personal lifestyle. In the third phase (Steps 11-12), the addict maintains sobriety "One Day at a Time" in practicing gratitude and giving in connection with others in similar circumstances (AA). Jung understood that grace and community were powerful tools in resisting the power of evil.

DID YOU HEAR ME?: Failures in Upward Communication. *R. Bryan Kennedy, Kimberly Bell, Michael Essary, Susan D. Herring, Jim Kerner, Laura Lynn Kerner, and Linda Shonesy, Athens State University, Athens, AL 35611.*

Cases involving faulty decisions leading to disastrous or at least unfortunate results due to failures in upward communication between subordinates and management are discussed. Examples include decisions following the initiation of a strike at a production plant, the Challenger disaster, and the Japanese attack at Pearl Harbor. In addition to offering lessons for improved communication, these cases are appropriate as studies for classes in principles of management, public administration, industrial psychology, managerial communications, organizational behavior, and labor management relations.

ECONOMIC OF ADULT EDUCATION IN THE WORKFORCE. *Chris Miller, Calhoun Community College, Decatur, AL 35609. R. Bryan Kennedy, Athens State University, Athens, AL 35611.*

The job market is bleak, but the basic skills of our citizens are sometimes just as bleak. Over 40 percent of Alabama students fail to complete high school. One out of every four Alabamians is reading below the 5th grade reading level. The consequences of inadequate education are profound and greatly impact a decent standard of living. For the most part, the days of abundant low-skilled jobs are gone in Alabama and throughout the United States with the exception of the service sector and agriculture. Today, we operate in the modern, technology-driven workplace where inadequately prepared workers cannot survive. Adult Education offers a second chance to all Alabamians who need to upgrade their educational achievements. Those who are successful will experience an improved quality of life for themselves, their family, and for our great state.

THE PUBLIC IMAGE OF LABOR UNIONS: INDIVIDUAL PERCEPTIONS AND PUBLIC VIEWS. R. Bryan Kennedy, Susan D. Herring, *Michael Essary*, Matthew Holland, Laura Lynn Kerner, Kim LaFevor, and Linda Shonesy, Athens State University, Athens, AL 35611.

After almost a century of positive public reaction to labor unions, as evidenced by responses to Gallup Poll questions, the latest Gallup Poll shows a decrease in public support for unions and loss of faith in their benefits to workers. There are a number of reasons that might contribute to this lack of support, including public opinion as influenced by the mass media. This paper presents statistical information collected on individual perception of labor unions. The longitudinal study was conducted at Athens State University during 2007-2009. The results of the study are compared to statistical data gathered by the Gallup Poll and the Current Population Survey compiled by the Bureau of Labor Statistics. The possible role of media coverage of labor activities in influencing public opinion on unions is discussed.

Physic and Mathematics Paper Abstracts

ALGAN/GAN HEMT BASED BIOSENSOR. *Siddharth Alur*, Yaqi Wang, Yogesh Sharma, Tony Gnanaprakasa, Jing Dai Aleksandr L. Simonian, Jong Wook Hong, Michael J. Bozack, Claude Ahyi and Minseo Park, Auburn university, Auburn, AL 316849.

Recently a lot of biosensors have been developed for the purpose of detecting bacterial DNA. Among these techniques the field effect transistor (FET) based detection is interesting due to its label-free detection and rapid identification. GaN has been considered as a promising candidate for such applications due to its chemical stability. In this work, AlGaN/GaN high electron mobility transistor (HEMT) was used as a sensor platform. Ti/Al/Ni/Au was used as source and drain contacts, and Ni/Au contacts as gate electrodes. NF₃ plasma was used

to achieve device isolation. For the purpose of encapsulating the source and drain regions Photodefinable PDMS was used. This encapsulation was done so that the entire device except the gate region was covered with PDMS. Once this encapsulation was completed the schottky contact was exposed to a thiolated DNA in immobilization buffer for a period of 12hrs. XPS is performed to confirm probe immobilization. A high resolution XPS scan over the sulphur S2p peak shows a wide peak with a peak binding energy of about 162.1ev. The DNA strand is specifically chosen to represent Salmonella bacteria. After this the surface is exposed to the target DNA through the hybridization buffer. The change in the (Id-Vds) characteristics of the device is measured during these processes which confirm the probe immobilization and also the probe and the target DNA hybridization.

BLACK HOLE UNIVERSE THEORY. *Tianxi Zhang* Physics Department, Alabama A & M University. Normal, AL 35762.

A new cosmological model called black hole universe (BHU) has been recently proposed by Zhang. According to this model, the universe originated from a hot star-like black hole, and gradually grew up through a supermassive black hole to the present state by accreting ambient materials and merging with other black holes. The entire space is hierarchically structured with infinite layers. The innermost three layers are the universe that we are live, the outside space called mother universe, and the inside star-like and supermassive black holes called child universes. The outermost layer is infinite in radius and limits to zero for both the mass density and absolute temperature. The relationships among all layers or universes can be connected by the universe family tree. Mathematically, the entire space can be represented as a set of all black hole universes. The child universes are null sets or empty space. All layers or universes are governed by the same physics, the Einstein general theory of relativity with the Robertson-Walker metric of spacetime and tend to expand outward physically. The growth of a black hole universe decreases its density and temperature but does not alter the law of physics. The evolution of the space structure is iterative. When one universe expands out, a new similar universe grows up from its inside. This presentation will show details of the black hole universe theory and compare it with the standard model of cosmology.

COMPARATIVE STUDY OF PARTIALLY ORDERED MATERIALS AND MATHEMATICAL SETS. Marie T. Oumba, A.K. Batra and M.D. Aggarwal, Dept. of Physics, Alabama A&M University, Normal, AL 35762.

Partially ordered materials can be represented by a combination of a number of mathematical sets. It may not be easy to foresee at this point, but this preliminary study shall find a number of applications in the study of various amorphous and other combinations of materials formed by recently developed nanomaterials of various kinds. Quantifying the structural order in amorphous and partially ordered materials, and the effects of such order on its bulk

properties, has been a longstanding challenge for materials scientists. Disordered materials possess strong short range order driven atomic packing and bonding but lack the long range order which allows for analyses based on periodicity. An attempt is made to relate one of such structure with mathematical sets that shall be helpful eventually in understanding some order in such materials.

GaN SCHOTTKY DIODES WITH HIGH BREAKDOWN AND LOW REVERSE BIAS LEAKAGE CHARACTERISTICS. *Yaqi Wang, Yogesh Sharma, Hui Xu, Siddharth Alur, Kilho Kang, Minseo Park, Claude Ahyi, John Williams, Department of Physics, Auburn University, Auburn, AL 36849; Tanya Paskova, Edward A. Preble, and Keith R. Evans, Kyma Technologies, Inc., 8829 Midway West Road, Raleigh, NC 27617.*

GaN Schottky diodes with high breakdown and low reverse bias leakage characteristics were fabricated. The bulk n-GaN substrate was prepared using hydride vapor phase epitaxy (HVPE) technique. Ohmic contact (Ti/Al/Ni/Au) was deposited sequentially on the N-face of the substrate and annealed at 750°C under N₂ atmosphere. Pt Schottky contact was then deposited on the Ga-face. A maximum breakdown voltage of 600V, an on-state resistance of 1.3 mΩcm² and a turn-on voltage of 0.95V were obtained for 50 μm diameter devices. The devices also exhibited extremely low reverse bias leakage characteristics. The 50 μm diameter devices showed leakage current densities of 8.1×10⁻⁸ A/cm² at -100 V and 3.7×10⁻⁴ A/cm² at -400V, which are the best ever reported.

HERON-LIKE AREA FORMULA EXPRESSED IN TERMS OF A TRIANGLE MEDIANS. *Herman L. Windham, Dept. of Mathematics, Tuskegee University, Tuskegee, AL 36088.*

This presentation shows how to compute the area of a triangle using the length of the medians of a triangle. A Heron-like formula expressed in terms of the length of the medians of a triangle will be derived for computing the area. Heron's area formula makes use of the length of the sides of a triangle. The Heron-like formula developed in this presentation makes use of the length of the medians. Hence, a relationship between the length of the sides and the length of the medians of a triangle will be derived for the development of the Heron-like area formula.

MATHEMATICAL MODELING OF THE RADIATED ACOUSTIC FIELD OF AXISYMMETRIC ULTRASONIC TRANSDUCERS. *Albert J. Osei and Yazmin Ince, Dept. of Mathematics and Computer Science, Oakwood University, Huntsville, AL 35896. Sihon H. Crutcher, US Army Research, Development and Engineering Command, Huntsville, AL 35805.*

A technique which can predict the radiated pressure distributions from disc ultrasonic radiators with uniform vibration characteristics otherwise called plane piston vibrators is presented. To investigate non-uniform vibrational characteristics, the method is extended so that any axisymmetric vibration variation across the front face of the disc could be examined without the need of expressing this variation mathematically. The method relies on the assumption that any axisymmetric vibrational distribution may be approximated by a combination of a finite number of plane piston vibrators differing in size and vibrational amplitude. The predictions of the technique indicate that the axial field from a uniformly vibrating disc is characterized by marked variations in near-field pressure amplitudes, which may be reduced by causing the amplitude of vibration to decrease across the disc's face in a variety of configurations. The practical application of this type of amplitude shading in the fields of medical diagnosis and non-destructive testing is discussed. Conversely, an undesirable feature in acoustical imaging (near-field ripples) occur when the vibrational amplitude is increased is with radius.

NANOSTRUCTURED POLYMER FIBERS FOR HYDROGEN STORAGE. *Sesha S. Srinivasan, P.C. Sharma, Department of Physics, Tuskegee University, Tuskegee, AL 36088.*

Nanostructured polyaniline (n-PANi) fibers have been synthesized by two different methodologies such as (i) chemical template process and (ii) electrospinning of the chemically grown fibers. The morphology, texture, fiber density etc were optimized by varying the concentration of chemical compounds, surfactants and the rate of reaction by the chemical method. Whereas for the electrospinning technique, the variation of the input voltage and the distance between the spray needle to the substrate etc. are considered for the fiber growth optimization. The as-grown n-PANi fibers were characterized using FT-IR, Raman, SEM, BET and XRD techniques to reveal the structural, chemical, surface and morphological behavior. The hydrogen absorption and desorption at various temperature and pressure conditions are carried out using high pressure Sievert's type system. From these studies, the hydrogen storage capacity of 3-10 wt.% has been obtained at room temperature to 100 °C. The unique morphologies of nanostructured PANi fibers seem potential systems to meet or exceed the US-DOE technical targets. Acknowledgements: Dr. Lee Stefanakos, Dr. Yogi Goswami, Clean Energy Research Center, University of South Florida, Tampa, FL, USA; Dr. Ayala R. Phani, Nano-RAM Technologies, Bangalore, India; Dr. Kimberly McGrath, Quantum Sphere Inc., CA, USA; U.S. Department of Energy

OPTICAL PROPERTIES OF RARE EARTH DOPED TELLURIUM NIOBATE GLASS. *Hashim K. Sammel, Akshaya Kumar, Prakash C. Sharma and Sesha S. Shrinivasan, Department of Physics, Tuskegee University, Tuskegee, AL 36088.*

Optical properties of rare earth doped glasses have widespread applications as laser materials, temperature sensors and optical amplifiers. A glimpse on various applications of

rare earth doped glasses would be presented. Absorption and fluorescence characteristics of rare earth ion doped tellurium-niobate glass would be presented. In addition to this, the effect of temperature on the fluorescence properties of the glass would also be presented.

OPTICAL SOLITONS BY HE'S VARIATIONAL PRINCIPLE IN A NON-KERR LAW MEDIA. *Russell W. Kohl*, Dept. of Mathematics Alabama A&M University, AL 35762.

Optical solitons in a non-Kerr law media is studied, in presence of perturbation terms. This is governed by the Nonlinear Schrödinger's equation. He's semi-inverse variational principle is used to carry out the integration of this perturbed Nonlinear Schrödinger's equation with non-Kerr law nonlinearity. The types of nonlinearity that are considered are Kerr, power, parabolic and dual-power law. The parametric domain is also identified for the solitons to exist.

PHOTONIC MOLECULE CONSTRUCTION: SEPARATION-SENSITIVE MEASUREMENTS OF RESONANCE STATES IN COUPLED SPHERICAL CAVITIES. *David A. Keating*, Emre Guler, Kazuya Ichimura, and D. Brian Thompson, Dept. of Physics and Earth Science, Univ. of North Ala., Florence, AL 35632.

We have collected inelastic emission spectra from pairs of fluorescent microspheres that are aligned to create photonic molecules. The inelastic emission spectrum of a single microsphere exhibits intense narrow resonance peaks superimposed upon a free-space emission background. The modes of light circling around the sphere that give rise to these resonances is reminiscent of the electron quantum mechanical states in a hydrogen atom, giving rise to a "photonic atom" description of light propagating in the sphere. Then bringing together two spheres creates a "photonic molecule". Just as electron-electron interaction gives rise to energy splitting of quantum states in the hydrogen molecule, the coupling of non-propagating evanescent fields extending just beyond each sphere's surfaces gives rise to mode splitting. Since the evanescent fields decay exponentially, this coupling and the resulting resonance splitting is very sensitive to separation distance between spheres. This work is supported by a Cottrell College Science Award from Research Corporation.

SOLITON PERTURBATION THEORY FOR PHI-FOUR MODEL AND NONLINEAR KLEIN-GORDON EQUATIONS. *Anjan Biswas*. Delaware State University Department of Mathematical Sciences 1200 North DuPont Hwy Dover, DE 19901-2277.

The adiabatic variation of soliton velocity, in presence of perturbation terms, of the phi-four model and the nonlinear Klein-Gordon equations is studied. There are three types of models of the nonlinear Klein-Gordon equation, with power law nonlinearity, that are studied in this paper. The soliton perturbation theory is utilized to carry out this investigation.

TITLE: OPTICAL SOLITONS IN A KERR LAW MEDIA WITH FOURTH ORDER DISPERSION AUTHORS: A. Biswas, D. Milovic, E. Zerrad, and F. Majid Presenter: Fayequa Majid, Alabama A & M University. AL 35762.

In this paper, a closed form optical soliton solution is obtained for the nonlinear Schrodinger's equation with fourth order dispersion in a Kerr law media. The solitary wave ansatz is used to carry out the integration of this equation. Finally, a numerical simulation is given for the closed form soliton solution.

Physic and Mathematics Posters Abstracts

MATHEMATICAL MODELING OF VIRUSES: A STUDY OF H1N1 INFLUENZA VIRUS. *Amina C. Dozier* Department of Mathematical Sciences University of Alabama in Huntsville Huntsville, AL 35899.

Mathematical models have many uses and value in society's everyday problem solving. We will focus on the importance of mathematical modeling in the study of viruses, particularly the H1N1 virus. These models are used to study viruses that can lead to a human epidemic such as the H1N1 Influenza virus also known as swine Flu. Currently this swine flu virus has been reported in over 70 countries with over 130 deaths. Our main goals for this research are to determine what the relationships between the different strains of Influenza are and to distinguish the connection between these Influenza viruses and human epidemics. We will determine and construct the best mathematical model needed to study the various strains of the Influenza viruses. The results obtained from the models we develop may be used for tracking the spread of the swine flu virus and other strains of the Influenza viruses. This data may also be beneficial for the development of better treatment options and could aid in preventing the development of other strains of Influenza viruses.

A SEARCH FOR OPTICAL COUNTERPARTS OF ROTATING RADIO TRANSIENTS (RRATS). T. Tidwell, R. M. Blake. Univ. of North Alabama, Florence, AL 35632.

Rotating Radio Transients were discovered in 2006 as a result of data mining of the Parkes survey for transient objects. The 11 Rotating Radio Transients (RRATs) seem to be a unique class of pulsars which burst for short periods and when in outburst can be among the most radio-bright objects in the sky. The place these objects occupy in the evolution of pulsars is still an active area of investigation. One important property of these objects which is important to understand is their spectral energy distributions. We report here one of the first attempts to identify optical counterparts to RRATs. The data were obtained with the

0.4m robotic PROMPT telescopes during automated observing. Our data presented here consists of R and I-band imaging over 15 minutes on three nights of the sources J1443-60. While several candidate variable stars seem to be present in the data, we did not detect any transient sources coincident with the RRAT.

CARRIER CONCENTRATION AND THE PHONON CONDUCTIVITY OF SEMICONDUCTORS. *PRAKASH C. Sharua, Akshaya Kumar and Sesha S. Srinivasan, Department of Physics, College of Engineering Architecture and Physical Sciences, Tuskegee University, Tuskegee, AL 36088.*

In low doping concentrations, the electron (hole) is bound to the impurity atom. The phonon thermal conductivity depends upon the electron (hole) carrier concentration. The phonon thermal conductivity also depends up on various types of phonon interaction processes in semiconductors. Theory of bound electron (hole) phonon scattering is used to explain the conductivity in samples having low doping of impurities. On the other hand, if the doping of impurities is very high, free electron (hole) phonon model is used to explain the conductivity. However in the intermediate doping concentration region, no study has been made. The phonon conductivity of semiconductors in the intermediate doping concentration regions. Acknowledgements: The authors wish to acknowledge the support provided by the US army grant to complete this work.

CHOOSING FUNDAMENTAL CONSTANTS IN FOUR-DIMENSIONAL SPACE. *Arjun Tan and Matthew E. Edwards, Alabama A & M University, Normal, AL 35762.*

Candidates for the fundamental constants of nature include the universal gravitational constant G , the speed of light in vacuum c , the electronic charge e and Planck's constant h . It is known that since the fine structure constant relates the three fundamental constants of c , e and h , not all of the latter can be fundamental at the same time. However, it is shown that in four-dimensional space, the fine structure is not a dimensionless quantity and hence c , e and h can all be fundamental in such space. It is postulated that in order for three constants to be fundamental, one must be able to express the fundamental units of mass M , length L and time T in terms of them. The four possible options are: (1) c , e & h ; (2) G , c & e ; (3) G , e & h ; and (4) G , c & h . It is shown by dimensional analysis that M , L & T cannot be obtained from G , e & h in four-dimensional space and thus Option 3 is ruled out. Further, since c and h are both related to the photon (its energy and propagation), Option 4 is also ruled out. Thus the fundamental constants of nature in four-dimensional space can be chosen from either of Options 1 and 2.

ENERGY HARVESTING BY SMART MATERIALS. *Eugene Harris, N. Kukhtarev, T. Kukhtareva, J.C. Wang, Department of Physics, Alabama A&M Univ., 4900 Meridian Street, Normal, AL 35762.*

Experiments at AAMU performed by Eugene Harris, Dr. N. Kukhtarev, T. Kukhtareva, and Dr. J. C. Wang, suggest LiTaO₃ and LiNbO₃ may have potential as compact source of electrical power. LiNbO₃ is iron doped and is also photogalvanic, which gives it the capability to produce electricity from being illuminated by coherent or incoherent light. Both LiTaO₃ and LiNbO₃ are pyroelectric materials which give them a potential of being a source of compact electric power. Pyroelectric crystals create a surface voltage distribution that can be used for applications upon undergoing a change in temperature with respect to time. The pyroelectric coefficient of lithium tantalate is $-2.3 \times 10^{-4} \text{C/0Cm}^2$ (Almaz Optics, Inc. , 2009). The pyroelectric coefficient for lithium niobate is $-4 \times 10^{-5} \text{C/0Cm}^2$ (Wong, 2002). As can be seen from the previous information, the pyroelectric coefficient in LiTaO₃ is almost 10 times greater than in LiNbO₃. Spark gap experiments using LiTaO₃ than LiNbO₃ in specially designed surface contact copper electrodes can generate voltages into the kilovolt range that are discharging across a 1 mm air gap between two metal electrodes. Upon placing dielectric polystyrene spheres between the metal electrodes at the 1 mm spacing, the spheres were observed being displaced by the pulsed electric field from the crystal. White Food Flour was also placed at the 1 mm spacing and displacement of the flour was observed. A relationship between the thicknesses of the surface copper contact electrodes and the rate of the temperature T heating dT/dt was observed by using two copper electrodes of varying thickness and observing the voltage response from the crystal. The relationship between the thickness of the copper electrodes and the rate of heating had an effect on the quantitative and qualitative results of our applications studies. Further research will be performed in analyzing a circuit and electrode setup to best take advantage of the pulsed pyroelectric, photogalvanic and piezoelectric voltages voltages.

FUNDAMENTAL CONSTANTS AND FUNDAMENTAL UNITS. *Arjun Tan, Mohammed Karim, Tianxi Zhang and Matthew Edwards, Alabama A & M University, Normal, AL 35762.*

Candidates for the fundamental constants of nature include the universal gravitational constant G, the speed of light in vacuum c, the electronic charge e and Planck's constant h. Planck pointed out that since the fine structure constant relates c, e and h, at least one of the latter must be derived. Sommerfeld considered e to be derived whereas Dirac argued that h was more likely to be derived. It is postulated in this study that in order for three constants to be fundamental, one must be able to express the fundamental units of mass, length and time in terms of them. The three options are: (1) G, c & e; (2) G, e & h; and (3) G, c & h. Since e and h are related by the Bohr radius, Option 2 is ruled out. Further, since c and h are both related to the photon (its energy and propagation), Option 3 is also ruled out. By the method of elimination, the fundamental constant of nature are deemed to be those given by Option 1, viz., G, c & e. This conclusion is not in conflict with the assessment of Dirac.

HEATING AND ACCELERATION OF IONS IN SOLAR ^3He -RICH EVENTS.
April T. Broaden, Dept. of Physics, Ala. A&M Univ., Normal, AL 35762. T. X. Zhang, Dept. of Physics, Ala. A&M Univ., Normal, AL 35762.

Solar ^3He -rich events are solar energetic particles, in which the abundance ratio $^3\text{He}/^4\text{He}$ is enhanced by a factor of 1000 relative to the coronal abundance. Heavy ions are also enriched by the solar ^3He -rich events. To explain these fundamental solar phenomena, a complete two-stage acceleration model was proposed by Zhang. The first stage involves a preferential heating process of ^3He and heavy ions; while in the second stage, the preheated ^3He and heavy ions above the threshold are further accelerated to high energy through the Fermi Acceleration. Previously, the electrostatic-ion-cyclotron (EIC) waves were used for the preferential heating of ^3He and heavy ions through harmonic resonances. In this study, we applied the parallel propagating electromagnetic ion-cyclotron (EMIC) waves to preferentially heat ^3He and heavy ions. First, we studied the dispersion relation of parallel propagating EMIC waves, which have three modes: H-EMIC waves, ^4He -EMIC waves, and Alfvén waves. Second, we investigated the preferential heating of ^3He and heavy ions by the EMIC waves. The result indicated that the H-EMIC waves can be efficient at heating ^3He through the first harmonic resonance over ten times more than the heating of ^4He by the ^4He -EMIC waves. The Alfvén waves can efficiently heat heavy ions such as oxygen (O) and iron (Fe) through the first harmonic resonance. Third, we computed the abundance enhancements of ^3He ions and heavy ions in high-energy particles due to the further Fermi accelerations.

MODIFIED FRIEDMANN EQUATION WITH A SCALAR FIELD. *Manish M Jadhav, Tianxi Zhang and Amy Winebarger Physics Department, Alabama A&M University, 4900 Meridian Street, Normal, AL 35762.*

The type Ia supernovae measurements (Riess et al. AJ, 1998, 116, 1009) indicated that the universe is undergoing expansion at an increasing rate. According to the standard model of cosmology, the recent acceleration of the universe is attributed to dark energy, which accounts for about 74% of the total mass-energy content of the universe. There are two proposed forms for dark energy: (1) the cosmological constant, which is a constant energy density homogeneously occupying all space, first introduced by Einstein and (2) the scalar field. In this study, we investigate the scalar field as a possible candidate of dark energy to explain this accelerated expansion of the universe. For the FLRW metric, we first derive a modified Friedmann equation from the five-dimensional fully covariant Kaluza-Klein theory with a scalar field (Zhang, ApJL 2006, 636, L61 and references therein), which unifies the four-dimensional Einsteinian general theory of relativity and Maxwellian electromagnetic theory. Then, we solve the modified equation for the expansion factor and scalar field as functions of time. Lastly, we compare the results obtained from this study with measurements and results obtained from other theories of dark energy. This poster will present the derivation of the modified Friedmann equation and show preliminary results for the solution.

OPTICAL PROPERTIES OF ER³⁺ IONS DOPED IN GLASS. *Akshaya Kumar, Prakash C. Sharma and Sesha S. Shrinivasan, Department of Physics, Tuskegee University, Tuskegee, AL 36088.*

Glasses doped with rare earth ions are easier to make than growing rare earth ions doped crystals. One can tailor the optical properties of rare earth ions doped in glass easily by changing the composition of the glass. A calculation of optical properties such as life time, branching ratio and Judd-Ofelt intensity parameters of Er³⁺ ions doped in different glass system would be presented. Absorption and fluorescence measurements would also be presented.

OPTICAL TRAPPING OF NANO-(MICRO)PARTICLES BY GRADIENT AND PHOTOREFRACTIVE FORCES. *N. Kukhtarev, T. Kukhtareva, and F. Okafor* Physics and Biology Departments, Alabama A & M University, Normal AL, 35762.

In this study we describe photo-induced trapping/redistribution of silver nano-(micro) particles near the surface of photorefractive crystal LiNbO₃:Fe. This type of optical trapping is due to combined forces of direct gradient-force trapping and asymmetric photorefractive forces of electro-phoresis and dielectro-phoresis. The silver nanoparticles were produced through extracellular biosynthesis on exposure to the fungus, *Fusarium oxysporum* (FO). This study indicates that micro-organisms are important and constitute a possible viable alternative method for the production of nanoparticles. In addition, the theoretical modeling of asymmetric photorefractive electric field grating has been presented and compared with the experimental results. Initial results on the new hybrid system of nanoparticle layer—electro-optic crystals of lithium niobate show promising potential for development of non-contact holographic sensors. This research has been supported by Title III program , Alabama A&M University.

SOME THEOREMS ON POTENTIALS AND ELECTRIC FIELDS OF POINT, LINE AND PLANE CHARGE DISTRIBUTIONS. *Arjun Tau, Mohammed Karim, Tianxi Zhang and Matthew Edwards, Alabama A & M University, Normal, AL 35762.*

The potentials and electric fields due to the infinite plane and line charges and point multipoles are analyzed. The potentials are found to be solutions of Laplace's equations in hyperspaces of dimensions 1, 2, 3 The above examples therefore represent monopoles in these dimensions. Three theorems concerning the potentials and electric fields are arrived at: (1) The radial dependence of the electric field is the derivative of the potential (from Potential Theory); (2) The radial dependence of the potential due to a multipole is the derivative of that of a multipole of the immediately lower order (from Panofsky and Phillips); and (3) A multipole in n-dimensional hyperspace is equivalent to a multipole of the immediately higher order in the hyperspace of n – 1 dimensions (from current study).

The second theorem requires that Laplace's equation for the infinite plane charge be modified.

SYNTHESIS AND CHARACTERIZATION OF ZINC-IRON-OXIDE NANOPARTICLES BY HIGH ENERGY BALL MILL. *Edward G. Arthur, Sessa S. Srinivasan†, Akshaya Kumar, P.C. Sharma, Department of Physics, Tuskegee University, Tuskegee, AL 36088.*

We have successfully synthesized nanoparticles of zinc ferrite by high energy ball milling (HEBM) under both wet- and dry- conditions. The milling parameters such milling duration, speed, purge gas etc. have been optimized to obtain variations in crystallite sizes, surface area and the overall optical absorption shift. The structural and microstructural characteristics of the wet- and dry- ball milled ZnFe_2O_4 have been demonstrated wide marginal variation in the average crystallite sizes (9-16 nm) due to pulverization and agglomeration effects respectively. The optical absorption analysis revealed that the energy gap is increased (blue shift – 0.45 eV) for wet-milled and decreased (“anomalous” red shift – 0.14 eV) for dry-milled samples of ZnFe_2O_4 as the particle size decreased.

Science Education Paper Abstracts

DEATH IN A BOX: PACKAGING THE DECOMPOSITION PROCESS FOR THE MUSEUM ENVIRONMENT. *James P. Cormier, Spring Valley School, Birmingham, AL 35213.*

This paper is a presentation of the inspiration for and the design, development and construction of a decomposition chamber for the McWane Science Center's new exhibit *NatureScope*. A PowerPoint presentation will be given taking the audience from the initial sketches to the final product with discussion of design and material challenges that were overcome and how new and unexpected challenges were met. Additionally, an overall picture of *NatureScope* will be presented and how the decomposition chamber integrates into the larger exhibit.

GENES AND CONSEQUENCES: USING GENETIC DATABASES. *April M. Reis, Madelene Loftin, Jennifer Carden, and George Williams, Athens State University; HudsonAlpha Institute for Biotechnology.*

The rapidly evolving world of biotechnology is responsible for a vast amount of new data and the need for a new field of science called bioinformatics. As this new field develops, new career opportunities emerge and the need for students to grasp the basic concepts

of genetics becomes more important than ever. However, the Central Dogma is often taught in a basic, linear fashion. This over-simplified teaching strategy frequently results in lingering misconceptions, lower test scores in this area, and the burden of re-teaching an already complex concept. The Educational Outreach team at HudsonAlpha Institute for Biotechnology recognized the relationship between these two areas and created a kit that provides educators with a framework to introduce biological databases while teaching the Central Dogma. As students progress through the activities in the kit, they will decipher a simulated segment of DNA represented by an electropherogram and use the concepts of the Central Dogma to transcribe and translate it. Students will then enter the world of bioinformatics as they use several databases to research the segment of DNA, determine the gene name and function associated with that segment, and visualize the changes created from various polymorphisms.

GREEN LANDSCAPE AND ENVIRONMENTAL POLICY: A CONCEPTUAL MODEL FOR SERVICE LEARNING. *Stephanie E. Freeman, Catherine Sabota, Rudy Pacumbaba Jr, Mezimier Wagaw.* Dept. of Natural Resources and Environmental Sciences, Alabama A&M University, Normal, AL 35762.

Current landscape design does not take in consideration the ecosystem in the ever changing landscape. The objective of this research is to develop lectures that discuss environmental policy and horticulture practices that can be implemented in a service learning project. This will be accomplished by creating classroom activities that incorporate green landscape design practices in residential, commercial, and industrial areas. The students will become more thoughtful observers and critics of horticulture landscape. They will develop the knowledge, skills, and ability by applying best management practices using rain gardens, bioretention, and other low impact development practices. Students will be able to conceptualize and communicate the importance of low impact development to their communities, legislatures, and colleagues.

JONES VALLEY AND THE MINERALS BENEATH: HOW GEOLOGY BUILT A CITY. *Heather E. Guy,* Dept. of History, University of Alabama at Birmingham, Birmingham AL. 35294.

My proposal is an undertaking very few have attempted in the past. Namely, I am writing the history of Birmingham's origins from a geological perspective. I argue how the men of Elyton Land Company realized that the minerals under Jones Valley would give rise to a new industrial city never before seen in Alabama. The men of the Elyton Land Company realized the enormity of the minerals that lay beneath the soil. Iron and steel could be produced efficiently and most important, cheaply. Thousands of industrial jobs would have never been created. Important railway systems would have surpassed the proposed city. Without Elyton Land Company, the city of Birmingham would not exist as it does

today. Also, without the mineral wealth of Birmingham, the city would have never become the icon of industry in the South. The Linn-Henley Library Department of Archives in Birmingham provide a great number of primary sources dealing with Birmingham's mineral district and Elyton Land Company. For the Elyton Land Company, Linn-Henley houses: the original company minutes book, letter book, and business records book. Linn-Henley also houses the original hand drawn plans for the city, notes on the original survey, and original incorporation papers. All of these primary sources as well as appropriate secondary sources were used in my research.

SCIENCE EDUCATION THROUGH AN INTERDISCIPLINARY FIELD SCHOOL ON NAYAU, FIJI. *Sharyn R. Jones and Loretta A. Cormier, Dept. of History and Anthropology, Univ. of Ala at Birmingham, Birmingham, AL, 35294.*

We offer a critical assessment of the first year of a two-year interdisciplinary field school for undergraduates in archaeology and ethnography led by the authors on Nayau in the Lau Islands of Fiji. The field school was sponsored by a National Science Foundation REU (Research Experiences for Undergraduates) grant. The undergraduate student population consisted of nine female students. Our educational pedagogy was guided by the learning principles outlined by the Society for American Archaeology-NSF Matrix Program for Renewing the Undergraduate Archaeology Curriculum. The project used both quantitative and qualitative criteria to evaluate learning outcomes. Although the educational outcomes were met, we found that the most important challenges faced in the field were not measurable through the evaluation methods we designed. The focus of year one was archaeology. Students generally had little difficulty in mastering the archaeology tool set and data analysis, but we found that students experienced significant problems in adapting to the cultural milieu, with reactions ranging from culture shock to ethnocentric romanticizing of the Nayau people, which included difficulties among some students in understanding their role as participant observers, behaving ethically and appropriately, and understanding the complexities of gender relations in male-dominated Fijian society. Broadly, we will discuss the general advantages and disadvantages of teaching science in a foreign cultural context. Specifically, we will address the difficulties and ambiguities of gender appropriate behavior for female NSF science fellows in a patriarchal culture.

TEACHING CRITICAL THINKING IN A PHYSICAL CHEMISTRY COURSE. *M. B. Moeller, Dept. of Chemistry and Industrial Hygiene, University of North Alabama, Florence, AL 35632.*

The Information Revolution has greatly increased the need for critically examining the barrage of reports, many from dubious sources, that an individual can receive. Because the large amounts of factual material required to be learned by undergraduates majoring in a science discipline, these students may actually have less experience in critical thinking

than students in arts or humanities. To address this deficiency, a unit aimed at developing critical thinking skills was inserted into the curriculum for the first semester course in physical chemistry. During the first year for this unit specific questions in lectures and special short exercises in laboratory periods were designated critical thinking tests. When a student passed five of these tests, he or she would receive a form designating them as Certified Critical Thinkers. It was hoped that by simply raising students' awareness of the issue and giving them some exercises, their ability for thinking critically would improve. It was not apparent that these tactics achieved any level of success. The following year a more deliberate, albeit time-consuming, approach was attempted. At the beginning of the semester students were given a short lecture about critical thinking and were given the task of finding and critiquing examples of fuzzy thinking or incorrect logic in the printed news media or on the Internet. The class then discussed and selected the best examples the assignment submitted. As the semester progressed and concepts of physical chemistry were being covered, further instruction in critical thinking was also provided. At the end of the semester, the class viewed video clips downloaded from the internet and asked the identify portions that contained fallacy in argument or violated scientific principles. The success of the instruction will be assessed by the scores on the Major Field Test given all chemistry majors prior to graduation.

Gorgas Competition Paper Abstracts



COMPARISON OF CHARCOAL PRODUCED FROM THE INVASIVE *Pueraria Montana* var. lobata (KUDZU), OAK, HICKORY, AND A COMMERCIALY AVAILABLE CHARCOAL. James LeCroy, Jefferson County International Baccalaureate School, Irondale, AL 35210

Pueraria Montana var. lobata (Kudzu) is a nuisance plant infesting the Southeastern United States. Attempts have been made to either harness this weed for positive purposes or completely eradicate it. Charcoal is a renewable resource with many uses. Utilizing kudzu to make charcoal might help reduce its environmental damage. In this study charcoal was produced from hickory, oak and kudzu. Fifteen samples of each homemade charcoal as well as a commercially produced hardwood charcoal (control) were burned in a homemade calorimeter to determine their energy content. It appeared that the control charcoal produced a projected 29 KJ/kg, followed by hickory with 26 MJ/kg, oak with 25 MJ/kg, and kudzu with 23 MJ/kg. Kudzu appeared to produce 80% of the calories/ gram produced by commercial charcoal. The magnitude of variance in this experiment was such a factor that specific values for energy production could not be statistically supported. The inefficiency of the calorimeter was thought to be the cause of this variability. There was no significant difference in kudzu's performance and that of hickory or oak in peak temperature or burn times. Kudzu performed more poorly than control and hickory in energy production. There was no statistically significant difference in the performance of kudzu and oak in energy production. Statistically and subjectively, kudzu burned more completely than control, hickory or oak. These results might suggest that kudzu produces less energy than the control or hickory and possibly a similar amount of energy as oak, and burns more completely with less waste.

PHYTOREMEDIATION: A Three Year Study. Rebecca L. Daniels, Brooks High School, Killen, AL 35645.

Declining water quality is a global problem. People in poor countries may not be able to afford the purifying methods used in wastewater treatment plants. Even in industrialized nations, there is a need for more cost-efficient methods of treating wastewater. This is a three-year study on the use of duckweed, azolla, and water lettuce for phytoremediation of wastewater, particularly for control of heavy metals in coal ash ponds. Phase I of the study indicated that duckweed can be used for the removal of copper and nitrate contaminants in simulated wastewater but not for phosphate and ammonia. Phase II indicated that duckweed, azolla, and water lettuce can be utilized for the absorption of total heavy metals in coal ash leachate, but did not address specific heavy metals. This phase also included a qualitative analysis of coal ash leachate indicating the presence of cadmium, copper, zinc, aluminum, iron, and tin. Mercury, lead, manganese, silver, and cobalt were not present whereas tests for antimony, bismuth, and arsenic were inconclusive. Phase III of the study included a quantitative analysis by ICP of duckweed's ability to absorb five of the metals previously found to be present in coal ash leachate: aluminum, copper, iron, tin, and zinc. In another analysis by ICP, it was indicated that utilization of dried duckweed was even better than living duckweed for the absorption of heavy metals, indicating that a portable filter could possibly be engineered for the use of on-the-spot water purification.

Gorgas Competition Posters Abstracts

BACTERIA ON THE MOBILE PHONES OF HEALTH PROFESSIONALS AND A COMPARISON OF CLEANING METHODS. *Michael K. Longmire, Alabama School of Math and Science, Mobile, AL 36604.*

Protocols have been implemented in healthcare facilities in order to limit the spread of nosocomial pathogens. However, these often overlook the potential role of mobile phones in the spread of infection. This study examines the mobile phones of three populations of health professionals: hospital workers, physicians, and outpatient staff. Phones were swabbed for bacteria pre and post cleaning and plated on sheep's blood and methicillin-infused agar. Bacterial growth was quantified after 48 hours of incubation at 36°C. Heavy bacterial growth was observed in 41.0% of the pre cleaning plates. A paired t-test revealed a highly significant difference in bacterial growth before and after cleaning (before $\mu=72.50$, after $\mu=27.50$, $t=4.7892$, $p<0.0001^{***}$). Three cleaning substances were compared: a disinfectant wipe, a sterile pad soaked in a silver-ion solution, and a "nano-UV" disinfectant wand. An ANOVA showed a significant difference in efficacy between

cleaning methods (wipes = 80.2%, silver-ion solution = 72.4%, nano-UV = 38.8%, $p=0.015^*$). A questionnaire provided to participants revealed that 90.7% used their phones in the work place, but 59.3% never cleaned the phone. Number of interactions with patients or contaminated surfaces was not significantly correlated to amount of growth, though different populations were significantly different, suggesting outpatient facilities to be the least contaminated ($p=0.022^*$). These results suggest the value of the implementation of a cleaning protocol for mobile phones in these populations.

POTENTIAL ALLELOPATHIC SUPPRESSION OF KUDZU (*Pueraria montana*).
Mason Cole McFarland, Jefferson County International Baccalaureate School,
Birmingham, AL 35210.

The sweet potato (*Ipomoea batatas*) is a versatile plant and potential weed killer. The sweet potato has been known to produce chemicals that when exuded are toxic to other nearby plants. This process is called allelopathy. Allelopathy is a promising field of study that deals with natural reactions between plants to aid in weed control. Kudzu (*Pueraria montana*) is an invasive weed and grows back after applications of synthetic herbicides. These herbicides harm the environment and cause the area to become unusable and barren except for the kudzu. By using the allelopathic chemicals present in sweet potatoes it may be possible to develop a natural herbicide. For example in this experiment sweet potato periderm tissue was applied to not only the kudzu plants but also to kudzu seeds to examine the suppressive effects of the allelochemicals. If the specific allelochemical could be found it might be used to suppress the growth of kudzu and provide an eco-friendly alternative to harmful herbicides. The allelochemicals are located throughout all of the sweet potato but are concentrated in the periderm tissue. By manipulating this tissue one may be able to prevent not only the growth of kudzu but also the germination of seeds. The project uses periderm tissue in the root weight, field, sweet potato skin, seedling root weight, germination, and air experiments. Testing this tissue could determine what organic compounds are in the skin. Each compound found, could then be tested to determine which would have the greatest suppressive effect on kudzu.

RECOGNITION OF LOW-LEVEL TROPONIN ELEVATIONS AS CLINICALLY IMPORTANT CARDIAC EVENTS IN THE REASONS FOR GEOGRAPHIC AND RACIAL DIFFERENCES IN STROKE STUDY. Harsh Nitin Shah, Alabama School of Fine Arts, Birmingham, AL 35203. Monika Safford and Gaurav Parmar Department of Preventive Medicine, University of Alabama, Birmingham, AL 35294.

The Universal Definition of Myocardial Infarction recommends ischemic symptoms, electrocardiographic findings, and biomarker elevations be used to detect heart attacks (Thygesen et al. 2007). The guideline's recommendation: present the upper limit of normal of troponin, is not followed in most hospital labs. Therefore, some low troponin elevation

patients may be misclassified as not having had a cardiac event. I examined whether patients with low troponin levels were less likely to be identified as having coronary heart disease, or a heart attack, as those with higher troponin elevations. I reviewed records of 182 individuals admitted to a hospital to evaluate chest pain, and categorized troponin as being not elevated: less than 0.04; low level of elevation: between 0.04 and twice the lowest upper limit of normal; and high level of elevation: over twice the lowest upper limit of normal. I compared baseline characteristics in each group, and determined whether coronary artery disease or a heart attack was diagnosed less often in the low relative to the high troponin group. There were 76 patients in the no elevation group, 66 in the low group and 40 in the high group. The Framingham CHD Risk Score differed significantly: 10.5 for none, 12.5 for low, and 26 for high ($p < 0.01$). The individuals in the low elevation group were likely to be diagnosed with a heart attack or be diagnosed with coronary artery disease at rates similar to those with no elevation. Current limitations in hospital laboratory reporting may be leading to under recognition of coronary artery disease or heart attack among individuals with low levels of troponin elevation, and possibly compromise optimal risk stratification. Urgent attention to making hospital troponin reporting guideline-concordant is warranted.

**ALABAMA ACADEMY OF SCIENCE
FALL 2009 EXECUTIVE COMMITTEE MEETING
SAMDOR UNIVERSITY**

1. Call to Order 8:25 am

Present: Safaa Al-Hamdani, Phil Bonding, Scott Brande, Brian Burnes, Megan Gibbins, Richard Hudiburg, Larry Krannich, Adriane Ludwick, Ken Marion, Michiel Moeller, James Rayburn, Brian Thompson, Mickie Powel, Catherine Shields, Steve Watts.

Report	Action Item	Action Taken	Designated Responsibility	Due Date
B4, C16	Identify individuals for vacant Academy positions (Treasurer, State Director Science Olympiad, Chair Public Relations Committee)	Working On	Nominating Committee	Fall 2009
B2	Select a new State Director for Science Olympiad	Working on	Exec. Comm.	Fall 2009
B2	Elect a new Treasurer		Academy	Spring 2010
B7	Submit one page biographies of selected scientists from Alabama universities.	Done	Academy members	
B7	Encourage Academy members to submit manuscripts to the Journal	Done	Academy members	
B9	Reconsider the action to be taken if West Regional Science Fair does not submit their payment. Original motion was tabled until Fall 2009 exc meeting	Motion	Exec. Comm.	Oct 2010
B12 – VII	Acquire contact information for local science teachers	Done	Catherine Shields	Oct 2010
C1	Approval of Local Arrangements Committee plans for Spring 2010 Annual Meeting	Done	Exec. Comm.	Fall 2009
C5	Realign the sections as recommended by the Long-Range Planning Committee (Amendment to C&B) at Spring 2009 meeting and moved for action at fall 2009 Exec. Comm. Mtg.	Approved	Exec. Comm. and Academy	Fall 2009
C5	Future awards be constructed relative to the objectives of the Academy (Amendment to C&B)	Approved	Exec. Comm. and Academy	Fall 2009
C5	New awards be establish only when sufficient funds are in place or will be available in a regular manner (Amendment to C&B)	Approved	Exec. Comm. and Academy	Fall 2009
C11	Obtain photographs of members of the Executive Committee and forward to Archives	Done		Spring 2010
C11	Forward copies of committee reports, minutes of Executive Committee meetings to Archives	Done	James Rayburn	November 2009
C11	Obtain photographs of annual meeting attendees and forward to Archives			
C13	Obtain nominees for Gardner Award and Fellows of the Alabama Academy of Science	Reminder	Academy	Jan 15, 2010
E	Amend the Constitution and By-laws to be consistent with Long Range Planning Committee recommendations.	Approved	Exec. Comm. And Academy	Fall 2009, Spring 2010

2. Review/approval of minutes of the Spring 2009 Executive Committee Meeting
 Approved minutes Ken Marion motion, seconded by Al-Hamdani

Agenda B. Officer Reports

1. **Board of Trustees Report, Ken Marion** No Report Submitted

2. **President's Report, Brian Thompson**

Brian Burnes and I have been working to fill committee vacancies. Most committee members have agreed to re-appointment. For those who wish to step down, we have sought replacements. In particular, Marietta Cameron has tentatively agreed to appointment as Secretary of the Executive Committee. The list of nominations appears in the nominating committee report.

On September 30, I accompanied Ellen Buckner and Larry Krannich to Alabama A&M University to visit the site of the spring meeting. We were greeted by Drs. Yong Wang and Phil Bording, local arrangements co-chairs, and by Dr. Beverly Edmonds, VPAA. The VPAA pledged her full support for the conference. The facilities AAMU can provide are outstanding. Phil and Yong presented us with several interesting options for the conference format. In particular, we may be able to integrate our poster session with the university's annual Science-Technology-Engineering-Mathematics poster session.

I have reviewed a first draft of changes to the Constitution and By-Laws made by Larry Krannich. These changes incorporate the suggestions made by the Long Range Steering Committee and presented last Spring Meeting.

Action Items:

1. Identify an individual to serve as Treasurer
2. Identify an individual to serve as State Science Olympiad Director

3. **Report of the President-Elect, Brian Burnes**

Alabama Academy of Science 2009 Annual Meeting Report
Presentations and Posters

Section	Subject	Number
SECTION I	BIOLOGICAL SCIENCES	47
SECTION II	CHEMISTRY	13
SECTION III	EARTH SCIENCE	12
SECTION IV	GEOGRAPHY, FORESTRY, CONSERVATION, AND PLANNING	8

SECTION V	PHYSICS AND MATHEMATICS	12
SECTION VI	INDUSTRY AND ECONOMICS	8
SECTION VII	SCIENCE EDUCATION	8
SECTION VIII	BEHAVIORAL AND SOCIAL SCIENCES	8
SECTION IX	HEALTH SCIENCES	12
SECTION X	ENGINEERING AND COMPUTER SCIENCE	6
SECTION XI	ANTHROPOLOGY	9
SECTION XII	BIOETHICS & HISTORY & PHILOSOPHY OF SCIENCE	7
	Total	130

Institution	Number
Alabama A&M	6
Alabama State University	1
Auburn University	15
Auburn University Montgomery	7
Clemson University	1
Jacksonville State University	10
Judson College	1
Medical College of Georgia	2
Mississippi University for Women	1
Northern Illinois University	1
Samford University	2
Troy State University	10
Tuskegee University	6
University of Alabama	5
University of Alabama - Birmingham	26
University of Alabama - Huntsville	7
University of North Alabama	1
University of South Alabama	3
University of West Alabama	25

University of West Alabama

10/15/09

**General Ledger Detail Trial Balance
For Period 10/01/2008 thru 09/30/2009**

Fiscal Year: 2009
Restricted

FUND: 30 -

Date	Src	Ref.No	Description	Opening Balance	Debits	Credits	Closing Balance
-----30-00-31150-4101 Restricted : AL Acad. of Sci. : Fund Balance-Reserved							
-----Oct 01	AA		*YE-OB*Opening Balance	714.00			
Oct Totals				714.00	0.00	0.00	
Totals for 30-00-31150-4101				714.00	0.00	0.00	714.00
-----30-00-31150-5631 Restricted : AL Acad. of Sci. : Non-Gov. Grants/Cont							
Feb 28	JE	J005258	AAS Registration Fees				320.00
			Feb Totals		0.00		320.00
Mar 09	CR	A000000769	Summary for date "03/09/09"		0.00		427.50
Mar 25	CR	A000000779	Summary for date "03/25/09"		0.00		182.50
Mar 30	CR	A000000783	Summary for date "03/30/09"		0.00		505.00
Mar 31	JE	J005350	AAS Registration Fees				2,645.00
			Mar Totals		0.00	3,760.00	
Apr 01	CR	A000000785	Summary for date "04/01/09"		0.00	4,240.00	
Apr 20	CR	A000000835	Summary for date "04/20/09"		0.00	121.50	
Apr 21	CR	A000000836	Summary for date "04/21/09"		0.00	1,340.00	
			Apr Totals		0.00	5,701.50	
Totals for 30-00-31150-5631				0.00	0.00	9,781.50	
9,781.50-							
-----30-00-31150-7390 Restricted : AL Acad. of Sci. : Travel							
Oct 24	PJ	V0041263	Dr. Brian S. Burnes			75.00	
Oct 31	JE	J004467	MP-B. Burnes			84.90	

		Oct Totals	159.90	0.00
Mar 31	JE	J005308 MP-K. England	70.20	
		Mar Totals	70.20	0.00
Totals for 30-00-31150-7390			0.00	230.10
230.10				0.00

University of West Alabama
General Ledger Detail Trial Balance
For Period 10/01/2008 thru 09/30/2009

Fiscal Year: 2009
Restricted

FUND: 30 -

			Opening			
Closing						
Date	Src	Ref.No	Description	Balance	Debits	Credits
Balance						

30-00-31150-7390 Restricted : AL Acad. of Sci. : Travel						

30-00-31150-8179 Restricted : AL Acad. of Sci. : Other Gen. Exp.						
Mar 31	JE	J005305	Printing Charges		818.00	
Mar 31	JE	J005305	Printing Charges		163.70	
Mar 31	JE	J005305	Printing Charges		97.05	
Mar 31	PJ	V0051420	Petty Cash		65.56	
			Mar Totals		1,144.31	0.00
Apr 03	PJ	V0051563	Petty Cash		32.08	
Apr 14	PJ	V0052004	Nature Conservancy		100.00	
Apr 16	PJ	V0052077	Backwater Gallery and Frame		190.00	
Apr 16	PJ	V0052078	Aramark , Inc		4,645.20	
Apr 21	PJ	V0052313	Qichao Liu		50.00	
Apr 21	PJ	V0052314	Joseph Castillo		25.00	
Apr 24	PJ	V0052340	Alabama Graphics		292.60	
Apr 29	PJ	V0052527	Petty Cash		21.23	
Apr 30	JE	J005425	Printing job #426-8/09		1,078.25	
			Apr Totals		6,434.36	0.00
Jul 31	JE	J005847	Supply Room Charges		5.00	
			Jul Totals		5.00	0.00

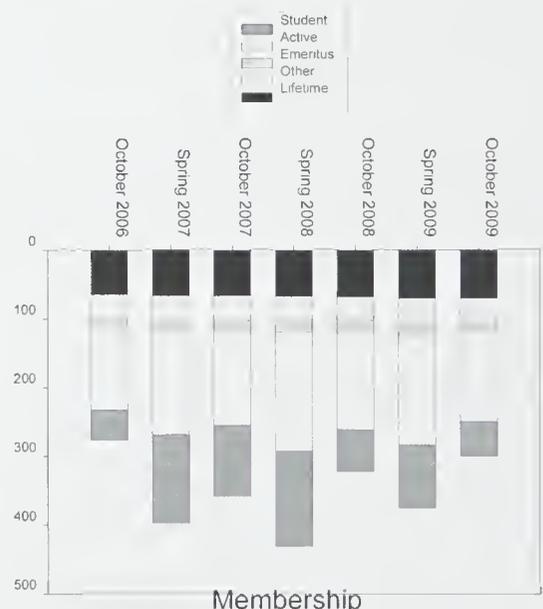
Totals for 30-00-31150-8179	0.00	7,583.67	0.00
7,583.67			
Totals for FUND: 30 - Restricted	714.00	7,813.77	9,781.50
1,253.73-			

4. **Second Vice President Report, Mickie Powell** No Report Submitted

5. **Secretary Report, James Rayburn**

1. Provided the membership list to Eugene Omasta for a grant.
2. Provided sets of labels of current members to Safaa Al-Hamdani for the journal.
3. Provided the minutes to Dr. Al-Hamdani.
4. Confirmed, as of October 14, 2009 we have 299 members including library and other members. (This is down 23 members compared to this time last fall; we are down 59 members for the last two years; 108 are paid for 2010)
5. Recorded \$4770.00 in dues paid for 2008. We also have \$200 already paid for 2010.
6. Has on the rolls, 132 Active members (36 paid), 13 emeritus, 71 lifetime, 51 Student (1 paid), 32 other members (none paid) see figure below.
7. If membership stays stable, expects \$3,760.00 more in dues for 2010. This has been a good indicator within \$1,000 of actual dues taken in for the year based on past years, usually a low estimate.
8. Confirms memberships by section as follows.

Section #	Total #
1	104
2	22
3	6
4	4
5	27
6	5
7	8
8	10
9	32
10	13
11	8
12	4
77(other)	33
None selected	23
	299



9. Dues reminder cards have not been distributed, but I am working on reminder cards with information about web page to be approved at October meeting. They will go out I hope before October 31.
10. We need to continue to improve PayPal Information.

6. Treasurer's Report, Taba Hamissou

The treasurer's report consists of the following:

All account balance as of October 14, 2009

All financial assets report, as of October 14, 2009

Incomes and Expenses statement as of October 14, 2009

The quarterly income for the Academy is \$35,768.65, including the Science Fair's. The expenses totaled \$32,056.01. The two cds generated \$418.24 interest. One printing invoice for the journal issues was paid by Auburn University. No library supports were received this quarter. The Academy assets decreased by \$2,053.01 from March to October. The decrease is due to low membership dues received and the annual meeting expenses.

Respectively submitted,

Taba Hamissou

All Account Balances as of 10/14/2009

Account

Balance

ASSETS

Bank accounts

cd(1) + cd(2)

\$21,960.06

Saving account

\$1,263.82

Checking

\$3,712.64

TOTAL ASSETS

\$26,936.52

March 13, 2009 – October 14, 2009

March 13, 2009

cd(1) + cd(2)

\$21,541.82

Saving account

\$1,261.01

Checking Account Balance

\$6,186.70

October 134, 2009

cd(1) + cd(2)

\$21,960.06

Saving account

\$1,263.82

Checking account

\$3,712.64

Total Academy Assets all accounts (March 13, 2009)\$26,936.52

Assets decrease in this quarter:

\$2,053.01

7. Journal Editor Report, Safaa Al-Hamdani

The following has been accomplished since the last meeting:

- The Alabama Academy of Science Journal Vol. 80. No 1&2 has been successfully released.
- We are on time in releasing the October issue of the journal for 2009. I am planning to send all the articles to the publisher by the end of October.
- Members of the academy need to become more active in submitting papers to the journal and volunteering to review manuscripts.
- Each Alabama university is invited to submit a one page biography of a selected scientist of their choice to be included in each issue of the journal.
- Tom Ash, the Executive Sales Representative for Cengage Learning - Brooks/Cole Pub. has informed me that they are willing to continue to advertise in the journal.

8. Counselor to Alabama Junior Academy of Science Report, Henry Barwood
No Report Submitted

9. Science Fair Coordinator Report, Virginia Valardi

Twenty high school students from across the state of Alabama traveled to Reno, Nevada to compete in the 60th International Science and Engineering Fair (May 10-16, 2009). Intel/ISEF is the world's largest pre-college science and engineering competition. Over 1500 students from 56 countries competed in this event that culminates a year of research and experimentation by these young scientists. The awards are given by category (16 different) or as special awards from over 60 participating organizations. The 2009 winners from the State of Alabama were:

Grand Awards:

Category Animal Science:

First Award of \$3,000

8. The Effect of Honey Hydrogen Peroxide Concentration on Small Hive Beetle (*Aethina tumida*) Survival **Lydia L McCormick**, 16, Junior, Jefferson County International Baccalaureate, Birmingham, Alabama

Category Computer Science:

Second Award of \$1,500

Do You 'ear Wha' I 'ear?, II: Lowering Voice Frequencies in Real Time to Revolutionize Hearing Assistance Technology **Nicholas Mycroft Christensen**, 17, Junior, Wetumpka High School, Wetumpka, Alabama

Category Computer Science Teams:

Second Award of \$1,500

Stylometric “Fingerprinting”: A Computerized Approach to Author Identification
Ashley Kate Vechinski, 14, Freshman **Bethany Lynne Johnson**, 15,
Sophomore Life Christian Academy, Harvest, Alabama

Special Awards:

Acoustical Society of America

Student award of \$500.00, in addition the student’s school will be awarded \$200, and the student’s will be awarded \$100 (1). Each winner will also receive a one-year ASA membership

Do You ‘ear Wha’ I ‘ear?, II: Lowering Voice Frequencies in Real Time to Revolutionize Hearing Assistance Technology **Nicholas Mycroft Christensen**, 17, Junior, Wetumpka High School, Wetumpka, Alabama

IEEE Computer Society

First Award of \$1000 (1), Team First Award of \$500 for each team member
Winners will receive a framed certificate, and a one-year free subscription to the CS magazine of their choice. A winner’s group photo will also be published in an issue of “Computer” magazine.

Stylometric “Fingerprinting”: A Computerized Approach to Author Identification
Ashley Kate Vechinski, 14, Freshman **Bethany Lynne Johnson**, 15, Sophomore
Life Christian Academy, Harvest, Alabama

Office of Naval Research on behalf of the United States Navy and Marine Corps.

Tuition Scholarship Award in the amount of \$8,000, Scholarships are payable at \$2,000 a year for four years. Recipients also receive a certificate signed by the Chief of Naval Research and the Vice Chief of Naval Research, and a U.S. Navy memento.

The Evidence and Potential Roles of Allelopathic Agents Present in Sweet Potatoes (*Ipomoea batatas*) **Mason Cole McFarland**, 17, Junior, Jefferson County International Baccalaureate School, Birmingham, Alabama

United Technologies Corporation

United Technologies Corporation (UTC) is a diversified company whose business units include Carrier heating and air conditioning, Hamilton Sundstrand aerospace systems and industrial products, Otis elevators and escalators, Pratt & Whitney aircraft engines, Sikorsky helicopters, UTC Fire & Security protection services, UTC Power fuel cells, and the United Technologies Research Center. We are proud to recognize 8 projects for excellence in science and engineering. Each winning project will receive \$2,000 in shares of UTC common stock. Each winner will also receive a plaque, a digital camera, backpack and the United Technologies Corporation Annual Report.

Do You 'ear Wha' I 'ear?', II: Lowering Voice Frequencies in Real Time to Revolutionize Hearing Assistance Technology **Nicholas Mycroft Christensen**, 17, Junior, Wetumpka High School, Wetumpka, Alabama

Florida Institute of Technology

Florida Institute of Technology is the only private technological University in the southeastern United States and is rated by the Princeton Review as the best private college in Florida. Florida Tech, located on the Space Coast near Kennedy Space Center, offers full undergraduate and graduate programs in engineering, science, psychology, business, and aeronautics. Scholarship Award of \$12,500 per year, renewable annually (12). Florida Tech is offering 12 tuition scholarships of \$50,000 each, to be distributed over four years.

The Role of Proteasomal Subunits in Polyglutamine Protein Aggregation in the Nematode *C. elegans* **Dave Raj Prahraj**, 16, Junior, Virgil I. Grissom High School, Huntsville, Alabama

The following two awards were presented to all of the students from Alabama. These students were: Kelly Sabrina Lynn, Nicholas Christensen, Parker Caviness, Todd Thrash, Gregory Lorino, Joseph Latham, Bethany Johnson, Ashley Vechinski, Dave Prahraj, Nathan Tinker, Joel Tinker, Marcel Girgis, Lydia McCormick, Mason McFarland, James LeCroy, Rakesh Goli, Tyler Odle, John Christopher Ashburn, Winston Joe, and Anya Glandon.

Wolfram Research, Inc.

Through innovation and progressive growth Wolfram Research continues to thrive as the world's leading technical software company. Wolfram Research products maintain a reputation for innovation, power, quality, and elegance. The company's aim can be summarized: Pushing the Envelope of Technical Computing. Wolfram Research is pleased to support the Intel International Science and Engineering Fair by presenting all finalists with their own copy of Mathematica 5.2 Software for students. Mathematica integrates a numeric and symbolic computational engine, graphics system, programming language, documentation system, and advanced connectivity to other applications. It is this range of Capabilities that makes Mathematica uniquely capable as a "one stop shop" for technical computing. Mathematica software for **all** Intel ISEF Finalists and Observers

Sierra Nevada College

SNC combines the liberal arts and professional preparedness through an interdisciplinary curriculum which emphasizes entrepreneurial thinking and environmental, social, economic and educational sustainability. These graduates will be scholars and contributors to a sustainable world. SNC is offering the "Science Scholarship" of \$12,500 per year for 4 years to **ALL** Intel ISEF finalists!

10. Alabama Science Olympiad Report, Jane Nall

Herculean efforts continue to be made each year by staff and volunteers on several university campuses, and teachers, parents, and students of over 200 public and private schools, so they might experience the joys and thrills of doing lab hands-on science.

Presently, registrations for teams and setting tournament hosts and dates are in progress. Probably due to the economy and funding cutbacks, fewer teams and hosting institutions are expected.

The elementary levels compete at various local and regional tournaments. Currently, the number of new teams registering has increased.

The University of West Alabama, Jacksonville High School and Auburn University host an A2 tournament (grades 4-6) and report they have a great time, and they are already planning this year's tournaments.

Presently, two regional C tournaments are scheduled at University of Alabama - Tuscaloosa and Huntsville. Thus, there is a reduction from five C tournaments to two and three regional B tournaments are University of Alabama - Tuscaloosa and Huntsville, and the Auburn University. State Alabama B will be held at Huntingdon College and Alabama C will be on the campus of Jacksonville State University in April. State Director is meeting with Spring Hill College science department this week in the hope they will host. Otherwise there will be no tournaments south of Montgomery.

Science Olympiad events address the National Standards for Science Education and comprise all areas of science including astronomy, meteorology, experimental design, genetics, anatomy, process skills for life science and biology, chemistry and polymers, physics, earth science and fossils, and water quality and the environment, map skills, GIS and remote sensing as well as building events such as a Rube Goldberg-like device, robot, bottle rocket, plane, bridge and tower building, musical instruments. Alternating events in taxonomy include topics of trees, amphibians and reptiles, birds, insects.

Still the best kept secret in the State, many volunteers of Alabama Science Olympiad continue to provide students the opportunity to participate and compete in Science Olympiad. Teachers, parents, coaches, bus drivers, university professors, university work study students, and other volunteers work to provide the students of Alabama the joys of "doing science" in an arena resembling athletic tournaments.

Director Nall is in search of more universities willing to host tournaments! Please consider showcasing your campus and join us in the fun! The State Director is appointed by the Alabama Academy of Science. To date Alabama has been lead by two directors – 1985-1996 Mr. Steven Carey, University of Mobile and 1997-present Ms. Jane Nall, Spanish Fort High School and the University of Mobile.

National this year will be May 20-22, 2010 hosted by the University of Illinois at Urbana-Champaign.

ALABAMA SCIENCE OLYMPIAD 2009-2010

Division A2 Grades 3-6 Olympiad Tournaments

University of West Alabama, Tuesday, October 20, 2009. Dr. Jeffery Merida.
Univ. of West Alabama, Station 7, Livingston, AL 35470. jmerida@uwa.edu

Jacksonville High School, Saturday, February 27, 2010. David Peters, 1000
George Douthit Drive SW, Jacksonville, AL 36265. (256) 435-4177,
www.esoatjhs.org

Auburn University, Saturday, February 27, 2010 Greg Harris & Terry Tidwell,
Department of Mathematics, 218 Parker Hall, Auburn, AL 36830
harriga@auburn.edu or tidweto@auburn.edu

Division B Grades 6-9 Olympiad Tournaments

Auburn University, Saturday, February 27, 2010, Dr. Steve Stuckwisch,
Department of Geology, 108 Tichenor Hall, Auburn University, AL
36830. (251) 844-6575 ssuckwisch@charter.net; <http://www.auburn.edu/~stuckse/ScienceOlympiad/>

University of Alabama at Huntsville, Saturday, February 20, 2010. Mrs.
Vanessa Colebaugh, 5019 Willow Creek Drive, Owens Cross Roads,
AL 35763. (256) 922-5747 nessacita@comcast.net, <http://www.uah.edu/sciolympiad/index.php>

University of Alabama, Saturday, February 13, 2010. Luoheng Han, Ph.D.,

Associate Dean and Professor, College of Arts and Sciences,
University of Alabama, Box 870268, Tuscaloosa, AL 35487-0268,
Phone: 205.348.7007, Fax: 205.348.0272. www.as.ua.edu

Division C Grades 9-12 Olympiad Tournaments

University of Alabama at Huntsville, Saturday, February 20, 2010. Mrs. Vanessa Colebaugh, 5019 Willow Creek Drive, Owens Cross Roads, AL 35763. (256) 922-5747 nessacita@comcast.net, <http://www.uah.edu/sciolympiad/index.php>

University of Alabama, Saturday, February 13, 2010. Luoheng Han, Ph.D., Associate Dean and Professor, College of Arts and Sciences, University of Alabama, Box 870268, Tuscaloosa, AL 35487-0268, Phone: 205.348.7007, Fax: 205.348.0272. www.as.ua.edu

State Science Olympiad Tournaments

Huntingdon College, Saturday March 14, 2010. Division B, Dr. Sidney Stubbs, Assoc. Vice President for Institutional Assessment and Compliance and Professor of Mathematics sstubbs@huntingdon.edu and Dr. Jim Daniels, Assoc. Prof. of Biology, jdaniels@huntingdon.edu, 1500 E Fairview Ave, Montgomery, AL 36106 (334) 833-4430

Jacksonville State University, March 3, 2010. Division C, Dr. Nagarajan Vasumathi (Vasi), Assistant Professor of Chemistry Department of Physical and Earth Sciences (PES, 232-B Martin Hall, Jacksonville State University, Jacksonville, AL 36265. Ph: 256-782-5816, fax: 256-782-5336, nvasumat@jsu.edu

2010 Science Olympiad National Tournament • May 20-22, 2010 hosted by the University of Illinois at Urbana-Champaign

State Director: Jane Nall, 31110 Wakefield Drive, Spanish Fort, AL 36527 (251) 621-2911, email drnall@hotmail.com Alabama Science Olympiad web page: <http://aso.jsu.edu/>

11. Counselor to AAAS Report, Steve Watts, No Report Submitted

12. Section Officers

I. Biological Sciences Section Report, Megan Gibbons

The final numbers for the March 2009 AAS meeting at University of West Alabama were:
A total of 49 presentations were made by faculty and students.

25 talks

24 posters

Seven students were entered in the competition for best talk. The award for best talk was given to:

Andrew T. Coleman, UAB, Diamondback terrapin hatchling orientation: to sea or not to see? That is the question.

Fourteen students were entered in the competition for best poster. Since we had more the 12 students in the poster competition we gave two awards.

Aaron T. Neal of UAB Malaria vaccine candidate *Plasmodium falciparum* merozoite surface protein 6: assessing genetic diversity in the Peruvian Amazon.
Kimberly A. Hobbs, University of Alabama Huntsville, Raman spectroscopic analysis of pancreatic islets.

The talks and poster sessions were well attended. Breaking up the talk sessions with poster viewing sessions seems to have increased attendance at the posters.

Dr. Megan Gibbons has taken over as chair of the Biological Sciences section, and Dr. Ketia L. Shumaker has accepted the position of vice-chairman for the Biological Sciences section.

II. Chemistry Section Report, Emanuel Waddell.

No Report Submitted

III. Geology & Earth Science Section Report

No Report Submitted

IV. Geography, Forestry, Conservation & Planning Section Report, Vacant.

No Report Submitted

V. Physics and Mathematics Section Report, Akshaya Kumar

I am pleased to report that total ten presenters (seven oral and three poster presentations) out of twelve submitted abstracts presented their research work in the Physics and Mathematics Section, at the Annual Meeting this year.

Two student papers for oral presentations and three poster presentations had been entered for student award competition.

There was a tie for best oral presentation award. It was given to two students, Mr. Hashim K. Samuel from Tuskegee University and Mr. Chun-Wei Wang from University of Alabama at Birmingham

Best poster presentation award was awarded to Ms. Deirdre N. Watts from University of Alabama at Huntsville.

In 2010, we will continue our efforts to increase the number of participants in the physics and mathematics section.

VI. Industry & Economics Section Report, Marsha Griffin

No Report Submitted

VII. Science Education Section Report, Karen Utz.

There were a number of innovative and informative presenters who participated in the 2009 Science Education section. The participants and papers are as follows,

- Michelle Sidler, Auburn University, “Science Studies in First-Year Composition”
- Heather Guy, UAB, “The Medical and Social Impact of Cholera in the 19th Century and Beyond”
- James P. Cormier, UAB, “Super-Size It! Large-Scale Anatomy Exhibits in Informal Science Education”
- Erika M. Steele, UA, “Comparing Faculty Perceptions with Classroom Observations”
- Bruce Wheatley, UAB, “Teaching Science and Evolution in Anthropology”

As always, the Education Section offered lively discussion sessions at the end of each panel. We allowed for more discussion time this year, which was sorely lacking in past years.

We need to bring in Science Educators and Teachers from the surrounding areas to take advantage of these worthwhile science education sessions. How can I obtain contact information for local science teachers? What type of PR is done each year to bring in those from the surrounding areas? I have discussed this concern with Ellen Buckner and would like to meet with her again to discuss in greater detail.

Action Item: Acquire contact information for local science teachers.

VIII. Behavioral and Social Sciences Section Report, Richard Hudiburg.

Section VIII – Behavioral and Social Sciences had 6 papers and 1 poster for the 86th annual meeting of the Alabama Academy of Science.

The section chair and vice-chair will make an effort to contact academic departments at colleges and universities in Alabama in order to encourage participation in the 87th annual meeting.

IX. Health Sciences Section Report, Bettina H. Riley

In response to the 86th Annual Meeting of the Alabama Academy of Science’s 2009 call for paper and poster titles, nine paper titles and three poster titles were received. All were accepted. Six papers were entered into the student competition. Two posters were entered into the student competition. The overall number of respondents was consistent with last year’s level. Two of the papers withdrew from the competition prior to the competition. One paper not entered in the competition withdrew prior to the meeting.

The paper and poster presentations were held on Thursday, March 26, 2009 in Bibb Graves Hall. The papers were presented in Room 204 and the posters with authors were available in the second floor hallway. The business meeting was conducted during the intermission at 10:15. A Vice Chair was elected for the 2009 – 2011 terms. His name is John M. Martin from the University of South Alabama.

The goal for the 87th Annual Meeting was set to increase the number of paper and poster presentations for this section. This should have an added benefit of increasing membership. As a result, contacts from five colleges around Huntsville have been identified to be targeted first with email invitations to participate in the March 2010 Annual Meeting. Other schools across the state will be emailed as well. Students from all health sciences will be targeted for participation, including medicine, nursing, public health, dentistry, optometry, health sciences biomedical, etc.

X. Engineering and Computer Science Section Report, Brian Toone

There is nothing to report at this time. I need to work to get the section more organized and start soliciting papers for the spring meeting.

XI. Anthropology Section Report, Harry Holstein.

No Report Submitted

XII Bioethics and History/Philosophy of Science Section Report, Gerry Elfstrom

No Report Submitted

13. Executive Director Report, Larry Krannich

Since March, 2009, I have been involved in the following activities as the Executive Director of the Alabama Academy of Science:

1. Distributed the Local Arrangements Manual to the local arrangements committee at the Alabama A&M University to assist them concerning arrangements, program booklet needs, and deadlines associated with the annual meeting of the Academy to be held on the Alabama A&M campus, March 31 and April 1, 2010 with the Executive Committee meeting on March 30th.
2. Attended the site visit at the Alabama A&M University on September 30th.
3. Prepared letters for distribution in late October to Alabama colleges and universities to solicit financial support for the Journal.
4. Prepared the Call for Papers for the 87th meeting of the Academy that will be distributed to all Section Chairs in hard and electronic copy after November 15th.

5. Updated the fliers and letters being sent to all Alabama chemistry faculty to solicit the participation of undergraduates and Alabama college and university Chemistry faculty in the 5th annual Undergraduate Chemistry Research symposium to be held in conjunction with the annual meeting of the Academy.
6. Contacted local sections of the American Chemical Society in the State to assess their willingness to again co-sponsor the state-wide undergraduate chemistry research symposium with the Academy.
7. Developed a draft of changes to the AAS Constitution & By-laws to incorporate changes recommended by the Long Range Planning Committee regarding reorganization of Academy sections and development of future awards, and the inclusion of the Fellows of the Academy program.
8. Consulted with Brian Toone, Editor for Electronic Media, to re-activate the on-line submission of Executive Committee reports and generate a compiled document for distribution to all attendees at the meeting.
9. Developed a doodle.com site for intended participation in the Executive Committee breakfast and meeting.
10. Prepared the committee chair report compilation and action items for distribution at the Fall Executive Committee meeting.

C. Committee Reports

1. Local Arrangements Committee Report, Yong Wang, Phil Bording

This report will be an oral report at the Executive Committee Meeting.

Action Item:

1. Approval of Local Arrangements Committee plans for Spring 2010 Annual Meeting.

2. Finance Committee Report, Ken Marion

The assets of the Academy as reported at the Fall Executive Committee meetings and Annual Spring meetings since 2001 are listed below.

Period	Assets (End of Period)	Change	Period	Assets (End of Period)	Change
1/1 – 10/12/2001	\$71,763		1/1 – 12/31/2001	\$75,813	
1/1 – 10/12/2002	\$72,197	\$434	1/1 – 12/31/2002	\$72,813	–\$3,000
1/1 – 10/12/2003	\$71,403	–\$794	1/1 – 12/31/2003	\$74,800	\$1,987
1/1 – 10/26/2004	\$74,265	\$2,862	1/1 – 12/31/2004	\$74,610*	–\$ 190
1/1 – 10/26/2005	\$63,895	–\$10,370	1/1 – 12/31/2005	\$65,561*	–\$9,049
1/1 – 10/26/2006	\$62,162	–\$1,733	1/1 – 12/31/2006	\$67,555*	\$1,994
1/1 – 10/31/2007	\$34,004	–\$28,158	1/1 – 12/31/2007	\$36,435*	–\$31,120
1/1 – 10/10/2008	\$25,618	–\$8,386	1/1 – 3/13/2009	\$28,989*	–\$7,446
1/1 – 10/14/2009	\$26,937	\$1,319			

During the last 12 months the financial assets of the Academy have remained relatively stable. A major reason for this has been the recent renewed financial support from the AU library for printing of the Journal. However, it should still be noted that our total assets remain near a decade low. The Academy needs to maintain realistic budgets to reflect this and, should conditions warrant, be prepared to consider steps (i.e., dues increase, increased meeting registration fees, etc.) to augment revenue in the near future.

3. Membership Committee Report, Mark Meade,

No Report Submitted

4. Committee on Research Report

No Report Submitted

5. Long-Range Planning Committee

No formal report is submitted.

The spring 2009 report will be discussed as an action item at the fall 2009 Executive Committee Meeting. See pages 18-20 of this Executive Committee document.

Action Items:

1. Realign the sections as recommended by the Long-Range Planning Committee
2. Future awards be constructed relative to the objectives of the Academy
3. New awards be established only when sufficient funds are in place or will be available in a regular manner.

6. Auditing, Senior Academy Committee Report, Robert Angus

I have contacted the Treasurer, Taba Hamissou. In December, Dr. Hamissou will make the bank records available to me. The audit will consist of me going over the Treasurer's records for funds received and funds paid out to assure that the records are accurate. I will submit the final auditor's report before the spring meeting.

7. Auditing, Junior Academy Committee Report, Henry Barwood

No report submitted.

8. Editorial Board & Associate Journal Editors Committee Report, Thane Wibbels

No report submitted.

9. Place and Date of Meeting Committee Report, Mark Meade

No report submitted.

10. Committee on Public Relations Report, Roland Dute

No report submitted.

11. Archives Committee Report, Troy Best

We need to obtain photographs (especially of members of the Executive Committee), committee reports, minutes of the AAS Executive Committee meetings, and any other materials that may be of interest to our membership. Items that may not seem of interest at present may be of great interest in the future. Photographs of officers and members at meetings are of special interest.

If you have items that you believe may be worthy of inclusion in the AAS Archives, please send them to me or to Dr. Dwayne D. Cox, University Archivist, Auburn University Ralph B. Draughon Library, 231 Mell Street, Auburn University, AL 36849.

Access to our AAS Archives is available 7:45-4:45 Monday-Friday. Dr. Cox has provided the following information relative to access. Archives materials **do not** go out on interlibrary loan. Patrons can come in and use them according to the donor specifications. Some require special permission from the donating office or persons who made the donation or sometimes the archivist. Materials to be used at night or weekends need to have special arrangements made so they can be pulled before 4:30 in the afternoon (Friday afternoon for weekend use). Copies can be made in most cases and that can be done either by going through InfoQuest or contacting Dr. Cox or the reference desk at 334/844-1732.

I encourage all officers and members of the AAS to donate significant documents, photographs, etc. to the archives.

Action Items:

1. Obtain photographs of members of the Executive Committee
2. Obtain copies of committee reports, minutes of Executive Committee meetings
3. Obtain photographs of annual meeting attendees.

12. Committee on Science and Public Policy Report, Scott Brande

Although no committee meetings were held this past year, I followed four relevant issues.

Evolution in the public school classroom

As I predicted last fall, representatives and senators in the Alabama legislature introduced again “Academic Freedom” bills in the 2009 legislative session. HB300 and SB560 are identical (with the exception of one descriptor term), and largely copy the language of bills introduced in previous years and in other states. These bills ostensibly protect the academic freedom of teachers and students who wish to express in the science classroom opinions antithetical to evolution, but they are really creationist bills in disguise (and the descriptor keywords include “creationism, “intelligent design”, and “origins”). I corresponded with the National Center for Science Education, which notified Alabama members of the legislative action. Fortunately, none of the bills have been enacted to date.

Adoption of Science Curriculum and Textbooks in Alabama

The Alabama Course of Study:Science was adopted in 2004, and science textbooks were adopted in 2005. The usual controversies over evolution in K-12 public school science classrooms won't return as an issue until 2010-11.

Evolution in the news

A) Michael Zimmerman, Dean of the College of Liberal Arts and Sciences at Butler University (Indiana) founded The Clergy Project, which began to support the teaching of evolution and oppose the misrepresentations of conflicts between science and religion. As of 10/20/09, 12,087 Christian, 459 rabbis, and 208 Unitarian Universalist clergy have signed on with the project

The Clergy Project helped to organize various activities around the world to celebrate Evolution Weekend 2009 (13-15 February 2009) and discuss the compatibility of religion and science. Although I distributed background material to area clergy, to the Birmingham News, and to WBHM, I saw little interest locally in covering this event.

B) LivingWaters.com – Kirk Cameron, an American actor (Growing Pains) and now evangelist, has partnered with Ray Comfort in LivingWaters.com, a ministry to teach Christians how to promote their faith “simply, effectively, Biblically ... the way Jesus did” (Wikipedia).

The current LivingWaters.com Origin into Schools project has said it will distributed some 120,000 copies of Darwin's *Origin of Species* at the top 100 universities in the U.S. Another 70,000 copies have been purchased by churches and individuals for distribution. This book contains the complete Origin, and a 50 page introduction written by Comfort that “...reveals the dangerous fruit of evolution, Hitler's undeniable connections to the theory, Darwin's racism and his disdain for women. It counters the claim that creationists are “anti-science” by citing numerous scientists who believed that God created the universe — scientists such as Einstein, Newton, Copernicus, Bacon, Faraday, Pasteur, and Kepler.”

I do not know yet of any local distribution efforts, but I'll keep watch on this project and report developments at our next meeting.

13. Gardner Award & Fellows Committee Report, Prakash Sharma

The first meeting of the Alabama Academy of Science was held at Sidney Lanier High School, Montgomery, Alabama, April 4, 1924, in conjunction with the Alabama Educational Association Meeting. Wright Gardner was elected as an office bearer of the academy in this meeting. Through his early studies he became determined to make teaching and research his two goals for his life. The Wright Gardner Award was established, after the name of this great future looking scientist and educator, by the Alabama Academy of Science in 1984 to honor individuals whose work during residence in Alabama had been outstanding. Persons nominated for this award have included researchers, teachers, industrialists, clinicians, scholars and active members and office bearers of the Alabama Academy of Science.

This is to request each and every member of this academy to publicize to individuals, heads of departments, deans and provosts of colleges and universities about this prestigious award. Please solicit nominations from individuals and different academic and industrial organizations for this award. The nomination should be forwarded to:

Dr. P. C. Sharma, Chair, Wright Gardner & Fellow Award Committee,
Head of Physics Department
Tuskegee University
Tuskegee, AL 36088.
Phone: (334) 727-8998; Fax: (334) 724-3917
e-mail: pcsharma@tuskegee.edu

You are welcome to nominate by either e-mail or mailing a hard copy.

The nominations should consist of the following documents.

- (i) Formal Nomination Letter,
- (ii) Vitae and at least three letters of references from peers, administrators and one by an expert in the area of his/her research, and
- (iii) One page citation that will be used for presentation of the award.

Anything missing from items (i, ii, iii) will result in rejection of the nomination. The closing date for nominations is January 15, 2010. The award will be presented in the "Joint Annual Meeting of Junior and Senior Alabama Academy of Science, 2010.

The Fellow of the Alabama Academy of Science designation is made by the Alabama Academy of Science to recognize individuals for their contributions in science in the State of Alabama and for their service to the Academy. AAS members are invited to submit nominations for this award to the chair of the committee not later than January

15, 2010. Members of the committee should encourage AAS members to submit nominations of outstanding persons. Each nomination should consist of a curriculum vitae and documentation substantiating the person's special contribution to science in Alabama and service to the Academy. Nomination can be submitted by either e-mail or mailing a hard copy. The address is given below:

Dr. P. C. Sharma, Chair, Wright Gardner & Fellow Award Committee,
Head of Physics Department,
Tuskegee University, Tuskegee, AL 36088
Phone: (334) 727-8998; Fax: (334) 724-3917
e-mail: pcsharma@tuskegee.edu

The nominations should consist of the following documents.

- (i) Formal Nomination Letter
- (ii) Vitae and at least four letters of references from experts in area of his/her research and
- (iii) One page citation that will be used for presentation of the award.

Anything missing from items (i, ii, iii) will result in rejection of the nomination. The closing date for nominations is January 15, 2010. The award will be presented in the "Joint Annual Meeting of Junior and Senior Alabama Academy of Science Meeting, 2010.

Dr. P. C. Sharma, Chair, Wright Gardner & Fellow Award Committee

14. Carmichael Award Committee Report, Richard Hudiburg

The committee welcomes two new members appointed to assist in the review of articles for the 2010 The Emmett B. Carmichael Award: David Nelson, University of South Alabama and Larry Davenport, Samford University.

The committee looks forward to reviewing research articles published in Volume 80 of the *Journal of the Alabama Academy of Science* in 2009. The Emmett B. Carmichael Award will be announced during the 87th annual meeting in March – April 2010.

15. Resolutions Committee Report, Mark Meade

A resolution will be drafted in memory of Dr. Level Hazlegrove who was a long-time member of the Academy and a past Executive Director.

16. Nominating Committee Report, Mickie Powell by Brian Thompson.

Listed below are committee positions up for re-appointment this year, and nominees (or lack thereof) for each position.

17. William H. Mason Scholarship Committee Report, Mike Moeller

In spite of sending an informational flyer and application forms to all the deans of colleges sciences and all the deans of colleges of education in Alabama, the Committee received no applications for the William H. Mason Scholarship last spring.

<u>Committee</u>	<u>Position</u>	<u>nominee</u>	<u>comment</u>
Archives	Chair	Troy L. Best	re-appointment
Auditing Junior Academy		Henry L. Barwood	no reply
Auditing Junior Academy		Govind Menon	re-appointment
Budget and Finance	Trustee	Ellen Buckner	re-appointment
Budget and Finance	Counselor to the Junior Academy	Henry L. Barwood	no reply
	Secretary	Marietta Cameron	Will replace James Rayburn
	Treasurer	unfilled	To replace Taba Hamissou
Electronic Media:	Associate Editor	Marietta Cameron	re-appointment
Emmett B. Carmichael Award:		David Nelson	replaces Linda Reed
Emmett B. Carmichael Award:		Robert Pitt	re-appointment
Emmett B. Carmichael Award:		Larry Davenport	replaces James Bradley
Gorgas Scholarship Program:		Elizabeth Dobbins	re-appointment
Gorgas Scholarship Program:		David H. Nelson	re-appointment
Long Range Planning:		Anne Cusic	re-appointment
Long Range Planning:		Ken Marion	re-appointment
Mason Scholarship		Malcolm Braid	replaces Lori Cormier
Membership:	Chair	unnecessary	
Public Relations:		unfilled	Roland Dute requests replacement
Public Relations:		Ken Marion	re-appointment
Regional Science Fairs:	Chair	Virginia Valardi	re-appointment
Research:		Bruce Smith	re-appointment
Research:		Alan Sprague	re-appointment
Research:		Robert Thacker	re-appointment
Resolutions:		Mark Meade	re-appointment
Science and Public Policy:		Steven Carey	no reply
Science and Public Policy:		Boakai Robertson	re-appointment
Science and Public Policy:		James Bradley	no reply
Science Olympiads:	Chair	unfilled	Jane Nall requests replacement
Wright A. Gardner Award:		Anne Cusic	re-appointment verified - Sharma
Wright A. Gardner Award:		Barrett Bryant	re-appointment verified - Sharma
Wright A. Gardner Award:		Gene Byrd	re-appointment verified - Sharma

The previous recipients of the William H. Mason Scholarship are:

1990 - 1991	Amy Livengood Sumner
1991 - 1992	Leella Shook Holt
1992 - 1993	Joni Justice Shankles
1993 - 1994	Jeffrey Baumbach
1994 - 1995	(Not awarded)
1995 - 1996	Laura W. Cochran
1996 - 1997	Tina Anne Beams
1997 - 1998	Carole Collins Clegg
1998 - 1999	Cynthia Ann Phillips
1999 - 2000	Ruth Borden
2000 - 2001	Karen Celestine, Amy Murphy
2001 - 2002	Jeannine Ott
2002 - 2003	(Not awarded)
2003 - 2004	Kanessa Miller
2004 - 2005	(Not awarded)
2005 - 2006	Mary Busbee, Bethany Knox
2006 - 2007	Kelly Harbin
2007 - 2008	Michael Hallman
2008 - 2009	Sheri Sanders Grosso
2009 - 2010	(Not awarded)

Attached to this report is a copy of an announcement that the Committee again plans to be sending soon to deans in colleges of science and colleges of education within Alabama. Members of the AAS Executive Committee are encouraged to copy and disseminate this information.

18. Gorgas Scholarship Committee Report, Ellen Buckner

During the 2008-2009 academic year, numerous teachers were encouraged to sponsor student research submissions to both the Gorgas and AJAS Paper Reading competitions. Avenues for contacting teachers included:

1. sponsorship of a booth at the Alabama Science Teachers' Association (ASTA) meeting in October, 2008 at the McWane Center in Birmingham,
2. presentation of a session at ASTA with Jarrod Lockhart, who works with teachers and students competing in Science Fair, describing research opportunities for students,
3. mailing a letter and brochures to science teachers throughout the state in October of 2008,
4. e-mails to science teachers throughout the state,

5. phone calls to teachers,
6. enclosing Gorgas and AJAS fliers in packets given to winners at the Central Region Science Fair at UAB in March, 2009,
7. placing Gorgas and AJAS fliers at the registration table at the Alabama State Science Fair in April, 2009.

Student participation in both Gorgas and AJAS is growing, but there is much room for continuing to increase submissions. Invitations to teachers resulted in identification of regional coordinators for two additional regions: Virginia Vilardi in the South Central region and Mary Thomaskutty in the North region. The South Central region was represented at the state competition. In the Central region, Janet Ort from Hoover High School sponsored student submissions for the first time and the submissions resulted in winning papers that proceeded to the State competition. One Hoover student won at the state level and attended the national Junior Science and Humanities Symposium (JSHS).

Ellen Buckner, Larry Krannich, Catherine Shields, Mark Jones, and Michael Hallman wrote a grant requesting funds to 1. support personnel to contact teachers and 2. provide incentives for teachers to mentor students through independent research and submit projects to both Gorgas and AJAS. A variety of individuals and agencies have been contacted regarding funding sources including Impact Alabama, the National Science Foundation (NSF), the University of Alabama at Birmingham (UAB), and Laying the Foundation.

Goals for the upcoming year include the continuation of contacts with individual teachers and groups in an attempt to increase participation in the program. Funding sources will be explored with the intention of submitting the grant proposal to support efforts to increase participation. Catherine Shields will coordinate a table at ASTA October 20, 2009.

Please see Gorgas attachments at the end of this packet of Executive Committee reports.

19. Electronic Media Committee Report, Brian Toone

Website:

I have made a number of routine updates to the website (announcements, etc...) as well as these below:

Annual Meeting Title and Abstract Submission for 2010

No major changes to the submission process.

Fall Executive Report Submission Page

I updated the report submission page to gather reports for this Fall 2009 executive meeting.

Online Membership Application

After much communication with paypal, I have resolved the limitation that paypal placed on the account while they verified that we truly are a non-profit organization and that we truly are the owners of the bank account linked to the paypal account.

As of Wednesday, October 14, **73** people have created membership accounts using the online form (see below) and of those **73** people, we had the following dues breakdown:

20	professional	1 yr memberships
2	professional	1 yr membership (renew)
2	professional	2 year memberships
2	professional	3 year membership
1	professional	lifetime membership
32	student	1 year memberships
1	student	4 year membership
13	non-paying (or mailed in)	

Current paypal balance: **\$1,732.34** USD

Merging the online and offline membership lists

I am still in the process of working on this, and unfortunately have no further progress at this time. Perhaps by the fall meeting, I will be able to update with additional information.

Alabama Academy of Science Membership Registration

We are now accepting membership dues payment online

Start Here

Whether you are an existing member or signing up for the first time, please start here to create your online membership account by filling out the requested information below

Required fields are shown in **bold**

First name: _____
M initial _____
Last name: _____
Address 1: _____
Address 2 _____
City, State Zip _____
Phone: _____ (include area code)
Fax _____ (include area code)
Email: _____
Password: _____
Confirm: _____

Your email address and password will allow you to login to the website to access exclusive information (such as online journal issues) available to members only

Select your affiliation from the following **SECTIONS OF THE ACADEMY**

- I. BIOLOGICAL SCIENCE
- II. CHEMISTRY
- III. EARTH SCIENCE
- IV. GEOGRAPHY FORESTRY, CONSERVATION & PLANNING
- V. PHYSICS AND MATHEMATICS
- VI. INDUSTRY AND ECONOMICS
- VII. SCIENCE EDUCATION
- VIII. BEHAVIORAL AND SOCIAL SCIENCES
- IX. HEALTH SCIENCES
- X. ENGINEERING AND COMPUTER SCIENCE
- XI. ANTHROPOLOGY
- XII. BIOETHICS & HISTORY & PHILOSOPHY OF SCIENCE

Submit

D. Old Business

E. New Business

1. Changes to the AAS Constitution & Bylaws

Enactment of the changes recommended by the Long Range Planning Committee will necessitate changes in the AAS Constitution & Bylaws. Also the scope of the Fellows of the Alabama Academy of Science should be included in this document. The recommended changes are as follows in the indicated Articles [deletions are struck-out; additions are bolded and underlined]:

ARTICLE III. SECTIONS

Sec. 1. The Academy shall have the following scientific sections:

- I. Biological Sciences
- II. Chemistry
- III. **Physics and Mathematics**¹²
- IV. **Engineering and Computer Science**¹²
- V. **Social Sciences**¹²
- VI. **Anthropology**¹²
- VII. Science Education
- VIII. **Industry, Environmental, and Earth Science**¹²
- IX. Health Sciences
- X. Bioethics and History and Philosophy of Science¹²

ARTICLE IV, Sec. I

r) *Wright A. Gardner Award and Fellow of the Alabama Academy of Science Committee*: Shall consist of four (4) members appointed by the President for staggered two (2) year terms with a chair designated for each ensuing year.

The Wright A. Gardner Award is made by the Alabama Academy of Science to some specific individual for noteworthy achievement in the field of Science during residence in Alabama. AAS members are invited to submit nominations for this award to the chair of the committee. Members of the committee should encourage AAS members to submit nominations of outstanding persons. Each nomination should consist of a curriculum vitae and a list of publications or other documentation substantiating the person's special contribution to science in Alabama. The nomination material must

be summarized in the form of a one-page citation. The committee, upon reaching a decision that an award should or should not be made, must relay this information confidentially to the President of the Senior Academy at least thirty (30) days before the Annual Meeting. In the event of an Award, the President should promptly notify the person selected for the honor. The Gardner Award itself shall be an appropriately executed plaque presented at the annual banquet of the Senior and Junior Academies after the President or the Chair of the Award Committee has read the citation.

The Fellow of the Alabama Academy of Science designation is made by the Alabama Academy of Science to recognize individuals for their contributions in science in the State of Alabama and for their service to the Academy. AAS members are invited to submit nominations for this award to the chair of the committee. Members of the committee should encourage AAS members to submit nominations of outstanding persons. Each nomination should consist of a curriculum vitae and documentation substantiating the person's special contribution to science in Alabama and service to the Academy. The nomination material must be summarized in the form of a one-page citation. The committee, upon reaching a decision that a Fellow designation should or should not be made, must relay this information confidentially to the President of the Senior Academy at least thirty (30) days before the Annual Meeting. In the event of a Fellow designation, the President should promptly notify the person selected for the honor. An appropriately executed certificate shall be presented to the designee at the annual banquet of the Senior and Junior Academies after the President or the Chair of the Award Committee has read the citation.¹²

ARTICLE XIV. AWARDS AND DESIGNATIONS¹²

Sec. 1 A limited number of named awards/designations shall exist in the Academy.

Sec. 2 These awards/designations can be named for an individual who has been very devoted to the Academy or for the nature of the award/designation.

Sec. 3 Each award/designation shall be directly connected to the objectives of the Academy.

Sec. 4 New awards/designations shall be established only when sufficient funds are in place or will be available in a regular manner to support these award/designation programs.

ARTICLE XV. AMENDMENTS

F. Adjournment ~ 12:00 pm

AGENDA
ALABAMA ACADEMY OF SCIENCE
SPRING 2010 EXECUTIVE COMMITTEE MEETING
ALABAMA A&M UNIVERSITY

Tuesday, March 30, 2010; Knight Center, Alabama A&M University

A. Call to order
 7:53 PM

B. Officers

<i>Report</i>	<i>Action Item</i>	<i>Action Taken</i>	<i>Person Responsible</i>	<i>Due Date</i>
B4	Determine nominees for remaining vacant positions		Exec. Comm.	
B6	Elect a new Secretary and Treasurer		Academy	3/31/2010
C11	Obtain photographs of members of the Executive Committee and forward to Archives		Exec. Dir.	
C11	Obtain copies of committee reports, minutes of Executive Committee meetings and forward to Archives		Exec. Dir.	
C11	Obtain photographs of annual meeting attendees and forward to Archives		Exec. Dir.	
C15	Approve resolutions thanking AAMU, honoring Leven S. Hazlegrove, and honoring Adriel D. Johnson		Exec. Comm. And Academy	3/31/2010
C18	Continue the Gorgas/AJAS Teacher-Fellow position for the two academic years (2010-11 & 2011-12) with revisions to the Job Description and goals to be more technology focused. Final approvals of the job, goals, and candidates will be made by the Gorgas Committee with President and President-elect serving as ad hoc members.		Exec. Comm. and Academy	3/31/2010
E1	Decision and response concerning the possible donation by an individual to AAS to a. Manage an endowment to provide grants to students to carry out research on the described forested part of the property b. Will the property to the Academy as a field station with the described stipulations.		Exec. Comm. And Academy	3/31/2010

Host committee Verbal Report (C1 was given at beginning of meeting).
 approval of minutes of the Fall 2010 Executive Committee Meeting
 B1. Board of Trustees, Ken Marion, No Report Submitted, Verbal Report

B2. President, Brian Thompson,

Mickie Powell, Brian Burnes, and I have been working to fill committee vacancies. Most committee members have agreed to re-appointment. For those who wish to step down, we have sought replacements. In particular, Marietta Cameron has tentatively agreed to appointment as Secretary of the Executive Committee. Also there was some confusion between me and Jane Nall as to whether she wanted to continue as Chair of Science Olympiad. It turns out that she has agreed to continue to serving as Chair.

The current list of nominations appears in the nominating committee report. However a vacancy still exists in the key committee position of Treasurer of the Executive Committee. We have been seeking a replacement for Taba Hamissou for two years without finding a candidate.

As noted at the executive committee meeting last fall, the West Alabama Regional Science Fair (WARSF) still owes AAS a \$975 fee from spring 2008. Virginia Vilardi and Brian Burnes have been discussing this with the WARSF director, and they have come up with the following proposal: The AAS will allow the 2008 fee of \$975 to remain unpaid by the West Fair without penalty with the understanding that the new West Fair Director will reorganize the financial base of the West Fair and the 2008 fee will be paid as soon as possible. I agreed to accept this proposal, since the Academy is no worse off than before, and might eventually receive payment.

I have been (a fly on the wall) listening to the e-mail conversation between our executive director, Larry Krannich, and the co-chair of the local arrangements committee at Alabama A&M, Yong Wang. The result of this coordination appears in the draft AAS Program 2010 Meeting Booklet sent out by Larry.

I have reviewed the current draft of changes to the Constitution and By-Laws made by Larry Krannich after discussion and approval of these changes during the executive committee meeting last fall.

B3. President Elect, Brian Burnes

Numerous Standard Operating Procedures have been submitted by the various officers and committee chairs. The following represents a compilation of those received.

Standard Operating Procedures of Alabama Academy of Science

1. Second Vice President: officially s/he is in charge of committee nominations, i.e. report C-16. However, it seems traditionally that it is the President that actually works to fill those positions with the help of the 1st Vice President.. In reality, the 2nd Vice President should study the constitution and bylaws, so that when s/he is president, will

know what is being asked when requesting people fill the various committee positions. The other thing the 2nd Vice President must do is find a replacement before the Spring meeting convenes!

2. State Science Olympiad Director

The duties of a state director of the Science Olympiad program are numerous, but they fall into three major areas: registration, tournaments, post-tournament/general duties related to the national organization. Many of the duties are handled on a daily basis, some days for long periods, and other days for short periods. Almost all duties are handled solely by the director. One year out of the last 14 years a parent offered to type the spreadsheet.

A few years ago when I was a regional tournament director, I kept a very accurate account of the minutes I spent for the regional tournament. The amount of time exceeded 200 hours. And a state director has many more responsibilities and will spend in excess of 800 total hours performing Olympiad-related activities.

I. TEAM REGISTRATION DUTIES

1. Send the estimated numbers of rules manuals in both middle and high school divisions to the national organization. Often this number has to be increased 1 or 2 times during the year if more teams register **Total time**: about 1.0 hr.

2. Make certain that all teams have submitted proper school information. In the past, this info has been all entered manually by the director. We are in the process of developing a complete on line registration process, but it will still have to be accessed daily.3333-

- Prepare mailing labels to mail manuals to registered teams; attach mail labels to envelopes.
- Write receipt for fees and send with rules manual. Ship manuals to teams, making certain school gets correct number and division manual. In about 10% the cases, schools provide incomplete mailing info and the director has to find correct info.

5. Prepare deposit slip for checks and take registration fees to bank.

8. On monthly basis prepare payment request for some of registration fee to be sent to the national organization (The national organization will only handle the entire registration process if a state has fewer than 20 teams. GA has over 200)

9. File registrations by division and tournament host. Maintain spreadsheet.

10. Make certain the number of teams does not exceed the number that can be accommodated by a site. Make certain that all teams from one school are going to the same site. Often times the site selection has to be changed as schools often generate a second or third team before the registration deadline.

Time/day for tasks 2-9 : variable. Depends upon number of registrations received on a give day.

Average time/week in May through October: 10

Total time for registration: > 200 hrs

II. TOURNAMENT DUTIES

1. Ensure that all sites have proper rules and rules clarifications, etc. Process involves frequent communication with national organization and site coordinators.
2. Develop a set of logistics/need suggestions and provide site coordinators with this information. Since the rules for some of the events are not final until November or even January, this form needs frequent updating.
3. Assist site coordinators with schedule development. A crucial activity is to point out which events are likely to use the same students, and hence should not be scheduled at the same time.
4. Order special equipment that certain events will need. Have these items shipped to sites.
5. Maintain communication with TD's of all site coordinators to insure that all or most questions and concerns are addressed.
6. Remind the TD's to order various awards (medals, ribbons, and trophies) for all sites.
7. Determine the number of schools from each site that attend the state meets. Distribute the letters to the various regional sites.
8. Await invitation letter(s) to national tournament. Distribute these letters the state tournament coordinators. Send information to the national organization.
9. Collect and organize all final score sheets and evaluations from each site. Send this information to the appropriate place.
10. Acquire/develop/write tests for various events at various sites if needed.
11. Continue to find new locations and coordinators for tournaments. In some cases the coordinator retires; in others a school decides that it no longer wishes to host a tournament. This process involves at least one letter of request to the president/principal and then 1-2 personal meetings. The meetings often last 1-2 hours.
12. Send evaluations and suggestions to site coordinators.
13. Prepare and send thank you letters to the president/principal for hosting a tournament.
14. Prepare and send a note of appreciation to the principal of all participating schools. Many principals do not realize that an Olympiad coach will spend in excess of 200 hours working with students prior to the competition.
15. Send proper site information to the national organization so the sites can be placed on insurance policy.

Total time for items II 1-15: >300 hours

III. GENERAL ADMINISTRATIVE DUTIES

1. Prepare and handle budget.
2. Answer questions from coaches, coordinators, students, etc. I receive many emails and phone calls daily.
3. Work on new events.
4. Add new/updated info to web page
5. Send various forms to national; respond to questions from national
6. Continue to work with new coaches and to develop a “mentor network” of experienced coaches.
7. Continue to seek outside support in any amount for the program.
8. Attend national tournament.
9. Assist schools in developing practice tournaments, and SO programs.
10. Promote the Science Olympiad at many educational forums: ASIM, ASTA, etc
11. Serve on rules editorial committee for national. Make comments and suggestions to rules as they are being developed.

Total time for items III 1-11: >200 hours

IV. ELEMENTARY SCIENCE OLYMPIAD

Many of the above items also have to be performed for various aspects of the elementary program.

Total time for elementary activities: 50-100 hours

Total time for all Science Olympiad activities: >750 hrs

3. **William H. Mason Scholarship Committee Committee Chair’s tasks:**
 1. October. Attend Fall Executive Committee meeting. Obtain permission to offer Fellowship in the coming year. Also distribute Fellowship information and application form to Executive Committee members. Make sure AAS webmaster has updated application form for the website.
 2. November. E-mail the deans of schools of sciences and dean of schools of education in Alabama. Attach to the e-mail an information flyer and an application form. Request that they forward the attachments to appropriate faculty. Send a copy of this to committee members to alert them that the process has started.
 3. January. Receive and log in application materials. One week before application deadline, inform applicants of the status of their application. (I.e. application complete, or what they lack. Applications received after this date do not get this service. Late application material may or may not get consideration.)
 4. February. Photocopy application material and mail it to Committee members along with a form for ranking the applications. Tally the results. Inform the President and the Executive Director of the Committee’s selection, if any. Send Fellowship acceptance form to selectee.
 5. March. Send to the Treasurer the name of the Fellowship recipient and give instructions to the recipient for collecting the award.

4. Chair of Section X - Engineering and Computer Science

Duties:

- * Chair the research presentations and business meeting at the spring annual meeting
- * Solicit abstracts from institutions around the state

5. Editor for electronic media

Duties::

- * Make updates to the website as requested by AAS executive committee
- * Organize the online abstract submission process for the spring annual meeting
- * Collect all the abstracts submitted for the annual meeting and send them to the journal editor
- * Organize the online submission of committee reports
- * Manage the online membership features of the website including paypal dues collection

6. International Science and Engineering Fair Coordinator

As ISEF Coordinator I research and plan the trip to the International Science and Engineering Fair held each year in a different location (this year San Jose, CA). I make hotel and travel arrangements for the group, coordinate with the individual fair directors to obtain information about their winners, then travel with and chaperon the group throughout the week of ISEF. During the week students are prepared for the competition during set up and inspection as well as interview practice. Group field trips are organized and supervised. Financial accounting for the group is also done. This includes budget proposal to the fair directors, collecting funds from fairs and additional attendees, and final report to the Academy Treasurer. A press release is provided to news media across the state and to the state dept. of education. The ISEF group normally includes 20 students and 10 or more additional adults.

7. Public Relations Committee

Needs description:

8. Chair of Board of Trustees

Chair of Board of Trustees, automatically then Chair of Budget and Finance Committee.

Duties of Chair of Board of Trustees-----Board is an advisory board for advice on direction and solving problems. Chair of Board provides coordination of Board with Executive Director and President of AAS.

9. Chair of Budget and Finance Committee

Budget and Finance Committee is an oversight group to examine annually the finances and financial health of AAS. Committee provides appropriate recommendation to the AAS concerning procedures to maintain financial stability and soundness.

10. Auditor

The audit will consist of me going over the Treasurer's records for funds received and funds paid out to assure that the records are accurate. I will submit a final auditor's report before the spring meeting

11. Duties of Archives Chair

I receive documents from members of the AAS and transmit them to our Archives.

B4. Second Vice President Report, Mickie Powell

I have contacted individuals to serve on the Board of Trustees, Editor of the Journal and Associate Counselor to the Junior Academy. The results are as follows:

Board of Trustees

Brian Burnes, Adriane Ludwick, and Richard Hudiburg have each agreed to serve another term on the Board of Trustees. Ronald Dute will be stepping down after several years of excellent service. I contacted Mike Howell (Samford University, retired) and he has accepted the nomination to fill Roland Dute's position.

AAS Journal

Safaa Al-Hamdani has agreed to continue serving as our journal editor. We greatly appreciate his continued service as editor.

Associate Counselor to the Junior Academy

I have contacted Catherine Shields (Jefferson County International Baccalaureate) as a potential nominee for the vacant position of associate counselor to the Junior Academy. I have not had a response as of March 28, 2010. If she is unable to accept the nomination I would be grateful for other suggestions for this position.

B5. Secretary, Jim Rayburn

1. I provided sets of labels of current members to Safaa Al-Hamdani for the journal.
2. As of February 24, 2010 we have 351 members including library and other members. There are 205 paid for 2010 and 146 are not paid at this time.
3. We currently have on the rolls 94 Active members (30 paid), 20 emeritus (16 paid), 71 lifetime, 88 Student (42 paid), and 32 other members.
4. We have taken in approximately \$2905 in dues and this is an underestimate of about \$1000.00
5. Memberships by section are listed below.

Section #	Total #
1	118
2	28
3	6
4	7
5	37
6	5
7	9
8	13
9	40
10	17
11	9
12	5
77(other)	33
None selected	24
total	351

6. I only sent one set of reminders out this year.
7. We need to continue to improve PayPal Information.

B6. Treasurer, Taba Hamissou,

The treasurer's report consists of the following:

- All account balance as of March 24, 2010
- All financial assets report, as of March 24, 2010
- Incomes and Expenses statement as of March 24, 2010

The quarterly income for the Academy is \$5,348.91 including memberships and Journal supports. The expenses totaled \$5,244.22, including an estimated interest from the 2 cds (\$418.24.) Printing invoice for the journal issue was paid by Auburn University. During this quarter, we received library supports from UAB, UA, and Troy University.

All Account Balances as of 03/24/2010

<u>Account</u>	<u>Balance</u>
CURRENT ASSETS as of 03/24/2010	
Bank accounts	
cd(1) + cd(2)	\$22,378.30
Saving account	\$1,266.63
Checking	\$3,169.09
TOTAL ASSETS	\$26,814.02

On October 14, 2009, it was:	\$26,936.52
cd(1) + cd(2)	\$21,960.06
Saving account	\$1,263.82
Checking account	\$3,712.64

October 14, 2009 – March 24, 2010
Details of financial activities

INFLOWS	
From 2009 meeting received after October 2009,	1,253.73
Membership received	1,730.00
Library support (multiple)	1,250.00
JAAS Publication contributions	600.00
Gale Group, notoriety	106.94
Interests from cds and saving acct	418.24
TOTAL	5,348.91

OUTFLOWS	
Honoraria	
Exe. Director	3,000.00
JAAS Editor	1,200.00
JAAS Secretary	800.00
JAAS mailing and stamps	194.22
Bank Charges	50.00
TOTAL OUTFLOW	5,244.22

B7. Journal Editor, Safaa Al-Hamdani

The following has been accomplished since the last meeting:

- The Alabama Academy of Science Journal Vol. 80. No 3&4 has been successfully released.
- The Alabama Academy of Science Journal Vol. 81. No.1 will be distributed to the members in April 2010.
- I have met with the Executive Sales Representative for Cengage Learning - • Brooks/Cole Publishing, and he informed me that they are willing to continue to
- advertise in the journal.

Discussion:

Problem of journal acceptance at Physical and Earth Sciences at JSU

Motion by Ken Marion,

Steering committee develop a letter in response to this to the department at JSU and for colleges and university across the state as a public relations attempt.

Seconded and

Motion passed - action item Brian Burnes will work on letter.

B8. Counselor to AJAS, Henry Barwood No report submitted.

B9. Science fair coordinator, Virginia Valardi, No report submitted.

B10. Science Olympiad Coordinator, Jane Nall,

Alabama Science Olympiad has experienced a rough year. Proration and budget cuts hit home as many teams failed to register. Bad weather on the weekend of the tournament at University of Alabama Tuscaloosa and the tragedy at University of Alabama Huntsville could have resulted in two tournaments being cancelled. They rallied! The loyal Science Olympiad event judges, directors, volunteers and teams pulled it together to attend the rescheduled tournaments. Director sincerely appreciates the loyalty of everyone to the SO program.

Spring Hill College joined the SO Alabama family and conducted a fine tournament. The directors are enthusiastically beginning plans for 2011. I have been contacted by two honor UAB students and they are volunteering to Co-direct a C tournament there next year. They are encouraged by several science educators in the Birmingham area.

As for A2, the little Olympians, we have a record number of participants in 66 teams. Tournaments include University of West Alabama, Auburn University and Jacksonville High School.

Alabama will be represented by two B teams in May at National Tournament scheduled May 20-22, 2010 at the University of Illinois, Urbana-Champaign. Auburn Junior High and Our Lady of the Valley will be our B teams. One C team will represent us. The State C is in April and will have 11 teams vying for the win!

If we can keep the present folks hosting tournaments (three A2 tournaments, four B tournaments, with UAB adding, four C tournaments) and add a few more, Alabama Science Olympiad numbers should rebound. In addition to the current regional hosts (UWA, AU, JHS, UAH, AUT, and SHC), I am very appreciative of directors and event supervisors at Huntingdon College and Jacksonville State University for hosting the State B and C tournaments.

Discussions of coaching clinics are in the works. I hope to have announcement of locations and schedules later in the summer.

Thank you for your support of Alabama Science Olympiad.

ALABAMA SCIENCE OLYMPIAD 2009-2010

Division A2 Grades 3-6 Olympiad Tournaments

University of West Alabama, Tuesday, October 20, 2009. Dr. Jeffery Merida.
Univ. of West Alabama, Station 7, Livingston, AL 35470. jmerida@uwa.edu

Jacksonville High School, Saturday, February 27, 2010. David Peters, 1000
George Douthit Drive SW, Jacksonville, AL 36265. (256) 435-4177,
www.esoatjhs.org

Auburn University, March 27. Greg Harris & Terry Tidwell, Department of
Mathematics, 218 Parker Hall, Auburn, AL 36830 harriga@auburn.edu
or tidweto@auburn.edu

Division B Grades 6-9 Olympiad Tournaments

Spring Hill College, February 6. Dr. Charles Chester, (251) 380-3071,
cchester@shc.edu

Auburn University, February 20. Dr. Steve Stuckwisch, Department of
Geology, 108 Tichenor Hall, Auburn University, AL 36830. (251)
844-6575 ssuckwisch@charter.net; [http://www.auburn.edu/~stuckse/
ScienceOlympiad/](http://www.auburn.edu/~stuckse/ScienceOlympiad/)

University of Alabama at Huntsville, Saturday, February 28, 2010. Mrs.
Vanessa Colebaugh, 5019 Willow Creek Drive, Owens Cross Roads,
AL 35763. (256) 922-5747 nessacita@comcast.net, <http://www.uah.edu/sciolympiad/index.php>

University of Alabama, Saturday, February 28, 2010. Luoheng Han, Ph.D., Associate Dean and Professor, College of Arts and Sciences, University of Alabama, Box 870268, Tuscaloosa, AL 35487-0268, Phone: 205.348.7007, Fax: 205.348.0272. www.as.ua.edu

Division C Grades 9-12 Olympiad Tournaments

Spring Hill College, February 6. Dr. Charles Chester, (251) 380-3071, cchester@shc.edu

University of Alabama at Huntsville, Saturday, February 28, 2010. Mrs. Vanessa Colebaugh, 5019 Willow Creek Drive, Owens Cross Roads, AL 35763. (256) 922-5747 nessacita@comcast.net, <http://www.uah.edu/sciolympiad/index.php>

University of Alabama, Saturday, February 28, 2010. Luoheng Han, Ph.D., Associate Dean and Professor, College of Arts and Sciences, University of Alabama, Box 870268, Tuscaloosa, AL 35487-0268, Phone: 205.348.7007, Fax: 205.348.0272. www.as.ua.edu

State Science Olympiad Tournaments

Huntingdon College, Saturday March 14, 2010. Division B, Dr. Sidney Stubbs, Assoc. Vice President for Institutional Assessment and Compliance and Professor of Mathematics sstubbs@huntingdon.edu and Dr. Jim Daniels, Assoc. Prof. of Biology, jdaniels@huntingdon.edu, 1500 E Fairview Ave, Montgomery, AL 36106 (334) 833-4430

Jacksonville State University, April 10, Dr. A. Helmes, Jacksonville State University, Jacksonville, AL 36265. Ph: 256-782-5816, fax: 256-782-5336, nvasumat@jsu.edu

2010 Science Olympiad National Tournament. May 20-22, 2010 hosted by the University of Illinois at Urbana-Champaign

State Director: Jane Nall, 31110 Wakefield Drive, Spanish Fort, AL 36527 (251) 621-2911, email drnall@hotmail.com Alabama Science Olympiad web page: <http://aso.jsu.edu/>

B11. Counselor to AAAS, Steve Watts, No report submitted.

B12.I, Biological Sciences, Megan Gibbons

The final numbers for Section I presentations at the 2010 meeting at Alabama A&M are:

A total of 81 presentations

37 oral paper presentations

44 posters

16 students are entered in the competition for best oral paper presentation

Judges:

George Cline (contact person Wed am)
Megan Gibbons (contact person Wed pm)
Ketia Shumaker
other academics in attendance

31 students are entered in the competition for best poster and will be judged by at least two of the following judges:

Megan Gibbons
Mickie Powell
Martha Verghese

Because there are more than 12 participants in each of these competitions, we will give 2 awards for each “best student oral paper presentation” and “best student poster”.

B12.II, Chemistry Emanuel Waddell, No report submitted.

B12.III, Geology and Earth Sciences, Vacant

There are twelve papers and nineteen posters scheduled for presentation in the joint meeting of Section III - Earth Sciences and Section IV– Geography, Forestry, Conservation, and Planning for the 87th annual meeting of the Alabama Academy of Science. Election of a section chair and vice-chair are slated for the business meeting of the section IV.

By, Richard A. Hudiburg, Organizing Chair

B12. IV, Geogaphy, Forestry, Conservation and Planning, Vacant

B12.V, Physics and Mathematics, Akshaya Kumar

I am pleased to report that a total of twenty seven presenters (twelve oral and fifteen poster presentations) have submitted their research work for presentation in the Physics and Mathematics Section this year.

Three oral presentations and seven poster presentations have been entered for student award competition.

B12. VI. Industry and Economics, Marsha Griffin No report submitted.

B12. VII. Science Education, Karen Utz

The 2010 Science Education session consists of seven paper presentations and three poster presentations. The presentations range from environmental and educational outreach issues to gene research, critical thinking and ethnohistory.

Morning presentations

1. Jones Valley and the Minerals Beneath: How Geology Built a City. *Heather E Guy, Miss*, University of Alabama, Birmingham.
2. Green Landscapes and Environmental Policy: A Conceptual Model for Service Learning. *Stephanie E. Freeman*, Catherine Sabots, PhD, Rudy Pacumbaba Jr., PhD, Alabama A&M.

Poster Session

3. Connecting Lives: A Community Outreach and Field Study in Titusville Alabama. *SaBrina D Bone*, Barry McNealy, Jordan Croft, and Angelik Johnson, Malcolm Ryans, Melvin Griffin, Delana Buford, Christopher Evans, Brea Roper, Kenneth Sutton, Sharyn R. Jones, and Loretta A. Cormier, University of Alabama, Birmingham; Birmingham City Schools, A.H. Parker High School.

Afternoon presentations

4. Ethnohistory of Food: Food and Folk Medicine of Alabama Slaves. *Ashley Wilson*, Loretta A. Cormier, University of Alabama, Birmingham.
5. If You Are What You Eat, Then Maybe We Should Learn More About the Food We Eat: Increasing Awareness of Nutritional Benefits and Consequences Among Elementary Students in Alabama. *Lindsay Lee Whiteaker*, University of Alabama at Birmingham, Anthropology .
6. Teaching Critical Thinking in a Physical Chemistry Course. *Michael B. Moeller*, University of North Alabama.
7. Death in a Box: Packaging the Decomposition Process for the Museum Environment. *James P Cormier, Mr.*, Spring Valley School, Birmingham, AL.
8. Science Education through an Interdisciplinary Field School on Nayau, Fiji. *Sharyn R. Jones and Loretta A. Cormier*, Dept. of History and Anthropology, UAB.
9. Fostering Young Researchers through REU. *Sha Li* and Yong Wang, Alabama A&M University.
10. Genes and Consequences: A Bioinformatics Laboratory Experience. *April M Reis*, Madelene Loftin, Jennifer Carden, and George Williams, Athens State University; HudsonAlpha Institute for Biotechnology.

We look forward to an energetic and insightful Science Education session.

B12. VIII. Behavior and Social Sciences, Richard Hudiburg

There are seven papers and three posters scheduled for presentation in Section VIII – Behavioral and Social Sciences for the 87th annual meeting of the Alabama Academy of Science. Election of a section chair and vice-chair are slated for the business meeting of the section.

B12. IX, Health Sciences, Bettina Riley

In response to the 87th Annual Meeting of the Alabama Academy of Science's 2010 call for paper and poster titles, three paper titles and one poster title was received. All were accepted. One paper was entered into the student competition. No posters were entered into the student competition. The overall number of respondents was below last year's level. The paper and poster presentations will be held on Wednesday, March 31, 2010 at A&M University.

The goal for the 88th Annual Meeting will be to increase the number of paper and poster presentations for this section. This should have an added benefit of increasing membership. Contacts from the colleges around next year's annual meeting site will be identified to be targeted first with email invitations to participate in the 2011 Annual Meeting. Other schools across the state will be emailed as well. Some contacts have already been made for future presentations (e.g., new nurse practitioner program at UAB). Students from all health sciences will be targeted for participation, including medicine, nursing, public health, dentistry, optometry, health sciences biomedical, etc. In addition, follow-up personal phone calls will be made to encourage participation.

Several nursing participants entered paper/poster entries in other sections. For future consideration, I would like to have an open discussion at our executive committee meeting about the issue of whether the participant or the committee should make the decision of what section the paper/poster will be assigned if accepted.

B12. X, Engineering and Computer Science, Brian Toone

The Engineering and Computer Science section is well represented this year, with fifteen paper and six poster submissions. Of these, nine papers and four posters were entered for competition.

B12. XI, Anthropology, Harry Holstein No report submitted

B12. XII, Bioethics and History/Philosophy of Science, Gerry Elfstrom

At our 2009 meeting, we heard a total of 7 papers. Five were delivered by faculty members and two by students. A number of other faculty sat in on the session and were active participants in the discussions.

At the business meeting, Gerard Elfstrom was chosen as Section Chair. No Vice Chair was chosen.

This year, we had 7 papers submitted and will need to elect a Vice Chair for the section.

B13. Executive Officer, Larry Krannich

Since the last Executive Committee Meeting, my activities have focused on the following:

1. Solicited and obtained contributions from universities/colleges for JAAS support.

2. Coordinated with Brian Toone to have on-line submission of paper/poster titles and abstracts and executive committee reports for the annual meeting. The submission site included check-off boxes for students to enter the paper/poster competitions and request travel awards without having to proceed to another site.
3. Organized the annual Alabama Undergraduate Chemistry Research Symposium and gained co-sponsorship from all Alabama ACS Local Sections.
4. Worked with the President and Vice President to update all committee appointments.
5. Worked with section chairs and the local arrangements chair in the development of the program and program booklet for the 87th annual meeting of the Academy.
6. Forwarded a draft version of the program booklet to all presenters to check for accuracy of paper/poster listings.
7. Worked with presenters and the local arrangement chair in making changes to the program booklet.
8. Forwarded the final version of the program booklet to Brian Toone for posting on the web on March 16, 2010 and forwarded the program to the local arrangements chair for printing.
9. Sent e-mails to all paper/poster presenters thanking them for their participation and notifying them of poster guidelines and the posting of the program on the web site.
10. Communicated with a potential donor who desires to put a bequest in his will concerning scholarships and land for a possible field research site.
11. Designed and printed certificates for the Carmichael Award and all Section paper/poster competition winners.
12. Prepared the banquet program.
13. Developed a doodle.com site for intended participation in the Executive Committee dinner and meeting.
14. Prepared the committee chair report compilation and action items for posting and availability at the Spring Executive Committee meeting.

Committee Reports

C1. Local Arrangements, Yong Wang, Phil Bording, Verbal at Beginning of meeting.

C2. Finance, Ken Marion,

The assets of the Academy as reported at the Fall Executive Committee meetings and

Annual Spring meetings since 2001 are listed below.

Period	Assets (End of Period)	Change	Period	Assets (End of Period)	Change
1/1 – 10/12/2001	\$71,763		1/1 – 12/31/2001	\$75,813	
1/1 – 10/12/2002	\$72,197	\$434	1/1 – 12/31/2002	\$72,813	-\$3,000
1/1 – 10/12/2003	\$71,403	-\$794	1/1 – 12/31/2003	\$74,800	\$1,987
1/1 – 10/26/2004	\$74,265	\$2,862	1/1 – 12/31/2004	\$74,610*	-\$ 190
1/1 – 10/26/2005	\$63,895	-\$10,370	1/1 – 12/31/2005	\$65,561*	-\$9,049
1/1 – 10/26/2006	\$62,162	-\$1,733	1/1 – 12/31/2006	\$67,555*	\$1,994
1/1 – 10/31/2007	\$34,004	-\$28,158	1/1 – 12/31/2007	\$36,435*	-\$31,120
1/1 – 10/10/2008	\$25,618	-\$8,386	1/1 – 3/13/2009	\$28,989*	-\$ 7,446
1/1 – 10/14/2009	\$26,937	\$1,319	1/1 – 3/23/2010	\$26,814*	--\$ 2,175

During the last 18 months the financial assets of the Academy have remained relatively stable. A major reason for this has been the recent renewed financial support from the AU library for printing of the Journal. However, it should still be noted that our total assets remain near a decade low. The Academy needs to maintain realistic budgets to reflect this and, should conditions warrant, be prepared to consider steps (i.e., dues increase, increased meeting registration fees, etc.) to augment revenue in the near future.

C3. Membership, Mark Meade No report submitted.

C4. Research, George Cline

Forty students were given AAS Travel awards. Thirty-six of these students were given \$50, while 4 students from the host institution were given \$25. These students represented 10 Universities from across the state. The total amount awarded was \$3250. A list of all awardees and their home institution is attached.

There was considerable discussion about awards for students from the home institution. While they do not have the travel costs of the traveling students, they still have meals and possibly registration to pay for. It was decided that the four individuals involved this time should be awarded one-half of the amount given to the other awardees.

We need to discuss how these monies are distributed at the Fall Executive Committee Meeting. For 'several years' the committee has used funds for research awards to cover the increased demand for travel funds. This 'tradition' was continued this year. Does this need to be adopted as a formal policy, or can we continue to work as we do now? Additionally, we need to discuss the travel awards. These are usually based on need – i.e. the costs of registration, travel, and room & board. Students at the host institutions do not suffer some of these costs and probably need less than students that are traveling greater distances. At the same time, many students traveling are in University vehicles, so those costs are eliminated as well. We need to have some discussion and develop a policy for awarding these funds, because we may soon see an increased demand for both Research and Travel funds.

AAS Student Travel Awards, 2010

*Henock Tegete	Alabama A&M University
*Lavanya Chava, Lav	Alabama A&M University
*Ashlee Gray	Alabama A&M University
*Jordan Moore	Alabama A&M University
James R. Thomka	Auburn University
Angela M. Jackson	Auburn University.
Omowunmi A. Owoseni	Auburn University.
Siddharth Alur	Auburn University.
Yaqi Wang	Auburn University.
Michelle Anne Maciejewski	Birmingham Southern College
Lindsey M Minton	Jacksonville State University
Russell Price	Jacksonville State University
George Kiplagat	Jacksonville State University
Meriem Zettili	Jacksonville State University
David Marc Ponder	Jacksonville State University.
Walid Chacon	Jacksonville State University.
Kristin D Shirey	Jacksonville State University.
Sunde M. Jones	Jacksonville State University.
Kristin M Schwarzauer	Jacksonville State University.
Maman Brah	Jacksonville State University.
Eric G Brown	Jacksonville State University.
Jiangquan Zhu	Troy University.
Edwards G Arthur	Tuskegee University.
Andrew Coleman	University of Alabama, Birmingham
Song Gao	University of Alabama, Birmingham
Shawn Price	University of Alabama, Birmingham
Billy A McConathy	University of Alabama, Birmingham
Sandeep Kulathu	University of Alabama, Birmingham
Thomas Anthony	University of Alabama, Birmingham
Qichao Liu	University of Alabama, Birmingham
Kenneth C Walls, III	University of Alabama, Birmingham
Liping Zhou	University of Alabama, Birmingham.
Upendra Sapkota.	University of Alabama, Birmingham.
David A. Keating	University of North Alabama.
Trent H Walters	University of North Alabama.
Angela L. Mayer	University of South Alabama.
Shayne L. Keyes	University of South Alabama.
Samuel E Salvatore	University of West Alabama
Ryan M Woods	University of West Alabama.
Markita L Watkins	University of West Alabama.

*These 4 travel awards are for \$25. All others are for \$50

Research Grant Awards

The following \$250 research grant awards were made:

Rebecca L. Goodwin	Auburn University
Edwards G. Arthur	Tuskegee University
Andrew Coleman	University of Alabama, Birmingham
Qichao Liu	University of Alabama, Birmingham
Taylor Roberge	University of Alabama, Birmingham

C5. Long-Range Planning, Adrian Ludwick., There is no committee report at this time.

C6. Auditing, Senior Academy, Robert Angus.

I have contacted the Treasurer, Taba Hamissou multiple times, requesting the financial records so that I might perform my audit. As of today (3/25/10), I have not received anything from Dr. Hamissou. So, I have nothing to report.

C7. Auditing, Junior Academy, Henry Barwood. No report submitted.

C8. Editorial Board and Associate Journal Editors, Thane Wibbels. No report submitted.

C9. Place and Date of Meeting, Vacant

The following are the proposed sites for future annual meetings of the Academy:

2011 – Jacksonville State University

2012 – Tuskegee University

Tentatively, these meetings will be held in March of the respective years.

Vote on Tuskegee -

Next -2013 - Birmingham - Central of State need to recruit.

C10. Public Relations, Roland Dute.

The Public Relations Committee has nothing to report.

C11. Archives, Troy Best

We need to obtain photographs (especially of members of the Executive Committee), committee reports, minutes of the AAS Executive Committee meetings, and any other materials that may be of interest to our membership. Items that may not seem of interest at present may be of great interest in the future. Photographs of officers and members at meetings are of special interest.

If you have items that you believe may be worthy of inclusion in the AAS Archives, please send them to me or to Dr. Dwayne D. Cox, University Archivist, Auburn University Ralph B. Draughon Library, 231 Mell Street, Auburn University, AL 36849.

Access to our AAS Archives is available 7:45-4:45 Monday-Friday. Dr. Cox has provided the following information relative to access. Archives materials **do not** go out on interlibrary loan. Patrons can come in and use them according to the donor specifications. Some require special permission from the donating office or persons who made the donation or sometimes the archivist. Materials to be used at night or weekends need to have special arrangements made so they can be pulled before 4:30 in the afternoon (Friday afternoon for weekend use). Copies can be made in most cases and that can be done either by going through InfoQuest or contacting Dr. Cox or the reference desk at 334/844-1732.

I encourage all officers and members of the AAS to donate significant documents, photographs, etc. to the archives.

C12. Science and Public Policy, Scott Brande No report submitted.

C13. Gardner Award, Prakash Sharma

There were no nominations for Gardner Award this year. There are three awards for Fellow of Alabama Academy of Science (FAAS) to be presented in the Banquet on Wednesday, March 31, 2010, to these very highly qualified and deserving members of the academy.

C14. Carmichael Award, Richard Hudiburg

The winner of the Emmett B. Carmichael Award for 2009 is the following article.

Andrew M. Hein and Craig Guyer. Body temperatures of over-wintering Cottonmouth snakes: Hibernaculum use and inter-individual variation, *The Journal of Alabama Academy of Science*, 80(1), 35-44.

There were nine articles reviewed by the committee. These articles were either in the January 2009 (5 articles) or July/October 2009 (4 articles) issues of volume 80 of *The Journal of the Alabama Academy of Science*.

Appreciation is extended to the other members of the committee for reviewing and rating the articles: Robert Pitt of University of Alabama, Larry Davenport of Samford University, and David Nelson of University of South Alabama.

C15. Resolutions, Vacant

Three resolutions have been compiled for approval: Thanks to AAMU, Honor and

Recognition of Leven S. Hazlegrove, and Honor and Recognition of Adriel Johnson.
These are as follows:

Subject: To honor and recognize Alabama A&M University and the Local Arrangements Committee for their outstanding efforts in hosting the 2010 Annual Meeting of the Alabama Academy of Science, March 30-April 1, 2010.

Whereas, Alabama A&M University of Professors Dr. Phillip Bording, Yong Wang, Florence Okafor, and Mezemir Wagaw did chair the Local Arrangements Committee and coordinated all arrangements for the highly successful 2010 meeting.

Whereas, Alabama A&M University Administration did support the meeting with superb facilities in Elmore Gym, Knight Center, and the Engineering Building

Whereas, Alabama A&M University did provide outstanding hospitality throughout the meeting

Whereas, Alabama A&M University faculty and staff generously provided their time to assure the success of the meeting

Whereas, Alabama A&M University did coordinate an excellent awards banquet

Now, therefore,

Be it resolved by the Alabama Academy of Sciences Resolution Committee, its executive committee concurring:

That the membership of the Alabama Academy of Sciences, by this resolution,

honors and recognizes Alabama A&M University and the local arrangements committee for their outstanding efforts in organizing and conducting the 87th Annual meeting of the Alabama Academy of Sciences, March 30- April 1, 2010.

Be it further resolved that a copy of this resolution be forwarded to Alabama A&M University.

Subject: Resolution in honor of Leven S. Hazlegrove

To honor and recognize DR. LEVEN S. HAZLEGROVE for his outstanding efforts and contributions to science, education, and the Alabama Academy of Science.

Whereas, Dr. Hazlegrove earned a BS degree in Chemistry from Howard College (Samford University), Master's Degree in Analytical Chemistry from Emory University, a Ph.D. in Physical Chemistry from the University of Alabama.

Whereas, Dr. Hazlegrove did postdoctoral work at Duke University, University of North Carolina, and others

Whereas, Dr. Hazlegrove was Professor of Chemistry at Samford University for 33 years and served as the Chairman of the Department

Whereas, Dr. Hazlegrove directed three international chemistry institutes for college professors in East Pakistan (now Bangladesh) for the US State Department and presented many scientific papers at international and national meetings as well as published several books and numerous articles in scientific journals

Whereas, Dr. Hazlegrove was a member of the Alabama Academy of Science for many years, serving as President and Executive Director.

Whereas, Dr. Hazlegrove was awarded the Wright Gardner Award from the Academy in 2003 for his accomplishments in the field of science.

Now, therefore,

Be it resolved by the Alabama Academy of Sciences Resolution Committee, its executive committee concurring:

That the membership of the Alabama Academy of Sciences, by this resolution, honors and recognizes Dr. Leven S. Hazlegrove for his outstanding contributions to science and science education and conveys sadness upon his passing.

Be it further resolved that a copy of this resolution be forwarded to the Hazlegrove family.

Subject: Resolution to honor and recognize DR. ADRIEL D. JOHNSON for his outstanding efforts and contributions to science, education, and minority student engagement in science

To honor and recognize DR. ADRIEL D. JOHNSON for his outstanding efforts and contributions to science, education, and minority student engagement in science.

Whereas, Dr. Johnson earned a BA in biology/chemistry at Washington Univ., St. Louis; BS in biology at Tuskegee University; MS degrees in biology at Tennessee Technological University and University of Alabama in Huntsville; and PhD in animal science/nutritional physiology at North Carolina State University

Whereas, Dr. Johnson was Associate Professor of Biological Sciences at the University of Alabama in Huntsville for 21 years, conducting research in cell biology and nutritional physiology

Whereas, Dr. Johnson was acutely interested in his students and devoted much of his time to promoting science and mathematics interest and careers among minority students

Whereas, Dr. Johnson directed the campus chapter of the Alabama Louis Stokes Alliance for Minority Participation

Whereas, Dr. Johnson was a member of the Alabama Academy of Science for many years.

Now, therefore,

Be it resolved by the Alabama Academy of Sciences Resolution Committee, its executive committee concurring:

That the membership of the Alabama Academy of Sciences by this resolution, honors and recognizes Dr. Adriel D. Johnson for his outstanding contributions to science, education and minority student career mentoring and conveys sadness upon his passing.

Be it further resolved that a copy of this resolution be forwarded to the Johnson family.

C16. Nominating Committee, Mickie Powell

Listed below are committee positions up for re-appointment this year, and nominees (or lack thereof) for each position.

<u>Committee</u>	<u>Position</u>	<u>nominee</u>	<u>comment</u>
Archives	Chair	Troy L. Best	re-appointment
Auditing Junior Academy		unfilled	
Auditing Junior Academy		Govind Menon	re-appointment
Budget and Finance	Trustee	Ellen Buckner	re-appointment
Budget and Finance	Counselor to the Junior Academy	Henry L. Barwood	
Budget and Finance	Secretary	Marietta Cameron	replaces James Rayburn
	Treasurer	unfilled	Taba Hamissou
	Journal Editor	Safaa Al-Hamdani	re-appointment
Electronic Media:	Associate Editor	Marietta Cameron	re-appointment
Emmett B. Carmichael Award:		David Nelson	replaces Linda Reed
Emmett B. Carmichael Award:		Robert Pitt	re-appointment
Emmett B. Carmichael Award:		Larry Davenport	replaces James Bradley

Gorgas Scholarship Program:		Elizabeth Dobbins	re-appointment
Gorgas Scholarship Program:		David H. Nelson	re-appointment
Long Range Planning:		Anne Cusic	re-appointment
Long Range Planning:		Ken Marion	re-appointment
Mason Scholarship		Malcolm Braid	replaces Lori Cormier
Membership:	Chair	unnecessary	
Public Relations:		unfilled	Roland Dute requests replacement
Public Relations:		Ken Marion	re-appointment
Regional Science Fairs:	Chair	Virginia Valardi	re-appointment
Research:		Bruce Smith	re-appointment
Research:		Alan Sprague	re-appointment
Research:		Robert Thacker	re-appointment
Resolutions:		Mark Meade	re-appointment
Science and Public Policy:		???	
Science and Public Policy:		Boakai Robertson	re-appointment
Science Olympiads:	Chair	Jane Nall	Re-appointment
Wright A. Gardner Award:		Anne Cusic	re-appointment verified - Sharma
Wright A. Gardner Award:		Barrett Bryant	re-appointment verified - Sharma
Wright A. Gardner Award:		Gene Byrd	re-appointment verified - Sharma

By Brian Thompson

C17. Mason Scholarship, Mike Moeller

Two complete applications for the William H. Mason Fellowship were submitted and reviewed this year. After considering the application material, the Committee selected Ms. Danielle Morlan for the \$1,000 fellowship. Ms. Morlan has been notified of the award and has verbally accepted the Fellowship, although we are still waiting for the written acceptance form. She hopes to attend the banquet at the 2010 annual meeting. Ms. Morlan received a B.S. with a major in BioMedical Science from the Southern Illinois University in 2009. She is attending the University of West Alabama for an M.A. in Education with certification in Biology.

I greatly appreciate the service of reviewing the applications performed by Committee members Charles Eick, Malcolm Braid, Loretta Cormier and Jane Roy.

C18. Gorgas Scholarship Program, Ellen Buckner

The Gorgas Committee would like to thank the teacher-sponsors listed below who had applicants to the 2010 Gorgas Scholarship Competition. Without committed teachers these outstanding students would not have the opportunities for scholarships and further development in science. We are also pleased to report that three of the 2010 finalists were named Intel National Science Talent Search Semi-Finalists and one went on to be named a National Finalist. An outstanding competition program is planned for this meeting. Thanks to the many scientists who are assisting and paper readers and finals judges from institutions across Alabama!

The report of Dr. Catherine Shields is attached. Dr. Shields has done an excellent job recruiting teachers, preparing a grant application and encouraging participation in the AJAS and Gorgas competitions. She has served as the Gorgas/AJAS Teacher-Fellow for two years and has assisted the program to grow during that time. We thank her for her expertise and activity on behalf of the Gorgas and AJAS programs.

The Gorgas Committee met by conference call on March 10, 2010 to discuss continuation of the Gorgas-AJAS Teacher-Fellow program. We discussed the finances, effectiveness, and goals for the future. At this time the committee makes the following motion:

Motion: To continue the Gorgas/AJAS Teacher-Fellow position for the two academic years (2009-2011) with revisions to the Job Description and goals to be more technology focused. Final approvals of the job, goals, and candidates will be made by the Gorgas Committee with President and President-elect serving as ad hoc members.

New this year!

The student poster display (with author present) will take place from 1:00-2:15, immediately outside the lunch area after the luncheon speaker. I encourage all of you to take that opportunity to view the students' posters and meet these outstanding science students.

Ruth Borden
Alabama School of Fine Arts

Lady Emrich
Grissom High School

Vicki Farina
Brooks High School

Julibeth Jones
Jefferson County International Baccalaureate

Barry McPhail
Alabama School of Math and Science

Dasi Mosley
Rausay High School

Catherine Shields
Jefferson County International Baccalaureate

Emily Stafford
Deshler High School

Virginia Vilardi
Wetumpka High School

Nabiha Yuouf
Rausay High School

AJAS/Gorgas Teacher-Fellow Report, March, 2010

During the fall of 2009, work focused on recruiting teachers who would be interested in having their students compete in the Alabama Junior Academy of Science (AJAS) Paper Reading and Gorgas Scholars Competitions. Attempts were made to expand participation through phone calls, e-mails, and networking at professional meetings. During the spring of 2010, efforts have focused on grant proposals to obtain funding for the Alabama Science Competition Teacher Network (ASCTN). These funds would be used to provide incentives for teachers to take on the extra responsibilities required for students to compete.

During December and January, contact was made with Dr. Tommy Bice, Deputy State Superintendent of Education at the Alabama Department of Education. Upon hearing of the work of AJAS, Dr. Bice wrote, "What an exciting experience for those fortunate to be participants. I can see why you want it expanded in our state. I would welcome the opportunity to discuss possibilities with you and others you deem appropriate." The hope was to include AJAS in the Race to the Top grant proposal for federal funds. Unfortunately, the demands of preparing the Race to the Top grant kept Dr. Bice from having time in his calendar to commit to us. However, he spoke at the Alabama National Board Certified Teacher (NBCT) Network meeting at Spain Park High School January 23, 2010. I was able to talk with him at this meeting. He expressed support for the work of the AJAS but was not able to include us in the Race to the Top proposal. I plan to be in contact with Dr. Bice during the summer to explore other funding sources. The states who will progress to the final review for the Race to the Top grants were recently announced, and Alabama did not make the cut.

A Toyota Tapestry grant was submitted in January for \$10,000 to support the work of AJAS. Awardees were to be notified by March 1, 2010. As no word has been received, it is presumed that the grant was not funded.

Elizabeth C. French (Director, Alabama Commission on Higher Education, No Child Left Behind Program) was contacted about including AJAS in funding proposals for No Child Left Behind. That proposal will be prepared this summer and fall, so I plan to be in touch with Dr. French during the summer.

Twelve finalists were identified for the Gorgas competition, representing seven different schools (Brooks, Wetumpka, Alabama School of Fine Arts, Alabama School of Math and Science, Ramsay, Virgil Grissom, and the Jefferson County International Baccalaureate School). Dasi Mosley from Ramsay attended the AJAS state meeting in 2009 and submitted student work this year for the competition. Her students competed in Gorgas this year, but did not compete in Paper Reading.

Ms. Tammy Dunn was asked to consider being the State Coordinator of the Science Olympiad competition. While Tammy is enthusiastic about Science Olympiad, she feels the commitment is too great to accept in addition to her work and personal responsibilities. The possibility of hosting a Science Olympiad competition at the University of Alabama at Birmingham (UAB) was explored at a meeting that included Charlotte Kent and her roommate (UAB students), Catherine Shields, and Debbie Anderson (JCIB Faculty).

Dr. Henry Barwood is receiving submissions for the AJAS Paper Reading competition. Students from Wetumpka High School, under the guidance of Virginia Vilardi, will compete in Paper Reading for the second year. While many teachers and others in the community were contacted, the expansion of the program is proceeding very slowly.

Motion to continue to program to continue co-coordinator .

Voted and passed

C19. Electronic Media, Brian Toone.

Web Site

I have made a number of routine updates to the website (announcements, etc...) as well as these below:

Annual Meeting Title and Abstract Submission for 2010

No major changes to the submission process.

Spring Executive Report Submission Page

I updated the report submission page to gather reports for this Spring 2010 executive meeting.

Online Membership Application

As of Wednesday, March 24th, 66 people have either initiated or renewed their membership using Paypal according to this breakdown:

22	professional	1 yr memberships
3	Professional	1 yr membership (renewing)
2	professional	2 year memberships
3	professional	3 year membership
1	professional	lifetime membership
33	student	1 year membership
1	student	3 year membership
1	student	4 year membership

Current PayPal balance: \$3,459.77

Old Business None

E. New Business

Discussion of the possible donation by an individual to AAS to

- a. Manage an endowment to provide grants to students to carry out research on the described forested part of the property
- b. Will the property to the Academy as a field station with the described stipulations.

Motion to make inquire about points a and not b get into Pete Conroy
Passed

2. - Get Pete Conroy info for GT for land Trust -

Accepted SE-SETAC Joint meeting with AAS

F. Adjournment 10:22 pm



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The Alabama Academy of Science publishes significant, innovative research of interest to a wide audience of scientists in all areas. Papers should have a broad appeal, and particularly welcome will be studies that break new ground or advance our scientific understanding.

Information for the Authors:

- Manuscript layout should follow the specific guidelines of the journal.
- The authors are encouraged to contact the editor (E-mail: sah@jsu.edu) prior to paper submission to obtain the guidelines for the author.
- At least one author must be a member of the *Alabama Academy of Science* (except for Special Papers).
- The author(s) should provide the names and addresses of at least two potential reviewers.
- Assemble the manuscript in the following order: Title Page, Abstract Page, Text, Brief acknowledgments (if needed), Literature Cited, Figure Legends, Tables, Figures.

What and Where to Submit:

The original and two copies of the manuscript and a cover letter should be submitted to the following.

Dr. Safaa Al-Hamdani
Editor-Alabama Academy of Science Journal
Biology Department
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Review Procedure and Policy:

Manuscripts will be reviewed by experts in the research area. Manuscripts receiving favorable reviews will be tentatively accepted. Copies of the reviewers' comments (and reviewer-annotated files of the manuscript, if any) will be returned to the correspondent author for any necessary revisions. The final revision and electronic copy are then submitted to the *Alabama Academy of Science Journal* Editor. The author is required to pay \$100 for partial coverage of printing costs of the article.

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