

MISSISSIPPI
ACADEMY OF SCIENCES



SEVENTY-SECOND ANNUAL MEETING

February 20-22, 2008

Whispering Woods Hotel and Conference Center
Olive Branch, MS

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**GENERAL SCHEDULE****WEDNESDAY, FEBRUARY 20, 2008**

<u>TIME</u>	<u>EVENT</u>	<u>LOCATION</u>
4:00 PM to 6:00 PM	Board of Directors Meeting	TBA

THURSDAY, FEBRUARY 21, 2008

<u>TIME</u>	<u>EVENT</u>	<u>LOCATION</u>
7:30 AM to 5:00 PM	Registration	Lobby
9:00 AM to 5:00 PM	Exhibits	
8:00 AM to 4:00 PM	Divisional Programs	See Pages 12-27 for overview
Noon to 1:00 PM	Special Presentation (p. 11)	Grand Ballroom
4:00 PM to 4:30 PM	Set up for 6:00 PM Poster Session	Grand Ballroom
5:00 PM to 6:00 PM	2008 Dodgen Lecture & Presentation of Awards	Grand Ballroom
6:00 PM to 7:00 PM	Reception and Poster Session Agriculture and Plant Sciences Cellular, Molecular, and Developmental Biology Chemistry and Chemical Engineering Ecology and Evolutionary Biology Mathematics, Computer Science, and Statistics Physics and Engineering Psychology and Social Sciences Science Education Zoology and Entomology	

FRIDAY, FEBRUARY 22, 2008

<u>TIME</u>	<u>EVENT</u>	<u>LOCATION</u>
7:15 AM	Past-Presidents' Breakfast	To Be Announced
7:30 AM to 2:00 PM	Registration	Lobby
8:00 AM to 12:00 PM	Exhibits	
8:00 AM to 5:00 PM	Divisional Programs	See Pages 12-27 for overview
8:30 AM to 10:30 AM	Health Fair	Grand Ballroom
10:45 AM to 11:45 AM	Poster Session Health Sciences Marine and Atmospheric Sciences	Grand Ballroom
11:30 AM to 12:30 PM	Mississippi Center for Supercomputing Research	Dogwood
Noon to 1:00 PM	Special Presentation (p. 12)	Grand Ballroom
1:00 PM to 1:45 PM	MAS Business Meeting	Grand Ballroom



**11200 East Goodman Road
Olive Branch, MS 38654**

Directions to Conference Center From:

Memphis International Airport - Exit airport to I-240 East towards Nashville to 385 East/ Bill Morris Parkway. Exit Hacks Cross Road south; continue for 4.5 miles. Whispering Woods is on left.

I-40 Westbound from Nashville - Go West to I-240. Take I-240 South to 385 East/Bill Morris Parkway. Exit Hacks Cross Road south; continue for 4.5 miles. Whispering Woods is on left.

I-40 Eastbound from Arkansas - Go East to I-240. Take I-240 towards Jackson, MS; continue on I-240 towards Nashville (not I-55 South) to 385 East/Bill Morris Parkway. Exit Hacks Cross Road south; continue for 4.5 miles. Whispering Woods is on left.

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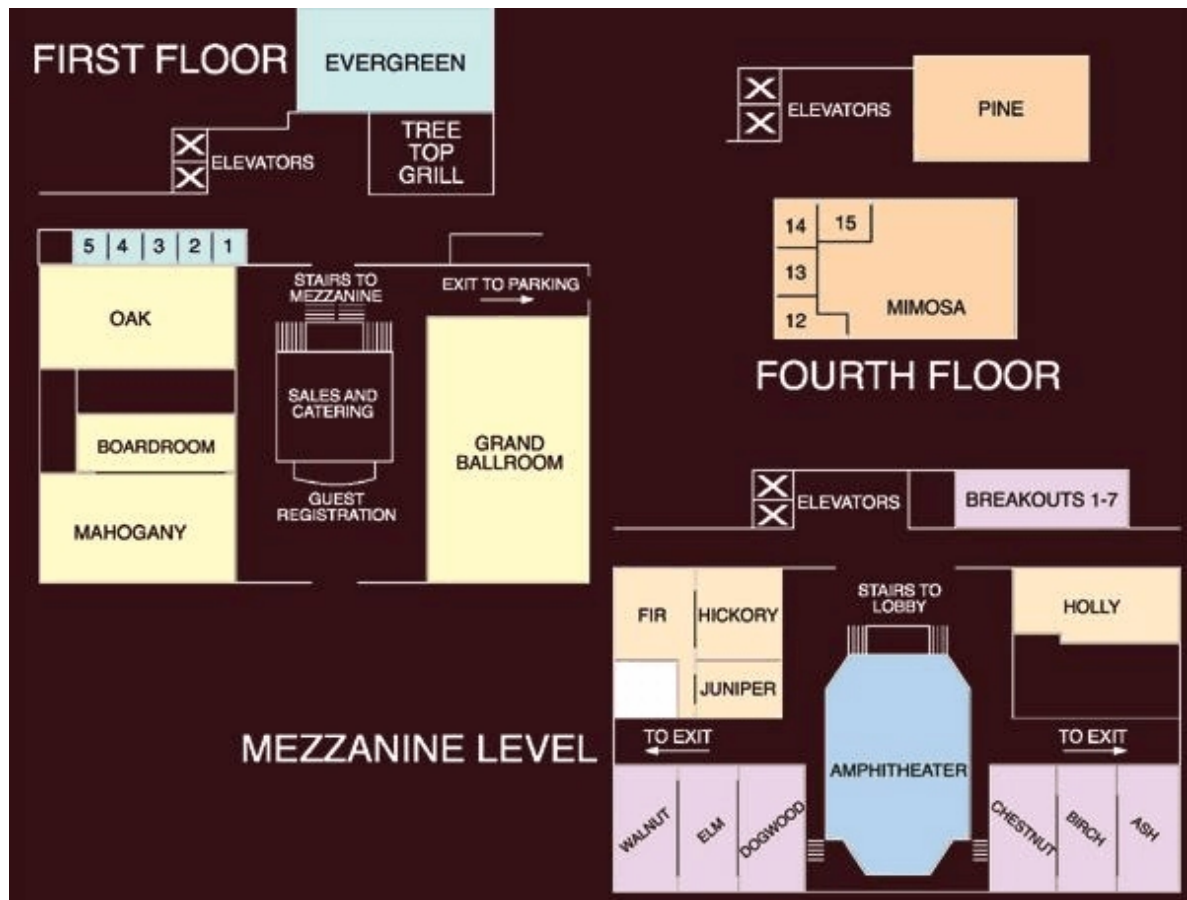
I-55 Northbound from Jackson, Mississippi - Exit State Highway 302 East/Goodman Road; continue East for 14 miles. At Hacks Cross Road intersection, turn left. At second light, turn right. Whispering Woods is straight ahead.

The Hacks Cross entrance to Whispering Woods is now traffic light controlled making access into the hotel easier and safer. A green "Whispering Woods Hotel" directional sign is mounted next to the traffic light.

Complimentary airport shuttle service is available to and from Memphis International Airport from 7:00 am to 10:30 pm daily. Upon arrival, call 662-895-2941 for pick outside baggage claim. Contact the front desk 24 hours prior to departure to arrange return transportation to Memphis International Airport.

<http://www.wwconferencecenter.com/directions.htm>

Whispering Woods Conference Center Floor Plan



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 Itawamba Community College
 Jackson State University
 Mississippi Gulf Coast Community College
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*** Exhibitors, 2008 Annual Meeting**

Additional 2008 Exhibitors:

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Millipore Corporation
UMC, Graduate Studies in Neuroscience
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2008 Dodgen Lecture

5:00 pm Thursday
February 21, 2008

The Neurobiology of Vocal Learning

given by

Erich D. Jarvis, Ph.D., Associate Professor,
Department of Neurobiology, Duke University Medical Center



Erich Jarvis, a world-renowned neurobiologist at Duke University Medical Center, is noted for his research on genes in the brain pathways for vocal learning in birds. As an associate professor in the department of neurobiology at the North Carolina university, he heads a team of researchers in the field of vocal communication. Using songbirds as the main animal model, the scientists are learning how the brain is able to learn the behavior of sound. By learning how birds are able to produce sound, Jarvis hopes his studies lead to the treatment of speech problems in humans, such as stuttering.

The recipient of many awards and honors, Dr. Jarvis received the 2002 National Science Foundation's Alan T. Waterman Award, which is the highest award given by the NSF to a scientist who has made significant

discoveries before the age of 35. The award was accompanied by a \$500,000 grant to continue his research. He was a recipient of the 2005 National Institutes of Health Director's Pioneer Award given annually to the top 1.5% of applicants.

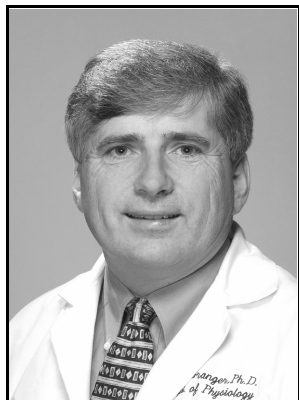
Dr. Jarvis received his undergraduate training in Biology and Mathematics at Hunter College, NY (1988) and his doctorate in Molecular Neurobiology and Animal Behavior from The Rockefeller University, NY (1995). More information about Dr. Jarvis' work can be found at <http://www.jarvislab.net>.

(Biography adapted from <http://www.dom.com/about/education/strong/2005/jarvis.jsp>)

Special Presentation

Noon, Thursday
February 21, 2008

Translational Research: Pathophysiology of Hypertension During Preeclampsia
given by **Joey P. Granger, Ph.D.**



Dr. Granger is the Billy S. Guyton Distinguished Professor and Professor of Physiology and Medicine and Associate Director of the Center for Excellence in Cardiovascular-Renal Research and Dean of the School of Graduate Studies in the Health Sciences at the University of Mississippi Medical Center in Jackson, MS. He earned his doctorate from the University of Mississippi School of Medicine in 1983. He received his postdoctoral training in physiology at the Mayo Clinic from 1983-1985. He was appointed Assistant Professor of Physiology at Mayo Medical School in 1985. In 1986, he joined the faculty of the Department of Physiology at Eastern Virginia Medical School. In 1990, he moved back to the University of Mississippi Medical Center.

Dr. Granger is currently an Associate Editor for Hypertension and for the American Journal of Physiology. He has also served as the Editor of the Council for High Blood Pressure Newsletter and a member of Editorial Boards of American Journal of Hypertension, American Journal of Physiology: Renal, Journal of CardioMetabolic Syndrome and News in Physiological Sciences. He has served on numerous scientific committees of the Council for High Blood Pressure Research Inter-American Society of Hypertension, and the American Physiological Society. Within the past year he has been elected to serve on the Leadership committees of the American Physiological Society and the Council for High Blood Pressure Research of the AHA. He has served on scientific study sections for the American Heart Association, National Institutes of Health, NASA, and the Veterans Administration.

He has received several awards including the American Physiological Society 2008E.H. Starling Distinguished Lecture Award, American Physiological Society 2008 Bodil M. Schmidt-Nielsen Distinguished Mentor and Scientist Award, Dahl Memorial Lecture of the AHA, American Society of Hypertension Young Scholar Award, the International Society of Hypertension Demuth Research Award, Inter-American Society of Hypertension Young Investigator Award, the Regulatory and Integrative Physiology Young Investigator Award of the American Physiological Society Water and Electrolyte Section, the Harold Lamport Award of the Cardiovascular Section of the American Physiological Society, the Bowditch Lecture of the American Physiological Society, and the Established Investigator Award of the American Heart Association. Granger's research has been continuously funded by the National Institutes of Health since 1984.

Dr. Granger's research has focused on the role of the kidneys in the pathogenesis of hypertension. His current research focuses on the role of endothelial and neurohormonal factors in mediating hypertension in animal models of preeclampsia. His laboratory is also investigating the role of the renal endothelin system in salt-sensitive hypertension.

Special Presentation

Noon, Friday
February 22, 2008

Public Health and the Environment: from Science to Policy to Program Management
given by **Stephanie Miles-Richardson, D.V.M., Ph.D.**



Stephanie Miles-Richardson, D.V.M., Ph.D., is Associate Director for Minority Health and Health Disparities Policy in the Office of Minority Health and Health Disparities, Office of Strategy and Innovation, Office of the Director, Centers for Disease Control and Prevention (CDC). Previous appointments at CDC and the Agency for Toxic Substances and Disease Registry (ATSDR) include Scientific Technical Advisor for a \$4 million congressionally mandated applied research program which addressed data needs for hazardous substances identified by ATSDR. She also served as Minority Health Program Manager at the National Center for Environmental Health/ Agency

for Toxic Substances and Disease Registry (NCEH/ATSDR). In this capacity, she promoted public health as a key consideration and ensured that NCEH/ATSDR addressed environmental health disparities within African American, Asian American, Native Hawaiian/Pacific Islander, American Indian/Alaska Native, Hispanic and/or low income White populations exposed to hazardous substances. She has served as Project Manager for programs that address community concerns about exposure to hazardous substances as well as environmental justice in minority and/or low income communities. Dr. Miles-Richardson has served as an agency expert on the effects of endocrine disrupting chemicals, providing technical expertise internally and representing the agency on interagency and national committees. She is the author/chemical manager of ATSDR's Toxicological Profile of di (2-ethylhexyl) phthalate, a chemical with endocrine-disrupting potential.

Dr. Miles-Richardson was born in Nashville, Tennessee and raised in Grambling, Louisiana. She is a graduate of Grambling High School and graduated from Grambling State University with an undergraduate degree in Biology. She earned her veterinary medical degree from Tuskegee University in Tuskegee, Alabama and a dual Ph.D. in pathology and environmental toxicology from Michigan State University, East Lansing, Michigan, where she received a National Institutes of Environmental Health Sciences Postdoctoral Fellowship. Her dissertation, *Effects of Estrogenic Compounds on Fathead Minnows*, was focused on the development of a bioindicator to assess human exposure to endocrine disrupting compounds. Dr. Miles-Richardson has published several papers on endocrine disruption, and her work has been presented locally, nationally, and internationally.

Dr. Miles-Richardson is an Adjunct Associate Professor in the Department of Pathobiology, College of Veterinary Medicine, Nursing, and Allied Health, Tuskegee University, Tuskegee, Alabama and holds an academic appointment at Morehouse School of Medicine. She is married to Burnell Richardson, Jr. (ASCP) and they have 2 children.



OVERVIEW OF DIVISIONAL PROGRAMS

GENERAL SYMPOSIUM

Thursday, February 21

Location: Grand Ballroom

12:00p TRANSLATIONAL RESEARCH: PATHOPHYSIOLOGY OF HYPERTENSION DURING PREECLAMPSIA

5:00p THE DODGEN LECTURE: THE NEUROBIOLOGY OF VOCAL LEARNING

Friday, February 22

Location: Grand Ballroom

12:00p PUBLIC HEALTH AND THE ENVIRONMENT: FROM SCIENCE TO POLICY TO PROGRAM MANAGEMENT

AGRICULTURE AND PLANT SCIENCE

Thursday, February 21

Thursday Evening

LOCATION: Grand Ballroom

6:00 Dodgen Reception and Divisional Poster Sessions

Please set up between 4:00p and 4:30p

1. CHELATE-INDUCED CHANGES IN METAL SOLUBILITY AFFECT THE PHYTOEXTRACTION EFFICACY OF CADMIUM BY WHEAT (TRITICUM AESTIVUM L.)
2. UPTAKE OF VARIOUS SOIL METALS BY INDIAN MUSTARD PLANTS GROWN IN CADMIUM CONTAMINATED SOIL
3. SENSORY EVALUATION OF LETTUCE FERTILIZED WITH UNCOMPOSTED HUMAN HAIR
4. BLOOD PHYSIOLOGY OF BLUE x CHANNEL HYBRID CATFISH AT THREE STOCKING DENSITIES DURING THE SUMMER MONTHS.
5. EFFECT OF VARIOUS CHELATING AGENTS ON THE CHEMICAL UPTAKE BY LEMON GRASS
6. DEVELOPMENT OF BIOSENSORS FOR DETECTING HAZARDOUS CHEMICALS
7. TOWARDS A GINKGO BACTERIAL ARTIFICIAL CHROMOSOME (BAC) LIBRARY
8. GROWTH RESPONSES, CADMIUM ACCUMULATION AND PHYTOCHELATIN LEVELS OF WHEAT (*Triticum aestivum* L.) EXPOSED TO CADMIUM-CONTAMINATED SOILS
9. GROWTH AND HEAVY METAL ACCUMULATION OF PLANTS GROWN IN STERILE AND NONSTERILE SOILS
10. DEGRADATION OF LIGNOCELLULOSE IN SOUTHERN PINE SAWDUST BY THE FUNGUS *TRICHODERMA REESEI*
11. SUGAR PRODUCTION FROM THE DECOMPOSITION OF LIGNOCELLULOSIC MATERIALS BY *TRICHODERMA REESEI* UNDER AEROBIC CONDITION
12. GROWTH RESPONSE OF *WALTERSIA METALLIDURANS* TO HEAVY METAL AND CHELATE AMENDMENTS IN NUTRIENT BROTH
13. INVESTIGATION ON HIGH EFFICIENT DEGRADATION OF DYESTUFF USING LIGNIN PEROXIDASE PRODUCED BY *PHANEROCHAETE CHRYSOSPORIUM*
14. A COPPER SULFATE BASED PRODUCT AS AN ALTERNATIVE SANITIZER FOR FOOD PROCESSORS AND RETAILERS



Friday, February 22

Friday Morning

LOCATION: Ash

- 8:15 COMBINED EFFECTS OF HEAVY METALS AND CHELATES ON SOIL MICROBIAL POPULATION AND PHOSPHATASE ACTIVITY**
- 8:30 CAPRINE SERUM FRACTION IMMUNOMODULATORY EFFECTS ON LIVABILITY AND TISSUE CHARACTERISTICS IN COMMERCIAL TURKEYS INFECTED WITH PASTEURELLA MULTOCIDA**
- 8:45 MUSCADINE JUICES AND SEED EXTRACTS INHIBIT THE GROWTH OF ENTEROBACTER SAKAZAKII**
- 9:00 WATER MOVEMENT IN WARM-SEASON TURFGRASS SYSTEMS: OBSERVATIONS AT THE PLOT SCALE**
- 9:15 ANTIMICROBIAL ACTION OF WATER-SOLUBLE MUSCADINE (VITIS ROTUNDIFOLIA) SEED EXTRACT ON E.COLI O157:H7**
- 9:30 RESPONSE OF FOLIAR FUNGICIDE APPLICATIONS TO WHEAT VARIETIES WHICH ARE RESISTANT, MODERATELY RESISTANT, AND VERY SUSCEPTIBLE TO LEAF RUST.**
- 9:45 Break**
- 10:00 ASSESSMENT OF THE EFFICACY OF CHELATE-ASSISTED PHYTOEXTRACTION ON BIOMASS, LEAD-TISSUE CONTENT, AND TRANSLOCATION INDEX OF SESBANIA EXALTATA AT THREE STAGES OF DEVELOPMENT**
- 10:15 ULTRASONOGRAPHIC MONITORING OF LUTEAL AND FOLLICULAR DEVELOPMENT AFTER PGF2 α IN COMBINATION WITH GnRH OR GnRH AND hCG**
- 10:30 ANTIMICROBIAL EFFECTS OF FRESH AND PROCESSED BRONZE MUSCADINE (VITIS ROTUNDIFOLIA MICHX.) JUICE ON SELECTED HUMAN PATHOGENS**
- 10:45 LESS-THAN-FULL FLOOD MANAGEMENT FOR MISSISSIPPI RICE PRODUCTION**
- 11:00 COMPARISON OF ATTACHMENT STRENGTH OF LISTERIA MONOCYTOGENES AND ITS INTERNALIN NEGATIVE MUTANTS**
- 11:15 QUALITY OF LETTUCE FERTILIZED WITH UNCOMPOSTED HUMAN HAIR**
- 11:30 Divisional Business Meeting**

CELLULAR, MOLECULAR AND DEVELOPMENTAL BIOLOGY

Thursday, February 21

Thursday Morning

Location: Oak

- 9:00 Opening Remarks**
- 9:10 ACTIVITY ASSAY OF A COTTON FIBER RING-TYPE UBIQUITIN LIGASE**
- 9:30 IgD EXPRESSION IN CHANNEL CATFISH, ICTALURUS PUNCTATUS**
- 9:50 PARTIALLY PURIFIED FRACTIONS OF LEAF EXTRACTS OF OCIMUM GRATISSIMUM EXHIBIT HIGHER ANTI-PROLIFERATION ACTIVITY IN PROSTATE ADENOCARCINOMA CELLS**
- 10:10 BIOFILM FORMATION IS REGULATED BY MSA IN STAPHYLOCOCCUS AUREUS**
- 10:30 Break**
- 11:00 MSA EXPRESSION WITHIN THE STAPHYLOCOCCUS AUREUS BIOFILM**
- 11:20 I1-1 β -MEDIATED UP-REGULATION OF CXCL12 WITHIN ASTROCYTES DURING EAE**



Thursday Afternoon

Location: Oak

- 1:30** SULFUR METABOLISM IN THE DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM
1:50 DIFFERENTIAL EXPRESSION OF THE M46 GENE IN THE MOLD AND YEAST FORMS OF THE PATHOGENIC FUNGUS HISTOPLASMA CAPSULATUM
2:10 MAPPING CANDIDATE GENES INVOLVED IN TOMATO FRUIT CUTICLE BIOSYNTHESIS
2:30 ELUCIDATION OF THE TRANSMEMBRANE TOPOLOGY OF MSA IN STAPHYLOCOCCUS AUREUS.

Thursday Evening

LOCATION: Grand Ballroom

- 6:00** Dodgen Reception and Divisional Poster Sessions
Please set up between 4:00p and 4:30p

1. SIGNAL INDUCED CHANGES IN THE SUBCELLULAR LOCATIONS OF IRAK-1 - INTEGRATES LPS AND TNF R1 SIGNALING
2. UNIQUE REGULATION OF FE-SUPEROXIDE DISMUTASE (FE-SOD) BY FERRIC UPTAKE REGULATOR IN AZOTOBACTER VINELANDII.
3. CAMPTOTHECIN MODIFIES LIPOPOLYSACCHARIDE/PHORBOL-12-MYRISTATE-13-ACETATE INDUCTION OF INTERLEUKIN-1 RECEPTOR ANTAGONIST IN HUMAN FIBROBLASTS.
4. HETEROLOGOUS EXPRESSION OF HUMAN PHOSPHOLIPASE D IN BUDDING YEAST
5. THE ROLE OF DIA2 AND CDC20 IN UV-ACTIVATED REPAIR PATHWAYS
6. PRODUCTION AND CHARACTERIZATION OF MONOCLONAL ANTIBODIES TO ENDOTHELIAL MONOCYTE ACTIVATING POLYPEPTIDE II (EMAP II)
7. AFFINITY OF RAMELTEON FOR COMPETITION TO 2-[125I]IODOMELATONIN BINDING TO THE SUPER HIGH AND HIGH AFFINITY STATES OF THE HMT1 AND HMT2 MELATONIN RECEPTORS EXPRESSED IN MAMMALIAN CELLS
8. MOLECULAR AND CELLULAR EFFECTS OF LEAD ON HUMAN EPITHELIAL CELLS (HACAT)
9. EFFECTS IN SLEEP DEPRIVED RATS OF AN ANTIDEPRESSANT AND A SLEEP AID, ALONE OR IN COMBINATION ON SLEEP PATTERNS
10. THE MOLECULAR MECHANISMS FOR THE EXPRESSION, SECRETION AND UNIPOLAR TARGETING OF ICSA IN SHIGELLA FLEXNERI
11. THE MOLECULAR AND CELLULAR MECHANISMS OF MERCURY ON HUMAN JURKAT T-CELLS
12. SERUM LACTATE DEHYDROGENASE [LDH] AND BILIRUBIN [DIRECT] AS BIOMARKERS OF ARSENIC TRIOXIDE INDUCED HEPATOTOXICITY IN SPRAGUE-DAWLEY RATS.
13. THE HYPERTHERMOPHILIC MICROBIOLOGICAL POPULATIONS OF SUBTERRANEAN HYDRO-CARBON DEPOSITS
14. INHIBITION POTENCY OF ORGANOPHOSPHATES ON HUMAN CARBOXYLESTERASE 1 PROTEIN
15. SCREENING FOR SYNTHETIC LETHAL MUTANTS OF LEXA AND DINB DELETION MUTATIONS IN ESCHERICHIA COLI.
16. THE AQUAPORIN GENE FAMILY: EXPRESSION IN NORMAL AND NEOPLASTIC TISSUES
17. AUTOMATIC EXTRACTION OF INFLUENZA VIRUS PATHOGENICITY FROM BIOMEDICAL LITERATURE
18. DOES THE GENETIC POLYMORPHISM INVOLVING A VARIABLE NUMBER OF TANDEM REPEATS IN GLYCOPROTEIN IB DIRECTLY INFLUENCE PLATELET ACTIVATION BY VON WILLEBRAND FACTOR?
19. CELLULAR AND MOLECULAR TARGETS OF MERCURY TOXICITY IN HUMAN RENAL PROXIMAL (HK-2) CELLS
20. DUCTAL CARCINOMA CELL GROWTH IS VITIATED BY VERNONIA AMYGDALINA EXTRACTS



Friday, February 22

Friday Morning

Location: Oak

- 9:00 IDENTIFYING MAMMALIAN PICOT (PROTEIN INTERACTING COUSIN OF THIOREDOXIN) INTERACTING PROTEINS**
- 9:20 THE ROLES OF CDC20 AND RAD4 IN DOUBLE STRAND BREAK REPAIR**
- 9:40 A CLPP MEDIATED REGULATORY NETWORK IN STAPHYLOCOCCUS AUREUS REVEALED BY SAMMD**
- 10:00 FAST IDENTIFICATION OF CLUSTERED REGULARLY INTERSPACED PALINDROMIC REPEATS**
- 10:20 THE ROLE OF THE SSA1 GENE IN THE SPONTANEOUS FORMATION OF THE [URE3] PRION OF SACCHAROMYCES CEREVISIAE**
- 10:40 SPONTANEOUS FORMATION OF THE [URE3] PRION IN SACCHAROMYCES CEREVISIAE IS NOT A STRICTLY RANDOM PROCESS**
- 11:00 Closing remarks, divisional meeting, and awards for poster and platform presentations.**

CHEMISTRY AND CHEMICAL ENGINEERING

Thursday, February 21

Thursday Morning

LOCATION: Mahogany

- 9:00 ECL QUENCHING BEHAVIOR OF RU(BPY)₃²⁺/TPRA SYSTEM BY CL⁻ AT AU ELECTRODE: DIRECT EVIDENCE OBTAINED FROM EQCM**
- 9:15 DETECTION OF CHEMICAL NERVE AGENT SIMULANTS: PROGRESS TOWARDS QCM SENSORS**
- 9:30 APPROACHES TO THE SYNTHESIS OF A TITANANTHRACENE**
- 9:45 VEGETABLE OIL MACROMONOMER-BASED LATEXES AND WATERBORNE INDUSTRIAL COATINGS**
- 10:00 FRONTAL POLYMERIZATION WITH ENCAPSULATED INITIATORS PREPARED BY SEVERAL METHODS**
- 10:15 Break**
- 10:30 MASS SPECTROMETRY BASED ASSAY FOR THE ENZYMATIC HYDROLYSIS OF PSEUDO-PROCHIRAL MALONATE DIESTERS**
- 10:45 PREPARATION AND CHARACTERIZATION OF TRIS(2,2'-BIPYRIDYL)RUTHENIUM(II)-LOADED MICROCAPSULES AS ELECTROGENERATED CHEMILUMINESCENT LABELS FOR BIOMOLECULES DETECTION** Tommie L. Pittman* and Wujian Miao, University of Southern Mississippi, Hattiesburg, MS 39406
- 11:00 FRONT TEMPERATURE AND FRONT VELOCITY AS A FUNCTION OF BENZOYL PEROXIDE CONCENTRATION, TRITHIOL CONCENTRATION AND FILLER LOADING IN THE FRONTAL POLYMERIZATION OF A TRIACRYLATE**
- 11:15 EXO- AND ENANTIOSELECTIVE DIELS ALDER REACTIONS: PYRAZOLIDINONE AUXILIARIES ARE ABLE TO OVERRIDE SECONDARY ORBITAL INTERACTIONS**
- 11:30 DETECTION OF PEROXIDE-BASED EXPLOSIVES USING ELECTROGENERATED CHEMILUMINESCENCE**

Thursday Afternoon

LOCATION: Mahogany

- 1:15 MODIFIED FOX EQUATION TO PREDICT GLASS TRANSITION TEMPERATURES OF VEGETABLE OIL MACROMONOMER LATEXES**



- 1:30 NAPHTHALIMIDE LINKED ONIUM SALTS AS POTENTIAL PHOTOACTIVATABLE DNA-CLEAVING REAGENTS
- 1:45 PREPARATION OF HOMOCHIRALLY SIMILAR ISOLEUCINE ANALOGUES THROUGH A COMMON SYNTHETIC INTERMEDIATE
- 2:00 STUDY IN THE REACTION OF CYANAMIDE WITH 1,3-DIAMINOPROPANE: FORMATION OF MELAMINE AND TETRAHYDRO-2-PYRIMIDINONE
- 2:15 Break
- 2:30 STUDY OF CHEMICAL COMPOSITIONS OF AN AFRICAN EDIBLE PLANT VERNONIA AMYGDALINA (VA)
- 2:45 PEPTIDOMIMETICS : SYNTHESIS AND INCORPORATION OF UNNATURAL CYSTEINE ANALOGUES INTO BIOACTIVE PEPTIDE
- 3:00 CONVECTION INDUCED BY GRADIENTS IN EFFECTIVE INTERFACIAL TENSION
- 3:15 Business Meeting and Awards

Thursday Evening

LOCATION: Grand Ballroom

- 6:00 Dodgen Reception and Divisional Poster Sessions
Please set up between 4:00p and 4:30p

1. MONO AND BINUCLEAR COPPER COMPLEXES OF SALICYLIDENE SCHIFF BASES: SYNTHESIS AND CHARACTERIZATION OF MESOGENIC PROPERTIES
2. DEOXYGUANOSINE ADDUCT FORMATION OF 2-HYDROXY-1,4-DIOXANE
3. SYNTHESIS AND CHARACTERIZATION OF SOME FLUORINE-CONTAINING COMPLEXES OF RUTHENIUM(II): USE OF ¹⁹F NMR IN STUDYING DNA INTERACTIONS
4. SYNTHESSES AND CHARACTERIZATIONS OF SOME TRANSITION METAL COMPLEXES CONTAINING ANALOGUES OF 2,6-PYRIDINEDICARBOXYLIC ACID
5. STABILITY OF CATFISH ANTIOXIDANT CONTAINING BIODIESEL UNDER ACCELERATED STORAGE CONDITIONS
6. ANALYSIS OF REFRACTIVE INDEX OF TEMPERED AND NON-TEMPERED FLOAT GLASS
7. PREPARATION OF ACTIVATED 4-CYANODITHIO PENTANOIC ACID (CTP) AND RAFT POLYMERIZATION OF FREE AMINE CONTAINING POLYMERS
8. ACETYLCHOLINESTERASE INHIBITORS IN HERBS AND SPICES
9. GELATIN SUSPENDED CARBON NANOTUBE ALIGNMENT AND DIFFERENTIATION UTILIZING IODIXANOL
10. THEORETICAL STUDY OF THE ADSORPTION OF ORGANOPHOSPHORUS COMPOUNDS ON METAL OXIDE SURFACES
11. CATALYTIC GASOLINE SYNTHESIS: UPGRADING OF SYNTHESIS GAS INTO GASOLINE RANGE HYDROCARBONS OVER ION EXCHANGED BIFUNCTIONAL CATALYST.
12. ENANTIOSELECTIVE SYNTHESIS OF HETEROCYCLES USING THE DECARBOXYLATIVE PHOTOCYCLIZATION
13. ONIUM SALTS AS POTENTIAL PHOTOACTIVATABLE DNA-CLEAVING REAGENTS
14. PREPARATION OF HOMOCHIRALLY SIMILAR LYSINE ANALOGUES FROM A COMMON SYNTHETIC INTERMEDIATE
15. RESEARCH ON BIODIESEL FROM WASTE OILS
16. DIRECT OBSERVATION OF CELLULOSE ACETATE SEPARATED FROM SAWDUST BY SCANNING ELECTRON MICROSCOPE AND DETERMINATION OF LIGNIN FROM SAWDUST AND LEFTOVER FROM THE REACTION IN IONIC LIQUID
17. UNDERSTANDING THE MECHANISM OF β -ODAP NEUROTOXICITY
18. A COUPLED-CLUSTER ANALYSIS OF MOLECULES CONTAINING SULFUR AND NITROGEN USING CONVENTIONAL AND THE CC-PV(X+D)Z BASIS SETS
19. SENSITIVE ANALYSIS OF AMINO ACIDS BY USING HPLC WITH FLUORESCENCE DETECTION



20. PHOTO-INDUCED TOXICITY OF NANOCRYSTALS OF CADMIUM SELENIDE
 21. CHROMATOGRAPHIC AND NMR ANALYSIS OF 9-METHYL-10-NITROANTHRACENE AND ITS PHOTOPRODUCTS
 22. CHROMATOGRAPHIC AND NMR ANALYSIS OF 4-CHLORO-1,2-PHENYLENEDIAMINE AND ITS PHOTOPRODUCTS
 23. SOLVENT EFFECT ON THE PHOTOCHEMICAL DEGRADATION OF MONO- AND DINITRO-POLYCYCLIC AROMATIC HYDROCARBONS

Friday, February 22

Friday Morning

LOCATION: Mahogany

- 9:00 THIOL-ENE MICROEMULSIONS - NOVEL POLYMERS
 9:15 STUDY OF THE BEHAVIOR OF MISCIBLE AND PARTIALLY MISCIBLE SYSTEMS USING SPINNING DROP TENSIOLOGY
 9:30 INTERACTIONS BETWEEN SULFUR CONTAINING AMINO ACIDS AND PERFLUORINATED FATTY ACIDS
 9:45 THEORETICAL COMPARISON OF PARATHION AND PARAOXON FOR THE DISCERNMENT OF ACETYLCHOLINESTERASE-PHOSPHOROTHIONATE/ORGANOPHOSPHATE INHIBITION IN MAMMALS
 10:00 Break
 10:15 INFLUENCE OF NON-TARGET WATER CONSTITUENTS ON THE VISIBLE-LIGHT MEDIATED TiO₂ PHOTOCATALYTIC OXIDATION OF CIPROFLOXACIN
 10:30 PHOTOCHEMICAL REACTION OF A YE PRECURSOR 4-CHLORO-1,2-PHENYLENEDIAMINE AND ITS ASSOCIATED MUTAGENIC EFFECTS
 10:45 OPTIMIZATION AND REACTION KINETICS OF THE PRODUCTION OF BIODIESEL FROM CASTOR OIL
 11:00 VIBRONIC INTENSITIES IN MOLECULAR SPECTRA, PART 1. THE THEORETICAL FOUNDATION

ECOLOGY AND EVOLUTIONARY BIOLOGY

Thursday, February 21

Thursday Morning

LOCATION: Chesnut

- 9:00 PHYLOGENY, CLASSIFICATION, AND IDENTIFICATION OF THE TROPICAL PLANT FAMILY SAMYDACEAE
 9:15 RESPONSES OF LOWER MISSISSIPPI RIVER PHYTOPLANKTON BIOMASS AND COMPOSITION DUE TO NUTRIENT ADDITIONS
 9:30 MODELING THE MEDIAN TIME TO EXTINCTION IN POPULATIONS WITH AND WITHOUT INBREEDING-ENVIRONMENT INTERACTIONS
 9:45 TRANSFORMATION OF ANTHRACENE BY IMMOBILIZED LACCASE FROM TRAMETES VERSICOLOR
 10:00 Break
 10:15 A METHOD OF PRODUCING RANDOM AMPLIFIED POLYMORPHIC DNA MARKERS IN IPOMOEA PES CAPRAE
 10:30 ESTABLISHMENT OF MICROSATELLITE BASED PCR ANALYSIS OF SPOTTED SALAMANDER
 10:45 BACTERIOPLANKTON ABUNDANCE AND PRODUCTION IN THE LOWER MISSISSIPPI RIVER
 11:00 POTENTIAL EFFECTS OF SILVER CARP (HYPOPHthalmichthys molitrix) ON THE PLANKTON COMMUNITY OF FOREST HOME CHUTE, WARREN COUNTY, MISSISSIPPI

11:15 Business Meeting



Thursday Evening

LOCATION: Grand Ballroom

6:00 **Dodgen Reception and Divisional Poster Sessions**
Please set up between 4:00p and 4:30p

- 1. THE EFFECTS OF LATE 20TH CENTURY LAND USE ON BIRD POPULATIONS AT PLYMOUTH BLUFF ENVIRONMENTAL CENTER, NORTHEASTERN MISSISSIPPI**
- 2. RESIDUAL TOXICITY OF SOIL, WATERS AND THE IDENTIFICATION OF ACCUMULATED COMPOUNDS ON THE MISSISSIPPI GULF COAST COMPARED TO THE TOXICITY OF THE NINTH WARD OF NEW ORLEANS FOLLOWING HURRICANE KATRINA**
- 3. STEROID HORMONES AND IMMUNE FUNCTION IN NORTHERN CARDINALS (*CARDINALIS CARDINALIS*): DO THE SEXES DIFFER AND DO HORMONES IMPACT IMMUNE FUNCTION?**

GEOLOGY AND GEOGRAPHY

Thursday, February 21

Thursday Morning

LOCATION: Juniper

- 9:00** **MINING IN STREAMS: POLICY QUESTIONS FOR MISSISSIPPI**
- 9:15** **CHARACTERISTICS OF THE AGGREGATE INDUSTRY AND MEMPHIS STONE AND GRAVEL COMPANY'S MODERN MINING CYCLE**
- 9:30** **APPLICATION OF SATELLITE IMAGERY AND FIELD SURVEY TO ESTIMATE AGRICULTURAL CHEMICAL USE**
- 9:45** **CATAHOULA SANDSTONE AND QUARTZITE, THE HISTORIC BUILDING STONE OF SOUTH-CENTRAL MISSISSIPPI**
- 10:00** **DELTA FLOW MODEL: THE NEXT GENERATION**
- 10:15** **Break**
- 10:30** **"DELTA"-BLUFF MARGIN ALLUVIAL FANS**
- 10:45** **A HEURISTIC MODEL OF TRIBUTARY AND TRUNK STREAM INTERACTIONS**
- 11:00** **MAGNETOSTRATIGRAPHY SUSCEPTIBILITY USED FOR HIGH RESOLUTION CORRELATION AMONG PALEOCENE/EOCENE BOUNDARY SEQUENCES IN EGYPT, SPAIN AND THE U.S.A.**

Thursday Afternoon

LOCATION: Juniper

- 1:30** **SOIL CHARACTERISTICS OF THE HELEN MOYERS BIOCULTURAL RESERVE, YUCATÁN, MEXICO**
- 1:45** **HYDROSTRATIGRAPHIC RELATIONSHIPS OF THE WILCOX AND CLAIBORNE GROUPS IN NORTHWESTERN MISSISSIPPI AND WESTERN TENNESSEE**
- 2:00** **SURFACE GEOLOGY OF THE MOSCOW 7.5-MINUTE QUADRANGLE, SOUTHWESTERN KEMPER COUNTY, MISSISSIPPI**
- 2:15** **UPPER LEAF RIVER BASIN BASEFLOW STUDY: A PRELIMINARY STUDY FOR SURFACE WATER/GROUNDWATER INTERACTIONS WITHIN THE PASCAGOULA BASIN**
- 2:30** **Break**
- 2:45** **BASELINE ASSESSMENT OF NUTRIENT LOADING AND SEDIMENT GEOCHEMISTRY OF TOWN CREEK, JACKSON, MS**
- 3:00** **MISSISSIPPI GEOLOGY OF NATIVE LITHIC MATERIALS**
- 3:15** **SHALLOW SEISMIC REFLECTION IMAGING OF THE PENITENTIARY FAULT AND ITS ASSOCIATION WITH THE COMMERCE GEOPHYSICAL LINEAMENT, TAMMS, SOUTHERN ILLINOIS**

**3:30 Division Meeting and Chair Elections****Friday, February 22****Friday Afternoon****LOCATION: Chesnut****2:45 Joint Division Session with History and Philosophy of Science****A HISTORY OF THE MISSISSIPPI GEM AND MINERAL SOCIETY: A HALF CENTURY OF FOSTERING INTEREST IN EARTH SCIENCE**

HEALTH SCIENCES

Thursday, February 21**Thursday Morning****LOCATION: Grand Ballroom****Session 1: Biomedical, Dental, Microbiology, Epidemiology, and Animal Model Research****8:00 A STUDY OF GLYCOGEN CLEAVAGE BY HEPATIC GLYCOGEN PHOSPHORYLASE, PART 1. THE CHALLENGE IN THE DETERMINATION OF MECHANISMS****8:15 METHODOLOGY TO IMPROVE HEALTH DATA GEOCODING RESULTS THROUGH INCREASED ACCURACY OF DATA****8:30 FIRE ANT VENOM ALKALOIDS (SOLENOPOINS) INDUCE APOPTOSIS IN HUMAN CELLS.****8:45 EFFECTS OF PERIAPICAL TOOTH ABSCESES ON THE UTERUS OF PREGNANT RATS****9:00 INTYRAOSSEOUS DENTAL IMPLANTS: THE RELATIONSHIP BETWEEN MORPHOLOGIC CONFIGURATION AND BIOLOGIC RESPONSE; THOUGHTS FOR CONSIDERATION****9:15 BEHAVIORAL RISK FACTORS ASSOCIATED WITH ADULT OBSEITY IN TWO EXTREME STATES; COLORADO AND MISSISSIPPI****9:30 CHARACTERIZATION OF PROTEASE PRODUCTION IN A PSEUDOMONAS AERUGINOSA MUTANT****9:45 Break****10:00 THE AVIAN VESTIBULAR SYSTEM: FUNCTIONAL AND ANATOMICAL RECOVERY AFTER OTOTOXIC DAMAGE****10:15 METHODOLOGY TO ESTIMATE POLLUTANTS USING NEAR REAL-TIME AIR QUALITY AND SATELLITE DATA FOR A SURVEILLANCE SYSTEM****Session II: Cell Line and Cell Studies****10:30 IN-VITRO CYTOTOXIC AND GENOTOXIC EFFECT OF ARSENIC TRIOXIDE ON JURKAT T-CELLS****10:45 THE EFFECTS OF LPS AND TNF ALPHA ON MACROPHAGE CELLULAR PHOSPHOLIPIDS AND CYTOKINE PRODUCTION****11:00 N-ACETYL-L-CYSTEINE (NAC) INHIBITS OXIDATIVE STRESS AND GENOTOXICITY IN LEAD NITRATE-TREATED HEPG2 CELLS.****11:15 DOES HYPOXIA INDUCE INFLAMMATORY CYTOKINES IN PLACENTAL CELLS?****11:30 ESTRADIOL ENHANCES CELLULAR PROLIFERATION IN HUMAN JURKAT T-CELLS AND HUMAN LEUKEMIA (HL-60) CELLS.****Thursday Afternoon****LOCATION: Grand Ballroom****2:00-4:00 Session III: Poster Session I
(Poster Preparation 1:15-1:45)****1. HIGH DOSES OF 17 β -ESTRADIOL-INDUCED TOXICITY AND OXIDATIVE STRESS JURKAT T-CELLS**

2. THE IMPACT OF MICA FUNGIN ON THE CELLULAR INTEGRITY OF OSTEOBLAST CELLS IN VITRO: A PRELIMINARY STUDY
3. EVALUATION OF MG-63 CELLS AS A MODEL TO STUDY OSTEONECROSIS IN VITRO FOLLOWING EXPOSURE TO ETHANOL AND CORTISOL
4. THE EFFECTS OF ALENDRONATE ON MACROPHAGE CELL FUNCTION
5. THE EFFECTS OF ANGIOTENSIN II ON MRC-5 CELLULAR VIABILITY AND FUNCTION
6. AGE DEPENDENT CHANGES IN PURKINJE CELLS VACUOLES IN SCA1
7. CELLULAR EFFECTS OF PLATELET RICH PLASMA: INTERLEUKIN-1 RELEASE FROM PRP TREATED MACROPHAGES
8. BIOCHEMICAL CHANGES TO FIBROBLAST CELLS SUBJECTED TO IONIZING RADIATION
9. THE EFFECTS OF CORTISOL ON LPS STIMULATED MACROPHAGES
10. HEALTH IMPACT OF DIETARY EDIBLE FAT CONSUMPTION: THE ROLE OF HEALTHY/ UN-HEALTHY LIPIDS IN THE MEDIATION OF CELLULAR VIABILITY IN THE A549 CELL LINE
11. THE EFFECTS OF NATURAL PRODUCTS EXTRACTED FROM MUSHROOM ON THE VIABILITY AND FUNCTION OF MACROPHAGE CELLS
12. THE EFFECTS OF NEUROTRANSMITTERS ON THE PROLIFERATION AND VIABILITY OF MRC-5 FIBROBLAST AND MACROPHAGE CELL LINES.
13. ASSESSING THE ROLE OF RETINOIC ACID AND CITRAL IN MODULATING THE VIABILITY OF THE A549 CELL LINE
14. INVESTIGATING THE ROLE OF VARIOUS DIETARY LIPIDS IN THE MODULATION OF CELL SURVIVAL IN THE A549 CELL LINE
15. THE ROLE OF EPIGALLOCATECHIN GALLATE (EGCG) IN ATTENUATING THE TOXIC SIDE EFFECT SEEN FOLLOWING CYCLOSPORINE ADMINISTRATION
16. ANALYSIS OF PITUITARY STRUCTURE AND FUNCTION WITH LOSS OF CHD7 EXPRESSION DURING MOUSE DEVELOPMENT
17. EFFECTS OF RESVERATROL ON TRIPLE NEGATIVE (ER-, PR-, HER2-) BREAST CANCER CELLS
18. RETROSPECTIVE ANALYSIS OF PROSTATE, BREAST, AND LUNG CANCER TRIALS FOR FACTORS IMPACTING PATIENTS' ACCRUAL
19. THE EFFECTS OF 5-FU AND EGCG ON PANC-1 CELLS
20. THE EFFECTS OF A SELECTIVE COX-2 INHIBITOR ON PANC-1 CELLULAR FUNCTION
21. CHEMOTHERAPEUTIC POTENTIAL OF WATER-SOLUBLE EXTRACTS OF NATURAL COMPOUNDS
22. A COMPARISON OF TOTAL, FREE, AND %FREE PSA FOR THE SERODIAGNOSIS OF PROSTATE CANCER IN AFRICAN-AMERICAN AND CAUCASIAN-AMERICAN MALES
23. DISTRIBUTION AND LEVELS OF GFAP IN THE ORBITOFRONTAL CORTEX IN ALCOHOLIC AND DEPRESSED SUBJECTS
24. CARDIOVASCULAR RESPONSES FOLLOWING DIFFERENT TYPE OF BREATHING EXERCISES
25. PULSE PRESSURE AS AN INDEPENDENT RISK FACTOR FOR INCIDENT CORONARY HEART DISEASE: THE ATHEROSCLEROSIS RISK IN COMMUNITIES (ARIC) STUDY

Friday, February 22

Friday Morning

LOCATION: Grand Ballroom

8:30-10:30 Session I: Health Fair (Blood pressure monitoring, glucose testing, body mass index, etc.)

10:30-11:45a & 1:45-2:30p Session II: Poster Session II

1. MECHANISM OF TRICHOMONAS RESISTANCE
2. THE EFFECT OF ARABINOGALACTAN AND ELLAGIC ACID INJECTED INDIVIDUALLY AND SYNERGISTICALLY IN TRYPANOSOMA LEWISI INFECTED RATS
3. MORPHOLOGICAL EVALUATION OF EPIGALLOCATECHIN-3-GALLATE, THYMOQUINONE, AND TANNIC ACID ON LNCAP CELLS



4. IN VITRO ANALYSIS OF TOBRAMYCIN RELEASE FROM BETA TRICALCIUM PHOSPHATE DRUG DELIVERY SYSTEM
5. EVALUATION OF GROWTH FACTORS FOR TREATMENT OF DEGENERATIVE DISC DISEASE USING THE ADULT MALE RAT AS A MODEL
6. EFFECT OF 3, 4- METHYLENEDIOXYMETHAMPHETAMINE (MDMA) ON THE EXTRACELLULAR CONCENTRATION OF GLUCOSE IN THE RAT BRAIN
7. CONTRIBUTION OF PLY, PSPA, AND PSPC TO PNEUMOCOCCAL VIRULENCE
8. SYNTHESIS, CHARACTERIZATION, AND STRUCTURAL STUDIES OF BENZOPHENONE THIOSEMICARBAZONE AND ITS DERIVATIVES WITH DICHLORODIPHENYL TIN(IV)
9. DOES HYPOXIA INDUCE INFLAMMATORY CYTOKINES?
10. DEVELOPMENT OF METHODOLOGY TO EVALUATE ANTIOXIDANT PROPERTIES OF WATER-SOLUBLE EXTRACTS OF NATURAL COMPOUNDS
11. THE EFFECT OF ESTROGEN WITHDRAWAL ON THE BODY AND VITAL ORGANS OF ADULT FEMALE RATS.
12. KNOWLEDGE VS CHOICE ASSESSMENT IN PURSUING CAREERS IN HEALTH RELATED PROFESSIONS
13. AN EVALUATION OF GROWTH AND VIABILITY RESPONSES OF THE A549 CELL LINE UPON EXPOSURE TO ORGANIC INHIBITORS OF GLYCOLYSIS.
14. EVALUATION OF ATP AND SEROTONIN RELEASE BY ACTIVATED HUMAN PLATELETS
15. THE EFFECT OF EGCG ON RAW264.7 CELLS CHALLENGED WITH BACTERIA AND LPS
16. THE EFFECTS OF CORTISOL AND THYMOQUINONE ON PANCREATIC CELL VIABILITY AND FUNCTION

Friday Afternoon

LOCATION: Grand Ballroom

2:30-3:30 DIVISIONAL BUSINESS MEETING

HISTORY AND PHILOSOPHY OF SCIENCE

Friday, February 22

Friday Morning

LOCATION: Chesnut

- 8:30 IS SCIENCE FREE?**
- 9:00 INDUCTION AND ABDUCTION AS MODELS OF SCIENTIFIC EXPLANATION: CAN THE INFERENCE TO THE BEST EXPLANATION SAVE SCIENCE FROM UNCERTAINTY?**
- 9:30 Break**
- 9:45 A CRITICAL ASSESSMENT OF THE RESURRECTION OF LOGICAL PROBABILITY**
- 10:15 METHODOLOGICAL NATURALISM AND ITS CRITICS**
- 10:45 Break**
- 11:00 BIOLOGICAL INDIVIDUALS: A CRITIQUE OF PLURALISTIC AND MONISTIC APPROACHES**

Friday Afternoon

LOCATION: Chesnut

- 1:30 IN THE MIDST OF A WORLD-RIDDLE: THE LEGACY OF ERNST HAECKEL'S BIOPOLITICS**
- 2:00 HISTORY OF THE HERBARIUM OF THE UNIVERSITY OF SOUTHERN MISSISSIPPI**
- 2:30 Break**
- 2:45 A HISTORY OF THE MISSISSIPPI GEM AND MINERAL SOCIETY: A HALF CENTURY OF FOSTERING INTEREST IN EARTH SCIENCE (Joint meeting with Geology and Geography)**
- 3:15 Division Business Meeting and Awards**



MARINE AND ATMOSPHERIC SCIENCES

Friday, February 22

Friday Morning

LOCATION: Elm

9:00 Divisional Meeting

9:30 COMPARISON OF ENVIRONMENTAL PARAMETERS OF THE BAY OF ST. LOUIS, MISSISSIPPI, BEFORE AND AFTER HURRICANE KATRINA

9:50 INFLUENCE OF MONSOON WINDS ON THE MAKASSAR STRAIT THROUGHFLOW

10:10 ATMOSPHERIC CONDITIONS FOR FOG AND DEW EVENTS IN MISSISSIPPI

10:45-11:45 Poster Session

LOCATION: Grand Ballroom

- 1. COPRECIPITATION OF TRACE ELEMENTS BY YTTERBIUM HYDROXIDE FROM FISH OTOLITHS**
- 2. ASSESSMENT OF HEAVY METAL PROFILES IN EAST BILOXI AFTER HURRICANE KATRINA**
- 3. FISH DIVERSITY AND ABUNDANCE IN FRESHWATER AREAS WITHIN THE GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE/GRAND BAY NATIONAL WILDLIFE REFUGE**
- 4. ACCUMULATION PROFILE OF CADMIUM, LEAD, AND MERCURY IN OTOLITH ORGANS OF GOLDFISH**
- 5. ANTARCTIC FIRN ANNUAL EMISSIVITY TRENDS AT THE SKI HI AUTOMATIC WEATHER STATION FROM IN-SITU AND SSM/I BRIGHTNESS TEMPERATURES**
- 6. MARINE FUNGI AS INDICATORS OF HUMAN DISTURBANCE ON COASTAL ENVIRONMENTS**
- 7. SIMULATING ON-SHORE SALINE TRANSPORT DURING HURRICANE KATRINA**
- 8. CONSEQUENCES OF WIND PROFILE ASSUMPTIONS IN DETERMINATION OF WIND CHILL**
- 9. REANALYSIS OF THE 1945 HOMESTEAD HURRICANE**
- 10. GENE EXPRESSION PATTERNS IN PELAGIC MARINE BACTERIA: SHORT-TERM COMMUNITY RESPONSE TO ENVIRONMENTAL STIMULI**

Friday Afternoon

LOCATION: Elm

1:30 A STUDY OF OCEAN-ATMOSPHERIC INTERACTIONS AND HURRICANE PREDICTIVE INDEX (HPI) ASSOCIATED WITH LAND FALLING HURRICANE CHARLEY

1:50 MAPPING THE SEAFLOOR USING A MULTIBEAM ECHOSOUNDER IN AN AUTONOMOUS UNDERSEA VEHICLE (AUV)

2:10 VEGETATION INDICES FOR REMOTE SENSING OF CANOPY FORMING SUBMERGED VEGETATION

2:30 VISUALIZATION OF SHORT-TERM TEMPORAL CHANGES IN SEAGRASS ABUNDANCE AND DISTRIBUTION AT GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE

2:50 Break

3:00 SEED GERMINATION STUDY USING THE COASTAL SUBMERGED AQUATIC VEGETATION, RUPPIA MARITIMA

3:20 SEASONAL AND SPATIAL VARIATIONS IN MACROBENTHIC INVERTEBRATES IN THREE MISSISSIPPI GULF COAST BAYOUS

3:40 PHYTOPLANKTON PIGMENT DISTRIBUTIONS IN OCEAN MARGINS OF THE NORTHERN GULF OF MEXICO AND WESTERN NORTH ATLANTIC DURING SUMMER 2007

4:00 HIGH RESOLUTION MICROMILL SAMPLING FOR ANALYSIS OF FISH OTOLITHS BY ICP-MS



MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

Thursday, February 21

Thursday Morning**LOCATION: Dogwood**

- 9:00 IMPLEMENTING VARIOUS CHECKLIST IN ELECTRONIC FORM USING XML AND PYTHON PROGRAMMING LANGUAGES**
- 9:30 IMPLEMENTING E-MAIL ALERTS TO THE GCC TEMPERATURE MONITORING PROGRAM**
- 10:00 EMWASTE DATABASE TRANSFER AND FUNCTIONALITY ASSESSMENT**
- 10:30 A DEM CONVERSION TOOL**
- 11:00 RESEARCH ON HYBRID ARIMA AND SUPPORT VECTOR MACHINE MODEL IN FORECASTING ENVIRONMENTAL SUSTAINABILITY**
- 11:30 CREATING AN INTER-PLATFORM COMMUNICATION BETWEEN LEGO'S RCX AND NXT AND THE IR TOWER FOR A NETWORKING SYSTEM.**

Thursday Afternoon**LOCATION: Dogwood**

- 1:30 CHARACTERIZING ELECTROMAGNETIC DATA SPECTRA USING TRANSFORMS AND WAVELETS**
- 2:00 A SOFTWARE TOOL DEVELOPED FOR PATTERN RECOGNITION AND DATA MINING APPLICATIONS**
- 2:30 A COMPLETE DATA ANALYSIS USING MINITAB STATISTICAL SOFTWARE**

Thursday Evening**LOCATION: Grand Ballroom**

- 6:00 Dodgen Reception and Poster Session**
(Please set up between 4:00 and 4:30p)

- 1. PARALLEL COMPRESSION ON THE CELL BROADBAND ENGINE WITH CZIP**
- 2. A MULTI-RESOLUTION MODEL FOR RENDERING TERRAIN DATA USING JAVA AND OPENGL**
- 3. PERFORMANCE ANALYSIS OF OPENMP PROGRAMMING**
- 4. ASSESSMENT OF A NON-LINEAR OPTIMIZATION ALGORITHM FOR IMAGERY CLASSIFICATION**
- 5. AN EXPERIMENT WITH CONSTANT MIGRATION OF VIRTUAL MACHINES**
- 6. GAME PROGRAMING UNDER MICROSOFT XNA GAME STUDIO EXPRESS**
- 7. A NEW METRIC FOR DISTRIBUTED ALGORITHMS: ACCUMULATED FAILURE LOCALITY**
- 8. MATHEMATICA AS A SUPPLEMENT FOR TEACHING BEGINNING CALCULUS AT MISSISSIPPI VALLEY STATE UNIVERSITY**

Friday, February 22

Friday Morning**LOCATION: Dogwood**

- 8:00-9:00 Poster Session: The Math/CIS/Stats posters from the Thursday evening poster session will be displayed again this morning in the Grand Ballroom**

Oral Presentations

- 9:00 AN ARRURATE IMAGE MOSAICING APPROACH USING AFFINE INVARIANT CORNERS**
- 9:30 IMPLEMENTATION OF CHINESE SLIDING BLOCK PUZZLE USING BALANCED BINARY SEARCH TREE**



- 10:00** Toward Automatic Parallelization of Spatial Computation for Computing Clusters
10:30 SIMULATION-BASED ANALYSIS OF THE BANDWIDTH USAGE AND NUMBER OF HOPS PER RECEIVER FOR MOBILE AD HOC NETWORK MULTICAST ROUTING PROTOCOLS
11:00 Presentation of awards for Best Student and Faculty Oral Presentations, Best Posters, and best HPC presentation

11:30-12:30 All Math/CS/Stats division participants are welcome to attend the following open session:

MISSISSIPPI CENTER FOR SUPERCOMPUTING RESEARCH (MCSR) USER ADVISORY GROUP MEETING, POSTER SESSION, AND SPECIAL SUBSESSION ON SUPERCOMPUTING

PHYSICS AND ENGINEERING

Thursday, February 21

Thursday Morning

LOCATION: Amphitheater

- 8:30** MICRO-MANUFACTURING
8:45 THE BIGGEST MYSTERY OF THE UNIVERSE - DARK ENERGY.
9:00 Understanding Mysterious Dark Energy.
9:15 FORMATION OF BLACK HOLES.
9:30 DETECTION OF BLACK HOLES
9:45 Break
10:00 METHODOLOGY IN THE CONCENTRATION AND TEMPERATURE DEPENDENT SEPARATION OF COMPLEMENTARY AND NON-COMPLEMENTARY DNA TO ENABLE LIQUID CRYSTAL OBSERVATION AND EXTRACTION
10:15 MEASURING ACCELERATIONS OF HORIZONTALLY LAUNCHED SMALL SPHERICAL OBJECTS WITH A HIGH-SPEED CAMERA
10:30 THE CURRENT DENSITY IN A MIRROR
10:45 VORTICES IN THE OPTICAL NEAR FIELD OF AN ELECTRIC DIPOLE
11:00 DESIGN AND ANALYSIS OF HOMOGENIZED HIGH IMPEDANCE SURFACES

Thursday Afternoon

LOCATION: Amphitheater

- 1:30** ANALYTICAL MODELING OF HIGH IMPEDANCE SURFACES
1:45 CHARACTERIZATION OF SKIN MIMICKING GELS FOR MICS (402-405 MHz) AND ISM (2.4 – 2.48 GHz) BANDS
2:00 PLANE WAVE DIFFRACTION BY MULTIPLE SLOTTED COAXIAL LINE
2:15 LIGHT PROPAGATION NEAR A MIRROR
2:30 A HILS SYSTEM FOR UAV ATTITUDE DATA SYNCHRONIZATION
2:45 Break
3:00 INTRODUCTION OF SPECIAL WASTE MANAGEMENT IN USA
3:15 GAS TRANSPORT CAPABILITIES OF VORTEX RINGS
3:30 INVESTIGATION OF THE ELECTROMECHANICAL PROPERTIES OF ASTHMA MEDICINAL DRUGS USING LASER DOPPLER VELOCIMETRY
3:45 Divisional Business Meeting

Thursday Evening



LOCATION: Grand Ballroom

6:00 Dodgen Reception and Poster Session
(Please set up between 4:00 and 4:30p)

1. SYSTEMATIC CHARACTERIZATION OF A RUBIDIUM MAGNETO-OPTICAL TRAP
2. HYDROTHERMAL SYNTHESIS OF V₂O₅ NANOBELTS USING POLY(ETHYLENE)OXIDE AS A TEMPLATE

PSYCHOLOGY AND SOCIAL SCIENCES

Thursday, February 21

Thursday Afternoon

LOCATION: Holly

- 1:15 THE LETTER SPAN AND WORD SPAN TESTS OF SHORT TERM MEMORY
- 1:30 SHORT TERM MEMORY IN A PSYCHOMOTOR TASK
- 1:45 GENDER DIFFERENCES IN THE INFLUENCE OF PARENTAL AND TEACHER ACCEPTANCE ON STUDENT ACHIEVEMENT IN THE MISSISSIPPI DELTA
- 2:00 ROLE IDENTITY AND SERVICE-LEARNING
- 2:15 Break
- 2:30 PERCEIVED OBSTACLES TO MENTAL HEALTH TREATMENT FOR AFRICAN AMERICANS
- 2:45 THE DEMOGRAPHIC IMPACTS OF HURRICANE KATRINA ON THE MISSISSIPPI GULF COAST: AN ANALYSIS OF SEX AND AGE GROUPS BY ZIPCODE
- 3:00 EXTRAVERSION AND CELL PHONE USE
- 3:15 CONSERVATIVE POLITICAL VIEWPOINTS AND PERSONALITY
- 3:30 NARCISSISM AND PERSONALITY TRAITS

3:45 Division Business Meeting

Thursday Evening

LOCATION: Grand Ballroom

6:00 Dodgen Reception and Poster Session
(Please set up between 4:00 and 4:30p)

1. THE INFLUENCE OF GENDER ROLE ORIENTATION ON CHILDHOOD FRIENDSHIP PATTERNS
2. TO HEAR, OR NOT TO ADHERE: A FOLLOW-UP STUDY ON SISTERTALK ADHERE PARTICIPANTS
3. GENDER DIFFERENCES IN CHILDREN'S AGGRESSION AND POPULARITY PATTERNS
4. EFFECTS OF BILINGUALISM ON MEMORY ENHANCEMENT
5. PERCEIVED SOCIAL SUPPORT, MENTAL HEALTH AND WELL-BEING IN AFRICAN-AMERICAN NURSING HOME RESIDENTS
6. RACE AND ITS EFFECT IN SEEKING MENTAL HEALTH SERVICES
7. EFFECTIVENESS OF A BRIEF ANXIETY AND DEPRESSION QUESTIONNAIRE FOR COMMUNITY SCREENING
8. RELATIONSHIP BETWEEN SUBSTANCE ABUSE AND ANXIETY AND DEPRESSION AMONG CLINICALLY ADMITTED SAMPLE AND COLLEGE STUDENTS
9. RELATIONSHIP BETWEEN PSYCHOLOGICAL WELL-BEING AND INTERPERSONAL RELATIONSHIP AMONG COLLEGE STUDENTS
10. EFFECTS OF PHYSICAL ACTIVITY ON STRESS AMONG AFRICAN AMERICAN COLLEGE STUDENTS



- 11. RELATIONSHIP BETWEEN ROAD RAGE AND ANGER AMONG AFRICAN AMERICAN COLLEGE STUDENTS
- 12. EFFECTS OF PARENTAL INVOLVEMENT, SUPPORT, AND WARMTH ON STUDENTS' SELF-ESTEEM
- 13. RACIAL DIFFERENCES IN PHYSICAL ACTIVITY AND DIETARY HABITS AMONG OVERWEIGHT AND OBESE COLLEGE STUDENTS
- 14. REFINED ASSESSMENT OF MALE SEXUAL BEHAVIOR IN RATS AFTER EARLY LIFE EXPOSURE TO SELECTIVE SEROTONIN REUPTAKE INHIBITOR ANTIDEPRESSANTS (SSRIS)
- 15. THE EFFECTS OF ROMANTIC RELATIONSHIPS ON BODY IMAGE AND SELF-ESTEEM AMONG COLLEGE WOMEN

SCIENCE EDUCATION

Thursday, February 21

Thursday Morning

LOCATION: Ash

- 8:00 USE OF THE INTEGRATED SYSTEM APPROACH TO CONNECTING TECHNOLOGY OF THE 21ST CENTURY FOR INDUSTRIAL TECHNOLOGY CURRICULUM.
- 8:20 A VISUAL APPROACH TO REMINDING NON-TRADITIONAL STUDENTS ABOUT EXPONENTS
- 8:40 THE USE OF ASM "MICROBLIBRARY" RESOURCES IN TEACHING MICROBIOLOGY
- 9:00 ENHANCEMENT OF ATTITUDE IN COLLEGE BIOLOGY STUDENTS THROUGH INCREASED USE OF VISUAL INSTRUCTION
- 9:20 TECHNOLOGY ASSIMILATION IN SCIENCE CLASSROOM (TASC): A NEW STANDARD FOR ENHANCED STUDENT LEARNING
- 9:40 Break
- 10:00 ENHANCING WEBSITE ACCESSIBILITY OF DATA GENERATED BY THE CENTRAL GULF OF MEXICO OCEAN OBSERVATION SYSTEM
- 10:20 The Center for Ocean Sciences Education Excellence: Central Gulf of Mexico: Catalyzing Relationships Among Scientists and Teachers to Enrich Classroom Ocean Sciences Learning
- 10:40 CREATING A STATIC SHELL EXHIBIT FOR PATRONS OF THE J. L. SCOTT MARINE EDUCATION CENTER THROUGH THE CLASSIFICATION AND CATALOGING OF SPECIMENS
- 11:00 SAFETY IN THE CHEMISTRY LAB: AN OUNCE OF CAREFUL PLANNING IS WORTH A POUND OF RUSHING INTO CHAOS
- 11:20 CREATING A SAFETY VIDEO FOR MICROBIOLOGY
- 11:40 Business Meeting

Thursday Afternoon

LOCATION: Ash

- 1:20 TRANSFORMATION OF SCIENCE RESOURCES THROUGH TECHNOLOGY
- 1:40 THE DEVELOPMENT OF A HUMAN BODY LEARNING CENTER FOR THIRD AND FOURTH GRADE GIFTED STUDENTS
- 2:00 THE EFFICACY OF ELECTRONIC TECHNOLOGIES AND THEIR THERAPEUTIC APPLICATIONS FOR AMPUTEES
- 2:20 Break
- 2:40 THE EFFECTS OF HOMEOPATHIC REMEDIES ON THE METABOLISM OF GLUCOSE IN *Gryllus assimilis* AND ITS IMPLICATIONS TO THE TREATMENT OF HUMAN DIABETES
- 3:00 RURAL BIOMEDICAL INITIATIVE: TRANSFORMING RURAL STUDENTS INTO SCIENTIFIC SCHOLARS



- 3:20 CURRENT SCIENCE NEWS AND EPIDEMIOLOGICAL CASE STUDIES TO INSPIRE STUDENT SUCCESS
- 3:40 MARINE SCIENCES CAREERS EXPOSITION

Thursday Evening

LOCATION: Grand Ballroom

- 6:00 Dodgen Reception and Poster Session
(Please set up between 4:00 and 4:30p)

1. A SURVEY OF THE NATURAL AND BUILT ENVIRONMENT OF THE GULF COAST RESEARCH LABORATORY
2. FIRST STEPS IN CREATING A SEARCHABLE DIGITAL DATABASE FOR CURRENTS, THE JOURNAL OF MARINE EDUCATION
3. EDUCATIONAL CURRICULUM FOR THE BIRD EXHIBIT
4. SCIENCE BEYOND THE BASICS: AN EDUCATIONAL PROGRAM
5. "YOUR BACKYARD" PROJECT ENGAGES COLLEGE STUDENTS IN ONLINE CLASS
6. SUPERHYDROPHOBIC MATERIAL MIMICS LOTUS LEAVES
7. DEVELOPING AND IMPLEMENTING SCIENCE LESSONS FOR A FOURTH GRADE GIFTED CLASS
8. USING TRIANGULAR INQUIRY LEARNING TO INCREASE TEST SCORES IN THE MISSISSIPPI DELTA
9. THE INFLUENCE OF STUDY HABITS ON THE ACADEMIC PERFORMANCE OF BIOLOGY UNDERGRADUATES

ZOOLOGY AND ENTOMOLOGY

Thursday, February 21

Thursday Morning

LOCATION: Elm

- 9:00 DISTRIBUTION OF BROWN RECLUSE SPIDERS IN MISSISSIPPI
- 9:20 WATER QUALITY STUDIES OF NWORIE RIVER IN OWERRI, IMO STATE, NIGERIA
- 9:40 FAUJASIID ECHINOIDS IN THE UPPER CRETACEOUS OF NORTH AMERICA
- 10:00 THE BENEFITS OF PROPHYLACTIC LOCAL ANESTHETIC IN ADDITION TO GENERAL ANESTHESIA
- 10:20 ASSESSING ENDOTHELIAL FUNCTION BETWEEN MEN AND WOMEN DURING SUPINE REST
- 10:40 FOSSIL GONIASTERID SEA STARS IN THE SOUTHEAST
- 11:00 TEACHERS AS FIELD SCIENTISTS: DOES THEIR EXPERIENCE MAKE A DIFFERENCE TO THEIR STUDENTS?
- 11:20 Divisional Meeting

Thursday Evening

LOCATION: Grand Ballroom

- 6:00 Dodgen Reception and Poster Session
(Please set up between 4:00 and 4:30p)

EAVESDROPPING ON COLONIES OF THE BLACK IMPORTED FIRE ANT, *SOLENOPSIS RICHTERI* FOREL

AGRICULTURE AND PLANT SCIENCE

Chair: Gregorio B. Begonia, Jackson State University
Vice-chair: Md. S. Zaman, Alcorn State University

THURSDAY AFTERNOON

Grand Ballroom

6:00 Dodgen Reception and Divisional Poster Sessions
Please set up between 4:00p and 4:30p

P1.01

CHELATE-INDUCED CHANGES IN METAL SOLUBILITY AFFECT THE PHYTOEXTRACTION EFFICACY OF CADMIUM BY WHEAT (TRITICUM AESTIVUM L.)

Jennifer Ntoni, Maria Begonia, Gregorio Begonia, Gloria Miller, Miriam Igboavodha

Jackson State University

We hypothesized that the addition of synthetic chelates can increase the propensity of metal uptake by the roots and subsequent translocation to the shoot, thereby improving the efficacy of phytoextraction as a cost-effective and environmentally friendly phytoremediation technique. This study was therefore conducted to determine whether the addition of synthetic chelates can further enhance the root uptake and subsequent translocation of cadmium [Cd] to the shoots. Wheat [*Triticum aestivum* L.] seeds were planted in plastic tubes containing top soil and peat spiked with various levels (0, 250, 500 mg Cd/kg dry soil) of cadmium nitrate. At 6, 8, and 10 weeks after emergence, aqueous solutions (0, 250, 500 mg/kg dry soil) of [ethylenedis(oxyethylenenitrilo)] tetraacetic acid [EGTA] alone or in combination with acetic acid [HAc] were applied to the root zone. Plants were harvested at 5 days after chelate addition. Results revealed that at each growth stage, wheat was slightly inhibited by treatment combinations of Cd and chelates as shown by reductions in root and shoot biomasses among Cd/chelate-treated plants. Enhancements in root Cd uptake were attributed to chelate amendments especially at the highest Cd treatments. Also, partitioning of the metal to the shoots was significantly enhanced with chelate addition. Overall, this study demonstrated that depending on the nature and type of Cd-contaminated soil being remediated, the efficacy of phytoextraction can depend on the mobility of the metal in the soil especially at a growth stage when the plants had attained maximum biomass.

P1.02

UPTAKE OF VARIOUS SOIL METALS BY INDIAN MUSTARD PLANTS GROWN IN CADMIUM CONTAMINATED SOIL

M. S. Zaman, Cherry Lockett

Alcorn State University

Studies in our laboratory and as reported by other investigators indicated that *Brassica juncea* (Indian Mustard) plants is a Cadmium (Cd) hyperaccumulator. In this study, bioaccumulation of various naturally occurring soil metals such as antimony (Sb), barium (Ba), cobalt (Co), copper (Cu), lead (Pb), molybdenum (Mo), nickel (Ni), rhodium (Rh) and terbium (Tb) were evaluated in the presence of varied levels of soil Cd concentrations. Plants were grown in the laboratory under color corrected lights in Memphis silt loam soil containing 0 ppm, 100 ppm, and 250 ppm Cd. Plants were harvested on day 30 of the experiment and dried plant samples were acid digested for tissue metal content analysis. Tissue metal content analysis was performed using an atomic absorption spectrophotometer. Results indicated that Cd uptake by plants was dose related and presence of Cd in the soil interfered with the uptake of other metals.

P1.03

SENSORY EVALUATION OF LETTUCE FERTILIZED WITH UNCOMPOSTED HUMAN HAIR

Mandar Patel, Juan L. Silva, Taejo Kim, Youkai Lu, Valtcho Zheljazkov

Mississippi State University

Sensory evaluation of lettuce fertilized with different treatments of uncomposted human hair byproducts was conducted on a 9-point hedonic scale. The treatments consisted of 0, 2.5, 5, and 10% of hair in osmocote, Osmocote (OSM), and water soluble fertilizer NPK 20-20-20 (NPK). The lettuce samples were evaluated for their color, crispness, visual defects, browning, bitterness, flavor and overall acceptability. There was no significant difference observed in crispness, bitterness and flavor for different treatments. Visual defects were higher ($P < 0.05$) in lettuce fertilized with 0 and 10% hair than those fertilized with NPK and osmocote. Browning observed in lettuce fertilized with 0, 5 and 10% hair was higher ($P < 0.05$) than in those fertilized with 2.5% hair, osmocote and NPK. Though color and overall acceptability were not different at a 0.05 significance level, samples with osmocote and NPK were slightly preferred over those treated with hair. It can be concluded that lettuce fertilized with osmocote and NPK was preferred on most of the sensory attributes over lettuce fertilized with uncomposted human hair

P1.04

BLOOD PHYSIOLOGY OF BLUE x CHANNEL HYBRID CATFISH AT THREE STOCKING DENSITIES DURING THE SUMMER MONTHS.

Ravin Byrd¹, Susan LaBarre², Douglas Minchew², Rachel Beecham¹

¹Mississippi Valley State University, ²Mississippi State University

Osmolarity, blood urea nitrogen, lactate, glucose, magnesium, calcium, chloride, sodium, potassium, oxygen saturation (SO₂), bicarbonate (HCO₃), partial pressure of oxygen (pO₂), partial pressure of carbon dioxide (pCO₂), and pH were measured in whole blood of 450 blue x channel hybrid catfish (*Ictalurus furcatus* x *I. punctatus*) from 30 one acre ponds at the National Warmwater Aquaculture Center, Stoneville, Mississippi. The fish were observed at three different stocking densities (4330, 6490, and 8650 fish per acre). The samples were collected from May 2007 to July 2007 to compare monthly values. The fish were collected with standard rods and reels using catfish bait. The blood values were higher for osmolarity, calcium, sodium, and pO₂ at the 4330 stocking density. The blood values were higher for lactate, glucose, magnesium, potassium SO₂, HCO₃, and pCO₂ at the 8650 stocking density, and higher for blood urea nitrogen and pH at the 6490 stocking density. Monthly mean values for lactate and pH showed a gradual increase for all three months at all three stocking densities. Values for osmolarity, calcium, sodium, SO₂, pO₂, and pCO₂ each showed a gradual decrease for all three months at all three stocking densities. Blood urea nitrogen, lactate, glucose, magnesium, chlorine, and HCO₃ each showed fluctuations with no major increasing or decreasing trend. These data were collected for further research on the blood and health of the hybrid catfish.

P1.05

EFFECT OF VARIOUS CHELATING AGENTS ON THE CHEMICAL UPTAKE BY LEMON GRASS

Oriana Bledsoe, Mudlagiri Goli, Manju Pande, William Mahone
Mississippi Valley State University

Chelating agents are often used for various applications ranging from medicinal to agricultural. The objective of this project was to see the efficacy of few chelating agents on nutrient uptake in lemon grass. We have studied the effect of citric acid, oxalic acid along with popular chelating agent like EDTA to investigate the uptake of chemicals like calcium nitrate and Iron (III) nitrate by the plant tissues. The analysis of the metal in plant tissues is done by using atomic absorption. The growth state of the plant is done by doing standard height measurements and still videos. The effect of growth dynamics and transport dynamics will be discussed. The citric and oxalic acids have greater effect on the growth of the plant

P1.06

DEVELOPMENT OF BIOSENSORS FOR DETECTING HAZARDOUS CHEMICALS

Natalie Omattage¹, O.P. Perera¹

¹The Mississippi School for Mathematics and Science, ²United States Department of Agriculture

Food additives contaminated with cyanuric acid and

melamine were responsible for recent deaths of many pets. Food imports are currently being screened using chromatographic and mass spectrometric methods (e.g. HPLC & GC-MS/MS). Although these methods are very sensitive, the instruments as well as the reagents are expensive and require highly trained personnel to operate. A recombinant M13 bacteriophage library was screened to identify peptide sequences with high affinity to cyanuric acid and melamine. Amino acid sequences STNFFYQTFAFH and RNSNHTAYGEPP were identified as the consensus sequences specific to cyanuric acid and melamine, respectively. Quartz crystal microbalance (QCM) based biosensors were developed using these peptides. Although cyanuric acid binding peptide demonstrated better mass accumulation rates than the melamine binding peptide, both peptides were capable of detecting their respective ligands at concentrations as low as 1.25 parts per billion (ppb) during the first five minutes of the experiment. Cyanuric acid and Melamine binding peptides coupled to a gold binding peptide sequence are currently being developed to increase the peptide density and sensitivity of the assay. Biosensors with synthetic peptides could decrease the detection limit to picomolar concentrations of the ligands. QCM instruments are portable, cost much less than GC-MS setups, and do not require highly trained personnel to operate. Therefore, QCM based biosensors may be used at ports and warehouses to more thoroughly screen food additives imported into the United States. In addition to food contaminants, the QCM based biosensors may also be employed to detect other harmful chemicals.

P1.07

TOWARDS A GINKGO BACTERIAL ARTIFICIAL CHROMOSOME (BAC) LIBRARY

Quiana Hunter², Erica McInnis⁴, Avis Simms³, Xueyan Shan¹, Daniel Peterson¹

¹Mississippi State University, ²Mississippi College, ³University of Arkansas for Medical Science, ⁴Tougaloo College

Ginkgo biloba is of considerable ornamental and medicinal value. Moreover, as the only extant species in its phylum and the only gymnosperm to possess dimorphic sex chromosomes, Ginkgo is an evolutionary curiosity. To facilitate genomic research on this species, we initiated construction of a Ginkgo large-insert bacterial artificial chromosome (BAC) library. In brief, isolated Ginkgo nuclei were embedded in agarose plugs and incubated for 48 hours at 50°C in a solution containing sarkosyl and proteinase K to remove nuclear membranes and digest chromatin proteins, respectively. Pieces of one of the resulting plugs were incubated in solutions containing different concentrations of HindIII. Using pulsed-field gel electrophoresis (PFGE), the enzyme concentration producing the largest number of restriction fragments between 100-300 kb (i.e., suitable for BAC cloning) was determined. Based on these optimization experiments, a large-scale partial HindIII digestion was performed using several plugs. After a PFGE-based size

selection to eliminate fragments below 100 kb, we isolated 100-300 kb fragments from agarose by electroelution. The restriction fragments were ligated into a BAC vector and used to transform *Escherichia coli* (DH10B) cells. Clones were plated using standard protocols. The ratio of white colonies (i.e., those containing inserts) to blue colonies (those without inserts) averaged 4.62. Analysis of inserts from white colonies suggests a mean insert size of 90-100 kb. With some additional optimization, the molecular tools and data generated in our research should permit construction of a large-scale Ginkgo BAC library.

P1.08

GROWTH RESPONSES, CADMIUM ACCUMULATION AND PHYTOCHELATIN LEVELS OF WHEAT (*Triticum aestivum* L.) EXPOSED TO CADMIUM-CONTAMINATED SOILS

Jennifer Ntoni, Maria Begonia, Gregorio Begonia, Gloria Miller, Miriam Igboavodha

Jackson State University

Phytochelatins [PCs] are small metal-binding peptides that are induced to accumulate in plants as a response to metal toxicity during phytoextraction. We hypothesized that regardless of the growth stage, the production of total soluble thiols and glutathione will increase in roots and shoots of wheat plants grown in cadmium- and chelate-amended soils. This study was therefore conducted to further elucidate the tolerance mechanism of a previously determined Cd hyperaccumulator plant species. Wheat (*Triticum aestivum* L. cv TAM-109) seeds were planted in plastic tubes containing topsoil and peat spiked with two levels (0, 500 mg Cd/ kg dry soil) of cadmium nitrate. At six, eight and ten weeks after emergence, aqueous solutions (0, 500 mg/kg dry soil) of [ethylene bis(oxyethylene nitrilo)] tetraacetic acid (EGTA) were applied to the root zone. Plants were harvested at 5 days after chelate addition. During each harvest period, PC analyses were also carried out indirectly by quantifying total acid-soluble thiols, total glutathione and oxidized glutathione. Results showed that despite slight inhibitions in root and shoot growth, wheat plants exhibited significant amounts of chelate-enhanced Cd accumulations as shown by the root and shoot Cd tissue concentrations. At each growth stage, the production of total soluble thiols increased significantly in roots but not evident in shoots of plants exposed to both Cd and chelate. This study demonstrated that increased production of PC in roots of Cd-exposed wheat partially explains the tolerance mechanism of this species against cadmium toxicity.

P1.09

GROWTH AND HEAVY METAL ACCUMULATION OF PLANTS GROWN IN STERILE AND NONSTERILE SOILS

Miriam Igboavodha, Tabitha Dasari, Gloria Miller, Jennifer Ntoni, Juanquina Thomas, Gregorio Begonia, Maria Begonia

Jackson State University

Microorganisms are ubiquitous in soils to which heavy metal (HM) accumulating plants are native, even in those soils containing high concentrations of HM. It is known that some microorganisms can mobilize some metals in soil and can enhance the accumulation of some HM in the roots of non-accumulator plants. The objective of this study was to evaluate the growth and HM accumulation and translocation of plants (tall fescue and/or wheat) grown in sterile and nonsterile soils. Plants were grown in the greenhouse for six weeks in sterile and nonsterile growth media that had been amended with different concentrations of lead (Pb) or cadmium (Cd). After harvest, the roots and shoots' dry biomass and HM concentrations were quantified. Our results revealed that the root and shoot dry biomass of both fescue and wheat plants grown in sterile soil were higher than those grown in nonsterile soil across all Pb and Cd concentrations. Cadmium concentrations in roots and shoots were higher in nonsterile soil amended with 500 ppm Cd than at 0 and 250 ppm Cd. Lead concentrations in root and shoot tissues were higher in Pb-amended nonsterile soil compared to the sterile soil. These results suggest that the native populations of microorganisms in the soil can enhance the HM accumulation in plants.

P1.10

DEGRADATION OF LIGNOCELLULOSE IN SOUTHERN PINE SAWDUST BY THE FUNGUS *TRICHODERMA REESEI*

Rose Kishinhi, Gloria Miller, Tabitha Dasari, Jennifer Ntoni, Tasetta Hicks, Miriam Igboavodha, Ken Lee, Huey-Min Hwang, Gregorio Begonia

Jackson State University

Lignocellulosic materials are the most abundant agricultural residues in the world. Biofuels such as ethanol can be produced by microbial fermentation of simple sugars derived from lignocellulose degradation. However, a major obstacle to the effective utilization of lignocellulose is the chemically unreactive nature of its polymeric components. Therefore, the polymeric components must first be hydrolyzed to simple sugars before conversion to ethanol. A potential cost-effective technology for hydrolyzing lignocellulose to sugar is the use of microorganisms such as white rot fungi. This experiment was carried out to evaluate the degradation of pure cellulose and Southern pine sawdust lignocellulose by the fungus *Trichoderma reesei* under aerobic and anaerobic conditions. Cellulose and autoclaved and acid-treated pine sawdust, were separately added to flasks containing liquid medium, inoculated with *T. reesei*, and grown for 3 weeks under aerobic and anaerobic conditions. Samples were analyzed periodically for glucose production as a measure of lignocellulose degradation. Our results revealed that a higher rate and extent of degradation occurred at day 13 under anaerobic than in aerobic condition. Cellulose and the acid-treated sawdust produced higher sugar concentration at day 15 than day 13 under aerobic condition. These results indicate that the

presence or absence of oxygen can differentially affect sugar production from the degradation of lignoculloses by *T. reesei*.

P1.11

SUGAR PRODUCTION FROM THE DECOMPOSITION OF LIGNOCELLULOSIC MATERIALS BY TRICHODERMA REESEI UNDER AEROBIC CONDITION

Rose Kishinhi, Gloria Miller, Jennifer Ntoni, Tabitha Dasari, Miriam Igboavodha, Ken Lee, Huey-Min Hwang, Gregorio Begonia, Maria Begonia

Jackson State University

Lignocellulose refers to the composite of the predominant polymers of vascular plant biomass. Biofuels such as ethanol can be produced by microbial fermentation of simple sugars from lignocellulosic materials. However, the polymeric components must first be hydrolyzed to sugars before conversion to ethanol. The most common method to hydrolyze lignocellulose is acid hydrolysis. Although acid hydrolysis has been found to give high sugar yield, it is corrosive and requires expensive alloys or non-metallic ceramic or carbon-brick lining. A potential cost-effective technology for hydrolyzing lignocellulose is the use of microorganisms such as white rot fungi. The objective of this study was to evaluate the decomposition capacity of the white rot fungus *T. reesei* on some lignocellulosic materials under laboratory conditions. Each autoclaved flask containing liquid medium and carbon source (Southern pine sawdust, Whatman # 1 filter paper, cellobiose or cellobiose plus lactose) was inoculated with *T. reesei* and shaken at 60 rpm for 7 days at room temperature. The decomposition product (glucose) from each flask was determined daily using dinitrosalicylic acid reagent. Results revealed that the highest rate of decomposition occurred at 168 hrs. of incubation in the medium amended with cellobiose alone and at 144 hrs. with cellobiose plus lactose. No or very slight degradation was observed from the original sawdust, sawdust (200 mesh) and filter paper.

P1.12

GROWTH RESPONSE OF WAUTERSIA METALLIDURANS TO HEAVY METAL AND CHELATE AMENDMENTS IN NUTRIENT BROTH

Maria Begonia, Krystle Easley, Nicholas Walker, Phatia Wells, Alicia Benjamin, Jennifer Ntoni, Gloria Miller, Miriam Igboavodha, Gregorio Begonia

Jackson State University

Lead (Pb) is one of heavy metals responsible for soil pollution. Reports have shown that long and short-term response to toxic metals is a large reduction in microbial activities. The objective of this study was to investigate the effects of Pb and EDTA on the growth of bacterium *Wautersia metallidurans* in a lead- and EDTA-amended nutrient broth medium (NBM). Flasks containing NBM, previously amended with different concentrations of Pb and EDTA, were inoculated with cells of *W. metallidurans* and grown in the shaker for 3 days at 35C. Broth

cultures were sampled periodically and analyzed for bacterial growth (absorbance and plate counts). Our results showed that growth of *W. metallidurans* increased with increasing incubation period across all metal concentrations. In the absence of Pb, growth was higher in the medium lacking EDTA than with EDTA indicating the lethal effect of EDTA to the bacterial cells when used alone. Plate counts were not significantly different at 10 and 40 ppm Pb but significantly different at 72 hrs. for 70 ppm. In the presence of EDTA, growth was generally higher in the NBM amended with 10, 40 and 70 ppm. Pb than in the medium lacking EDTA. These data indicate that EDTA can alleviate the toxic effect of Pb to the bacterial cells due to the formation of Pb-EDTA complex which is less toxic than a free protonated Pb.

P1.13

INVESTIGATION ON HIGH EFFICIENT DEGRADATION OF DYESTUFF USING LIGNIN PEROXIDASE PRODUCED BY PHANEROCHAETE CHRYSOSPORIUM

Peng Wang, Xiaoke Hu, Sean Cook, Huey-min Hwang

Jackson State University

The use of *Phanerochaete chrysosporium* and its enzyme lignin peroxidase (LiP) in the degradation of environmental pollutants such as textile dye is a hot topic in the field of environmental science and engineering. Compared with *P. chrysosporium*, degradation of environmental pollutants with LiP has some advantages, such as no necessity of adding nutrition, controlling temperature and adjusting pH. Moreover, the technique of immobilized enzyme could provide great opportunity for commercialization because of enzyme's reusability and stability with respect to environmental changes in pH and temperature. In this work, we have successfully cultured the *Phanerochaete chrysosporium* (ATCC 20696) and purified two kinds of lignin peroxidase by using FPLC. According to the data of sodium dodecyl sulfate polyacrilamide gel electrophoresis (SDS-PAGE), the molecular weight of the enzymes is 38 kDa and 40 kDa, respectively. The test of efficiency degradation was carried out through LiP degradation of azo fuchsine dye in aqueous solution under the existence of H₂O₂. Results showed that both enzymes could efficiently degrade the azo fuchsine, a model of dyestuff, at concentrations to 40 mg/L in 60 min.

P1.14

A COPPER SULFATE BASED PRODUCT AS AN ALTERNATIVE SANITIZER FOR FOOD PROCESSORS AND RETAILERS

Juan Silva, Taejo Kim, Mandar Patel, Bang-Yuan Chen, dan Neely, Steve Zavagli

Mississippi State University, Tasker Products, Inc., Fairlawn, NJ

FRIDAY MORNING

Ash

01.01

8:15 COMBINED EFFECTS OF HEAVY METALS AND CHELATES ON SOIL MICROBIAL POPULATION AND PHOSPHATASE ACTIVITY

Maria Begonia, Gregorio Begonia, Jennifer Ntoni, Gloria Miller
Jackson State University

Many synthetic chelates and their complexes with heavy metals are toxic and poorly degradable in soil environments. However, information on their effects on soil biological activities is nil. The objectives of this study were to quantify soil phosphatase activity and microbial populations of a heavy metal- and chelate-amended soil that had been previously cropped with wheat for six weeks. Results revealed that phosphatase activity generally decreased with increasing levels of soil-applied lead (Pb) and cadmium (Cd). This decrease in microbial activity was more pronounced in the presence of chelates. Bacteria were not inhibited by Pb since soils treated with the highest level had the highest bacterial population. Cd was extremely inhibitory to bacteria as exhibited by the significantly low bacterial numbers at all Cd treatments compared to the control. Fungi were more sensitive to Pb as shown by the significant decrease in fungal population especially at the highest Pb treatment. EDTA alleviated the toxic effect of the lowest Pb treatment on fungal population. Cd did not inhibit fungal proliferation since fungal population increased with increasing level of applied Cd. The resistance of soil bacteria and fungi to soil-applied Pb and Cd indicates that these microorganisms may have resistance mechanisms to deal with metal toxicity.

01.02

8:30 CAPRINE SERUM FRACTION IMMUNOMODULATORY EFFECTS ON LIVABILITY AND TISSUE CHARACTERISTICS IN COMMERCIAL TURKEYS INFECTED WITH PASTEURELLA MULTOCIDA

Radhakrishna Pulikanti¹, E. David Peebles¹, Kenneth Willeford¹, Robert Keirs¹, Chinling Wang¹, Charles Matyi¹, Michael Kidd¹, Sharon Whitmarsh¹, Patrick Gerard²
¹*Mississippi State University*, ²*Clemson University*

Previous research has shown that caprine serum fraction immunomodulator 2 (CSF-I2) reduced mortality in turkeys selected for heavy body weight (F-line) and in commercial layers infected with *Pasteurella multocida*. The potential of CSF-I2 to impart immunoresistance to commercial turkeys infected with *P. multocida* was investigated. At 6 weeks of age, 16 commercial turkeys (8 males and 8 females) were randomly placed in each of 5 replicate rooms, and were injected subcutaneously in the back of the neck with 1.0 mL of *P. multocida* (strain P-1059; 4,500 bacteria per bird). Twenty four hours prior to bacterial challenge,

4 birds of each sex per room were injected in the right breast muscle with 1.0 mL of CSF-I2 (20 mg/mL protein concentration) or with 1.0 mL of carrier solute containing no CSF-I2 (sham control). Body weight, mortality, days to death, relative liver weight, and plasma refractive index were monitored through Day 10 post-challenge. Bird sex influenced body weight, otherwise there were no significant sex or CSF-I2 treatment main effects or interactions for the parameters investigated. The CSF-I2 did not impart immunoresistance to commercial turkeys infected with *P. multocida* as it did for F-line turkeys and commercial layers.

01.03

8:45 MUSCADINE JUICES AND SEED EXTRACTS INHIBIT THE GROWTH OF ENTEROBACTER SAKAZAKII

Wei-Lien Weng, Taejo Kim, Juan L. Silva
Mississippi State University

High polyphenol content in muscadine grapes (*Vitis rotundifolia* Michx.) and their antioxidant capacity has been reported, but little research has been conducted to assess potential antimicrobial effects of muscadines. In current studies, red and white muscadine juices and extracts from muscadine seeds were investigated for their inhibition effects against *Enterobacter sakazakii*. This bacterium has been implicated in baby formula foodborne outbreaks, causing meningitis and enteritis, with high fatality rate. Total phenolic content and some major phenolic compounds and organic acids of the samples were also analyzed. Within two hours, *E. sakazakii* was reduced by 6 log CFU/mL and 1-3 log CFU/mL in 1:1 diluted red and white muscadine seed extracts, respectively. In 1:1 diluted red and white juices, 2-3 log CFU/mL and 1 log CFU/mL of *E. sakazakii* was eliminated within two hours. In general, regardless of juice or seed extract type, red muscadines demonstrated stronger inhibition ability, having higher tartaric acid and total phenolics (mainly ellagic acid) and more variety of polyphenolic compounds, than white muscadines. Also, there was a stronger inhibition effect and higher total phenolic contents in white seed extract than those in white juice, but there was no significant difference between red juice and seed extract. A synergistic antimicrobial effect between phenolic compounds and tartaric acid may be the result. Further studies on the antimicrobial effect of fractions of polyphenolic compounds and organic acids are needed.

01.04

9:00 WATER MOVEMENT IN WARM-SEASON TURFGRASS SYSTEMS: OBSERVATIONS AT THE PLOT SCALE Peter A.Y. Ampim*, Joseph H. Massey, Barry R. Stewart, Cade M. Smith, Mississippi State University, Mississippi State, MS 39762

Peter Ampim, Joseph Massey, Barry Stewart, Cade Smith
Mississippi State University

Chemicals lost from treated turf areas in urban environ-

ments are usually carried in water. Understanding water movement in turfgrass systems is therefore necessary for better prediction of chemical transport from turf into sensitive environments. This study investigated the impacts of Mississippi Pride bermudagrass and Meyer zoysiagrass, plot size and mowing height on water movement through turf. These treatments were arranged in a split plot design in randomized complete blocks. Plots were pre-wetted to runoff 48 h prior to rainfall simulation to homogenize soil moisture levels in them. Potassium bromide was applied to the plots at 15 kg/ha, 0.5 h prior to rainfall simulation to help track water movement. Runoff was generated from each plot by applying 3.8 cm/h rainfall using a rainfall simulator and runoff stage measured at approximately five minute intervals. Saturated hydraulic conductivity was significantly different for the two grass species ($p < 0.05$) but it did not impact the rising phase of the hydrograph, steady-state flow rate, or total runoff volume as these parameters were unaffected by turfgrass species. Plot size and/or mowing height significantly affected time to first runoff, average steady-state flow rate, and total runoff volume. Bromide runoff showed an exponential decline ($r \geq 0.992$) in both turfgrass species and across all plot scales but showed no significant treatment effects. Linear regression analyses between plot size and total runoff volume and bromide mass in runoff suggest that runoff from warm-season turf is scalable.

01.05

9:15 ANTIMICROBIAL ACTION OF WATER-SOLUBLE MUSCADINE (VITIS ROTUNDIFOLIA) SEED EXTRACT ON E.COLI O157:H7

Taejo Kim, Yean-Sung Jung, Youkai Lu, Wei-Lien Weng, Juan L. Silva

Mississippi State University

Water-soluble muscadine seed extract could be incorporated into juices to enhance their antimicrobial and antioxidant properties. The objective of this research was to investigate the antimicrobial activity of water-soluble muscadine seed extract against *Escherichia coli* O157:H7. Bronze and purple muscadine seed powders were extracted in water with (121C, 15 min) or without heating (25C for 60 min). A cocktail of three strains of *E.coli* O157:H7 was inoculated in the water-soluble muscadine seed extracts and in a tartaric acid solution, incubated at 37C and counted on nutrient agar every 30 min for 120 min. The seed extracts were analyzed for pH and total phenolics. High-performance liquid chromatography was performed to separate and determine individual phenolic compounds and organic acids. Heat treatment on bronze and red muscadine seed extracts increased their antimicrobial activity, total phenolics and individual phenolic compounds, compared to unheated samples. Regardless of heat treatment, purple muscadine seed extract had lower pH, higher tartaric acid and gallic acid. This purple heated extract achieved 5-log reduction on *E.coli* O157:H7 cocktail in 60 min. Water solutions (pH 2.1- 2.34) which had the equivalent

tartaric acid (2.7 - 10.7 mg/mL) of the different seed extracts, did not show the same level of antimicrobial activity as the seed extracts. These results suggest that the antimicrobial activity these extracts is not only acid dependent but also due to concentration and profile of phenolic compounds

01.06

9:30 RESPONSE OF FOLIAR FUNGICIDE APPLICATIONS TO WHEAT VARIETIES WHICH ARE RESISTANT, MODERATELY RESISTANT, AND VERY SUSCEPTIBLE TO LEAF RUST.

Gabriel Sciumbato

Delta R & E Center, Mississippi State University

Twelve foliar applied fungicides were evaluated for the control of wheat rust (*Puccinia graminis* L.) on three different wheat (*Triticum aestivum* L.) varieties. The rust resistant variety '26R22', the moderately susceptible variety 'Gore' and the very susceptible variety 'Jagalene' were evaluated. No rust symptoms were observed on the resistant variety. The moderately susceptible averaged about 40 percent and the very susceptible variety had 100 percent infection. There were no significant yield responses to foliar fungicide treatments in the resistant and moderately susceptible varieties. Foliar fungicide treatments containing pyraclostrobin and tebuconazole significantly increased yields an average of 20 bushels per acre. It is recommended that a producer select a variety which is resistant to moderately susceptible to avoid the additional costs of foliar fungicide applications.

9:45 Break

01.07

10:00 ASSESSMENT OF THE EFFICACY OF CHELATE-ASSISTED PHYTOEXTRACTION ON BIOMASS, LEAD-TISSUE CONTENT, AND TRANSLOCATION INDEX OF SESBANIA EXALTATA AT THREE STAGES OF DEVELOPMENT

Gloria Miller, Gregorio Begonia, Maria Begonia, Shareena Dasari, Miriam Igboavodha, Jennifer Ntoni, Katrina Dunn, Oscar Hundley, Juanquina Thomas

Jackson State University

The concept of using older more mature plants for phytoextraction of contaminated soil was examined. Plants were grown in the greenhouse at Jackson State University in a growth medium consisting of Delta top soil and peat (2:1) that had been amended with either 0, 1000 or 2000 mg Pb/kg soil. Plants were harvested 6, 8, and 10 weeks after emergence. Six days before each harvest ethylenediaminetetraacetic acid (EDTA) and/or acetic acid (HAc) were applied to the root zone as an aqueous solution in 1:1 ratio with the metal. After each harvest, we assessed root and shoot biomass, Pb-tissue content, and translocation index. Our results showed that root and shoot

biomass generally increased with increasing time across all treatments through week 8. By week 10, there was a general decrease in biomass for increasing levels of Pb in the soil. Lead content in root and shoot tissue was greater with increasing levels of soil-Pb content. Translocation index for weeks 6 and 8 was higher for 1000 ppm as compared to 2000 ppm, however, by week 10, translocation index was not only low, but there was not a significant difference between the treatments of 1000 ppm and 2000 ppm. These results suggest that EDTA can be effective in enhancing uptake and translocation of Pb by *Sesbania* and that 8 weeks after emergence is the optimum growth stage for phytoextraction by this species.

01.08

10:15 ULTRASONOGRAPHIC MONITORING OF LUTEAL AND FOLLICULAR DEVELOPMENT AFTER PGF2 α IN COMBINATION WITH GnRH OR GnRH AND hCG

Ricky Johnson², William Bennett³, Evelin Cuadra², Melissa Mason²

¹Mississippi State University, ²Alcorn State University,

³University of Mississippi Medical Center

A study was conducted to test the hypothesis that injecting GnRH concurrently with PGF2 α followed by an injection of hCG, would advance follicular development and ovulation time. Thirty-eight post pubertal Holstein heifers were randomly allotted by weight, age and body condition scores to one of three treatments. Heifers in a control group (n=13) received two injections of PGF2 α (25 mg, i.m.) given 10 days apart. The second group (n=13) received an injection of GnRH (200 μ g, i.m.) immediately after the first injection of PGF2 α . Heifers in the third group (n=12) received the same hormonal protocol as animals in the second group, with another injection of hCG (1500 IU, im) two days after the first PGF2 α and GnRH treatments. Blood samples for progesterone and estrogen determination were collected on days -7, 0 (first injection of PGF2 α), 3, 7, and 12. Heifers in the second group maintained the same level of progesterone on days 2 (3.8 ± 0.9) and 7 (3.8 ± 1.0); the same concentration for that hormone was observed on day 2 (3.8 ± 1.1) for heifers in group 3. However, heifers in group 3 had a significantly higher level of progesterone on day 7 (8.3 ± 1.6) when compared to progesterone levels on day 2 for that same group. Additionally, heifers in group 3 ovulated a day earlier (4.1 ± 0.5) than heifers in group 2 (5.0 ± 0.6) and the control group (5.3 ± 0.4).

01.09

10:30 ANTIMICROBIAL EFFECTS OF FRESH AND PROCESSED BRONZE MUSCADINE (VITIS ROTUNDIFOLIA MICHX.) JUICE ON SELECTED HUMAN PATHOGENS

Taejo Kim, Yean-Sung Jung, Juan L. Silva
Mississippi State University

Muscadine grape is well-adapted to the warm, humid conditions of the Southeast where other grape varieties do not prosper. Muscadine grapes contain a large variety of phenolic phytochemicals. Included in the latter are phenolic acids, capable of dissociating in the prokaryotic cell membrane at biological pH. The objective of this research was to investigate antimicrobial activity of fresh or processed white muscadine juice against *E.coli* O157:H7, *Salmonella* Typhimurium and *Listeria monocytogenes*. Antimicrobial effects of fresh white muscadine juice (FJ) and heat-processed WMJ (HJ) were evaluated against *E.coli* O157:H7 (Ec), *Salmonella* Typhimurium (ST), and *Listeria monocytogenes* (Lm) at different storage temperatures. At 25 C, more than six log CFU/mL of Ec, ST and Lm in FJ were eliminated in 24 h, while at 4C, 2.9, 4.2 and 7.6 log CFU/mL of Ec, ST and Lm in FJ were eliminated, after 48 h. Heat processing did not affect Brix, pH and titratable acidity before or after heating. Heated juice (HJ) totally inactivated 7.6 log CFU/mL of EC at 37 C in 90 min, while FJ only eliminated 2.77 CFU/mL. This is the first study to show antimicrobial activity of FJ and HJ, suggesting that consuming Muscadine juice may protect against foodborne pathogens, and blending HJ with other fresh fruit or/and vegetable juices may enhance safety and functionality in non-alcoholic beverages, as well as their processed-fruit products such as jam, jellies and can

01.10

10:45 LESS-THAN-FULL FLOOD MANAGEMENT FOR MISSISSIPPI RICE PRODUCTION

James E. Grisham Jr., Joseph Massey

Mississippi State University

In the future, competition for water is expected to increase along with increasing human population and economic activity. Climate variability may only intensify regional and/or local shortages of water. If these challenges can be addressed, Mississippi could become a center of sustainable rice production as it has a relatively low population density and generally abundant in-season rainfall compared to rice growing states California and Texas. A production-scale project was begun in Mississippi in 2003 to extend water-saving research initiated by the University of Arkansas into the Mississippi rice-growing region. This project compared water use, agronomics, and pest pressure between rice grown in continuously- and intermittently-flooded water management systems. Intermittent flooding increases water use efficiency when compared to conventional flood management; however, low adoption rates have given the project a new focus. This project is now seeking ways to help producers better manage lower flood depths in order to practice intermittent flooding while maintaining the minimum water requirements for the rice crop. During the summer of 2007, mechanical flood depth indicators were placed at four production sites in Mississippi to determine their usefulness to producers in maintaining less-than-full floods. The indicators gave a better knowledge of

flood depth, especially after canopy closure. This reduced management time and improved the producer's ability to maintain a less-than-full flood. The indicators may also help producers with problem fields having high spots, sandy zones, and/or excessive slope.

01.11

11:00 COMPARISON OF ATTACHMENT STRENGTH OF LISTERIA MONOCYTOGENES AND ITS INTERNALIN NEGATIVE MUTANTS

Bang-Yuan Chen, Juan L. Silva, Yean-Sung Jung, Taejo Kim
Mississippi State University

Attached cells of *Listeria monocytogenes* on food contact surface pose potential cross-contamination problems to the food industry. Internalin A (InlA) and B (InlB) have been identified as the major surface adhesion proteins of *Listeria monocytogenes*. Our research has also shown that attachment strength values differ significantly among various foodborne pathogens when cells were incubated for 2 h, and adhered to inert glass coverslips. Comparison of removal exponents indicated that *L. monocytogenes* had the greatest strength. Lower but similar strength values were observed for both *Salmonella* Typhimurium and *E. coli* O157:H7. The objectives of this study were to compare the attachment strength of several strains of *L. monocytogenes* EGD including three mutant strains, LM_EGD Δ inlA, EGD Δ inlB, and LM_EGD Δ inlAB. *Listeria monocytogenes* EGD (LM_EGD) and its internalin negative mutants (LM_EGD Δ inlA, EGD Δ inlB, and LM_EGD Δ inlAB) were used to compare attachment strength on surfaces of inert glass. Western blot analysis using monoclonal InlA and InlB antibodies revealed the absence of InlA in LM_EGD Δ inlA, InlB in EGD Δ inlB and InlA and B in LM_EGD Δ inlAB. LM_EGD exhibited the strongest attachment strength with LM_EGD Δ inlAB having the weakest. Both InlA and B expression were correlated with higher attachment strength in LM_EGD.

01.12

11:15 QUALITY OF LETTUCE FERTILIZED WITH UNCOMPOSTED HUMAN HAIR

Juan L. Silva, Mandar Patel, Jelena Stojanovic, Youkai Lu, Taejo Kim, Valtcho Zheljazkov
Mississippi State University

A container experiment was conducted to evaluate uncomposted hair byproduct as a nutrient source for lettuce (*Lactuca sativa* L.). The treatments consisted of 0, 2.5, 5, and 10% of hair in osmocote, Osmocote (OSM), and water soluble fertilizer NPK 20-20-20 (NPK). In general, leaf moisture was lower ($P < 0.05$) while soluble solids was higher ($P < 0.05$) for the hair-in-fertilizer samples than for the NPK and OSM samples. Total phenolics did not differ but tended to be higher for hair-in-fertilizer samples. There were some color differences between treatment samples. Lettuce brightness or light reflectance was

higher for no hair-fertilized samples whereas greenness ($-a'$) was lower. There were no differences in b' (yellowness) values and color saturation amongst samples. Total coliform and plate counts were similar for all samples, averaging 6.0 and 1.2 log CFU/g, respectively. It can be concluded that up to 10% hair in a fertilizer can be applied to growing lettuce without any significant adverse quality. Moreover, this could raise the level of phytochemicals in lettuce

11:30 Divisional Business Meeting

CELLULAR, MOLECULAR AND DEVELOPMENTAL BIOLOGY

Chair: Lauren Brandon, Mississippi University for Women

Vice-chair: Bernadette Connors, Millsaps College

THURSDAY MORNING

Oak

9:00 Opening Remarks

02.01

9:10 ACTIVITY ASSAY OF A COTTON FIBER RING-TYPE UBIQUITIN LIGASE

Meng-Hsuan Ho, Din-Pow Ma
Mississippi State University

The ubiquitin-proteasome proteolysis pathway, responsible for the degradation and short-lived proteins, regulates a wide variety of cellular processes in eukaryotes. The ubiquitination of target proteins for degradation requires sequential action by three enzymes: an ubiquitin-activating enzymes (E1), an ubiquitin conjugating enzyme (E2), and an ubiquitin ligase (E3). There are two main classes of E3 ligases, the HECT domain and the RING-type ligases. In plants, the RING-type ubiquitin E3s are encoded by a very large gene family. It has been reported that there are 469 RING-type protein genes in the Arabidopsis genome, suggesting that plant RING-type ubiquitin E3s have many specific target substrates. Using a cotton E2 (GhUBC1) as bait in a bacterial two-hybrid system, we had previously cloned two unique fiber cDNAs, GhRIN1 and GhRIN2, encoding RING-type ubiquitin ligases. The GhRIN1 protein derived from the full-length GhRIN1 cDNA consists of 338 aa and has the highest homologies with E3 homologs from Arabidopsis (AAN18152 encoded by AT3g19950) and Rice (*Oryza sativa*) (BAD67937) by BLAST searches. GhRIN1 contains eight His and Cys residues (C3H2C3) in the RING domain and is classified as

the RING-H2 protein. To understand the function of the GhRIN1 protein, GhRIN1 was tagged with GST (glutathione-S-transferase) and over-expressed in *E. coli*. The over-expressed GhRIN1 protein had the E3 ligase activity and was capable of catalyzing the formation of polyubiquitin chains via in vitro auto-ubiquitination.

02.02

9:30 IgD EXPRESSION IN CHANNEL CATFISH, ICTALURUS PUNCTATUS

Shenika Kelly¹, Eva Bengten², Eva-Stina Edholm², Melanie Wilson²

¹Alcorn State University, ²University of Mississippi Medical Center

The overall goal of this project is to test the hypothesis that channel catfish (*Ictalurus punctatus*) secreted immunoglobulin delta (IgDsec) is bound to the surface of a granular cell population by an activation inducible IgD binding receptor. The catfish IgD homolog is a chimeric molecule consisting of a rearranged variable heavy (VH), diversity (D) and joining (JH) segment spliced to the first IgM constant domain, followed by seven IgD constant domains and either a transmembrane domain or a secreted tail. Cell separation studies of peripheral blood leukocytes (PBL) using anti-IgD and anti-IgM monoclonal antibodies revealed that IgD is found on surfaces of three distinct cell types; IgM+/IgD+ or IgM-/IgD+ B cells and IgM-/IgD+ granular cells, of unknown origin that don't express any Ig message, but are armed with exogenously produced IgD via a putative IgD-binding receptor. Induction of IgD staining on granulocytes was observed in response to over-night incubation with the mitogen concanavalin A. Finally, recombinant (r) IgD proteins encompassing different IgD domains were generated in a FLAG epitope tag expression vector. The resulting proteins were purified from total cell lysates using an anti-FLAG column and verified by Western blot. Future experiments include co-culture of concanavalin A stimulated cells with rIgD proteins to map the part of IgD that binds to the cells and co-immunoprecipitations will be done to detect the putative IgD receptor.

02.03

9:50 PARTIALLY PURIFIED FRACTIONS OF LEAF EXTRACTS OF OCIMUM GRATISSIMUM EXHIBIT HIGHER ANTI-PROLIFERATION ACTIVITY IN PROSTATE ADENOCARCINOMA CELLS

Stephen Ekinwe¹, Melvanique Thomas¹, Jelani Zarif¹, Lauraetta Lockridge¹, Yong Chen², Xiaopu Zhang², Hengshan Wang²

¹Jackson State University, ²Guangxi Normal University, China

Prostate Cancer is the third leading cause of cancer related deaths of men 50 years and older in the U.S. It affects African Americans disproportionately. There is currently no effective treatment for prostate cancer. Radical prostatectomy or brachytherapy, with the undesirable side effects of erectile

dysfunction (ED) and urinary incontinence (UI), are the current treatments for the disease. Lack of effective treatment drives the effort to discover and develop new, affordable, highly efficacious prostate cancer drugs with few or no serious adverse side effects. Previous in-vitro studies have shown that the aqueous extracts of the edible medicinal herb *Ocimum gratissimum* (Og), inhibit the proliferation of prostate adenocarcinoma (PC-3) cells. This leads us to believe that Og may harbor novel cancer-fighting compounds that need to be isolated. In this study, Og powder was sequentially extracted with different organic solvents to obtain various fractions. We hypothesized that the anti-proliferation activity of these fractions will be significantly greater than that of the aqueous extract. This hypothesis was tested by treating PC-3 cells with 1.61mg/ml of each fraction. Compared to treatment with 2.0mg/ml of aqueous extract, the fractions showed greater anti-proliferation activity against PC-3 cells. Fraction P2, the most active fraction, and fraction P3-2 showed a 5000-fold and a 537-fold higher anti-proliferation activity than the aqueous extracts respectively. These findings suggest that the organic solvent fractions of Og may contain more of its bioactive component(s).

02.04

10:10 Biofilm Formation is Regulated by Msa in Staphylococcus aureus

Antony Schwartz, Karthik Sambanthamoorthy, Mohamed Elasmri
The University of Southern Mississippi

Staphylococcus aureus is a Gram-positive bacterium that causes a wide array of community-acquired and nosocomial infections. Infections caused by *S. aureus* are progressively more difficult to treat owing to the increasing prevalence of antibiotic resistant strains. In addition, *S. aureus* forms biofilms. Generally, biofilm bacteria show much greater resistance to antibiotics due to changes in gene expression or physiology associated with surface-attached existence. The global regulator, *sarA*, regulates biofilm formation under both in vitro and in vivo conditions. Recently, we have elucidated the function of a novel locus, *msa* (modulator of *SarA*), that is required for the full expression of *sarA*. In this study, we show that the *msa* mutant exhibits a significant decrease in biofilm formation under static and flow conditions. Further analysis of the mutant biofilm using GFP and confocal microscopy revealed differences in morphology and thickness when compared to the wild type. Expression studies on biofilm-related genes showed that mutation of *msa* decreased the expression of *arcA*, *arlS*, *atl*, *clfA*, and *icaR*. Collectively, these results indicate that *Msa* plays a critical role in biofilm formation.

10:30 Break

02.05

11:00 MSA EXPRESSION WITHIN THE STAPHYLOCOCCUS AUREUS BIOFILM

Victoria Jones¹, Antony Schwartz², Mohamed Elasmri²

¹Mississippi University For Women, ²University of Southern Mississippi

Staphylococcus aureus is a gram positive bacterium that causes a myriad of diseases that range from superficial to deadly infections. These infections are caused by variety of virulence factors that are coordinately controlled by global regulators. One such regulator is the staphylococcal accessory regulator (sarA). SarA regulates over 100 genes that are involved in pathogenesis and the general maintenance of the cell. Also, SarA regulates biofilm formation. A recent study demonstrated that Msa (Modulator of sarA) modulates the expression of sarA and other virulence factors. The aim of this study is to construct a Green Fluorescence Protein (GFP) reporter system whose expression is regulated by the msa promoter. This reporter system will be used to visualize the spatial expression of Msa within a staphylococcal biofilm formed in a flow-cell apparatus.

O2.06

11:20 IL-1 β -MEDIATED UP-REGULATION OF CXCL12 WITHIN ASTROCYTES DURING EAE

Hong Loan Nguyen¹, Robyn Klein², Erin McCandless², Denise Dorsey², Bo Zhang², Leroy Johnson¹

¹Alcorn State University, ²Washington University in St. Louis School of Medicine

Multiple Sclerosis (MS) is an autoimmune disease of the central nervous system. Experimental autoimmune encephalomyelitis (EAE), a mouse model for MS, is induced by immunization with myelin proteins or adoptive transfer of myelin-specific CD4⁺ T cells. Recent research using the EAE model indicates that the chemokine CXCL12, is increased in the CNS during EAE and acts to limit inflammation at the blood-brain barrier (BBB). CXCL12 is normally found at endothelial cell basolateral surfaces and serves to localize infiltrating immune cells to the perivascular space, preventing CNS entry. During CNS autoimmune diseases, the pattern of CXCL12 is altered such that basolateral polarity is lost. This altered CXCL12 expression is associated with loss of immune cell localization to the perivascular space in increased parenchymal migration. Preliminary work has determined that the cytokine IL-1 β , which is also increased in the CNS during MS and EAE, is capable of redistributing CXCL12 expression at the BBB. We identified astrocytes as the source of redistributed CXCL12 at the BBB in vivo in mice with EAE or in those treated with IL-1 β . Primary cultures of astrocytes treated with IL-1 β displayed a dose-dependent up-regulation of CXCL12 mRNA. Primary cultures of oligodendrocyte precursor cells (OPCs), the myelinating glial cells of the CNS, increased their expression of myelin oligodendrocyte glycoprotein (MOG) mRNA, suggesting that CXCL12 promotes OPC maturation. Thus IL-1 β mediated increase in CXCL12 expression within astrocytes during CNS autoimmune diseases has consequences for both BBB integrity and remyelination.

THURSDAY AFTERNOON

Oak

O2.07

1:30 SULFUR METABOLISM IN THE DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM

Melissa Adams, Brooke Wheeler, Glen Shearer
The University of Southern Mississippi

Histoplasma capsulatum is a dimorphic fungus that causes histoplasmosis, a common respiratory disease in man. The organism grows in soil in a differentiated, multicellular MOLD form and de-differentiates to a simple budding YEAST in the lungs. This M-Y shift is required for disease. Sulfhydryl groups (particularly cysteine) are required for the M-Y transition. Cysteine dioxygenase (CDO1) produces cysteine sulfinic acid (CSA) from cysteine. CSA is a key intermediate in cysteine metabolism. CDO1 is thought to regulate the intracellular level of free cysteine or provide a product necessary for the transition to the yeast state. The role of cysteine in dimorphism is unclear, but it may act via modulation of intracellular redox. Other pathways involved in cysteine metabolism, and presumably redox control, include gamma-glutamyl cysteine ligase (GSH1) and Glutathione synthetase (GSH2) which result in cysteine being converted to glutathione. The expression and enzyme activity of these three genes are being studied. CDO1, which has been previously isolated in our lab, appears to be expressed in both M and Y phases of the organism while GSH1 and GSH2 appear to be expressed only in the yeast phase. Transcript levels are being measured by northern blotting and real Time PCR. Experiments are underway to determine if enzyme levels correlate with transcript levels.

O2.08

1:50 DIFFERENTIAL EXPRESSION OF THE M46 GENE IN THE MOLD AND YEAST FORMS OF THE PATHOGENIC FUNGUS HISTOPLASMA CAPSULATUM

Davida Crossley, Rupesh Patel, Glen Shearer
The University of Southern Mississippi

Histoplasma capsulatum, is the etiologic agent for the respiratory disease histoplasmosis. This dimorphic fungus grows as a multicellular mold in the soil and converts to a budding yeast growth form in the lungs. This mold-to-yeast conversion, which is a requirement for pathogenesis, can also be accomplished in the lab by switching incubation temperature from 25 C to 37 C. To understand the molecular basis of dimorphism we have isolated numerous mold-specific and yeast-specific genes. The subject of this study, the M46 gene, was originally isolated as a mold-specific gene in strain G186AS. Recent data, however, have shown that M46 is expressed in the mold morphotype of strains G186AS and Downs, but is transcriptionally silent in G184AS and G217B strains. The complete ORF is present in all

strains and the putative promoter sequence appears to be intact. The reason for lack of transcription in the latter strains could be due to a cis- or trans-acting problem. To address this question, we have constructed M46 promoter- fusions with a GFP (green fluorescent protein) reporter to analyze promoter function. Fluorescent microscopy data has shown that M46 promoters from all four strains were functional. This analysis allows us to conjecture that M46 is silent in strains G184AS and G217B due to a missing trans regulating factor(s). Future studies will attempt to identify this missing trans-acting factor(s) and construction of an M46 knockout to investigate the function of M46.

O2.09

2:10 MAPPING CANDIDATE GENES INVOLVED IN TOMATO FRUIT CUTICLE BIOSYNTHESIS

Vivian Smith¹, Leroy Johnson¹, Keith McGee¹
¹Alcorn State University, ²Cornell University

Most of the candidate genes used for mapping were found in Arabidopsis and few in other plants. Using the tomato ESTs databank, homologues gene sequences were found in the tomato genome. DNA sequences of these genes were amplified and sequenced from the cultivated tomato (M82) and the wild species *S. pennelli* genomic DNA. The polymorphism between the sequences of the two lines was used to design CAPS (Cleaved Amplified Polymorphic Sequences) genetic markers that were mapped to the Tomato-EXPEN 200 map (<http://www.sgn.cornell.edu/cview/>). There were twelve genes that were found in Arabidopsis: LACS, CER5, CYPA8, FDH, CER6, CYPA2, BDG, CER5, CYPA6, ECR, FAD2 and FATB. These Arabidopsis genes are also fruit specific genes, which is why a homologous comparison was found in tomato fruits. LACS was found on chromosome 1, CER5 was found on chromosome 3, CYPA8 was found on chromosome 4, FDH was found on chromosome 5, CER6 was found on chromosome 6, CYPA2 was found on chromosome 7, and BDG was found on chromosome 10. The other genes were not mapped on the tomato chromosome because of problems with DNA sequencing. Only one of the candidate genes was found to show some potential to be the gene causing cuticle mutation, and that gene was LACS. The other genes did not prove to be the genes causing the mutation in the phenotype of the CM (cuticle mutation) lines of tomatoes.

O2.10

2:30 ELUCIDATION OF THE TRANSMEMBRANE TOPOLOGY OF MSA IN STAPHYLOCOCCUS AUREUS.

Hope Ferguson, Vijayaraj Nagarajan, Mohamed Elasri
The University of Southern Mississippi

Staphylococcus aureus is an opportunistic pathogen that inhabits the skin and mucosal membranes of humans. Treatment of *S. aureus* infections is increasingly difficult due to antibiotic resistance. *S. aureus* causes a wide variety of infections using a large number of virulence factors. Many virulence factors

contributing to the pathogenicity of *S. aureus* are regulated by global regulators such as SarA. One of the promising approaches to combating antibiotic resistance is to target these global regulators. We have recently identified a protein that is essential for SarA expression. Bioinformatics analysis of Msa shows that it is a putative membrane protein. The predicted topology of the Msa is IN-OUT with three putative transmembrane segments (from amino acid positions 27-47, 54-75, 108-125). The N-terminus is predicted to be in the cytoplasmic side of the membrane while the C-terminus is predicted to be outside the membrane. Secondary structure prediction results indicate the presence of four distinct helical regions. One helical region corresponds to the cytoplasmic helix while the other three correspond to the integral membrane helices. The goal of this study is to determine the transmembrane topology of Msa using GFP (green fluorescent protein) and phoA (alkaline phosphatase) fusions. Analysis of the Msa sequence with eight signal peptide prediction programs showed a consensus that Msa has a cleavable N-terminal signal peptide that mediates its targeting into the membrane. We will also use these fusions to determine if Msa utilizes a signal peptide for translocation into the membrane.

6:00 Dodgen Reception and Divisional Poster Sessions

Please set up between 4:00p and 4:30p

Location: Grand Ballroom

P2.01

SIGNAL INDUCED CHANGES IN THE SUBCELLULAR LOCATIONS OF IRAK-1 - INTEGRATES LPS AND TNF R1 SIGNALING

Tamica Collins¹, Angela Lockett², Joseph A. Cameron¹, Maureen Harrington¹

¹Jackson State University, ²Indianapolis University/Purdue University

The innate immune system is present in nearly all multicellular organisms and is regulated in part by pathogen associated molecular pattern receptors. The interleukin-1 receptor associated kinase-1 (IRAK-1) is involved in the activation of the transcription factor NF- κ B in response to bacterial derived lipopolysaccharide (LPS) and the pro-inflammatory cytokines, TNF α and IL-1. Our research is focused on how the subcellular location of IRAK-1 is regulated by different stimuli. Mouse embryonic fibroblasts (MEFS) treated with LPS for 1 hour were harvested, separated into cytosolic and membrane fractions and subjected to SDS-polyacrylamide gel electrophoresis. Western blots were prepared, and probed for IRAK-1. Under steady-state conditions the IRAK-1 protein is located in the plasma membrane, cytosol and in a pelleted fraction which contains non-detergent soluble proteins. In response to LPS, IRAK-1 decreases in the cytosol and the amount of post-translationally modified IRAK-1 increases in the plasma membrane and the pellet. Next we examined whether

cholesterol is required for the LPS induced modification of IRAK-1 in the pellet or plasma membrane. In cells, in which the cholesterol was depleted from the plasma membrane, the LPS induced modification of IRAK-1 is reduced. LPS also induces binding of modified IRAK-1 to the type I TNF α receptor. If MEFs are pretreated with 0.4% ethanol, which disrupts lipid rafts, IRAK-1 binding to the type I TNF receptor is enhanced. (Supported in part by NIGMS-NIH Grant No. R25GM67592)

P2.02

Unique regulation of Fe-superoxide dismutase (Fe-SOD) by Ferric Uptake Regulator in *Azotobacter vinelandii*.

Young-Man Kwon, Yean-Sung Jung

Mississippi State University

Background:In *Escherichia coli* and *Pseudomonas aeruginosa*, Fur protein positively regulates the expression of *sodB* encoding Fe-SOD through small RNAs, RyhB or PrrFs. *Azotobacter vinelandii* also possesses *fur* and *prrf* genes encoding Fur and PrrF, respectively. **Method:**To study the effect of Fur on FeSOD in *A. vinelandii*, *fur* gene was inactivated by insertion of kanamycin resistance cassette. Ability of the mutant to grow aerobically was measured in both fixed-nitrogen and nitrogen-fixing conditions. On-gel activity assay and immunoblot analysis were used to estimate Fe-SOD activity and polypeptide levels, respectively, in cell extracts. Atomic absorption was used to measure iron levels in wild type and mutant cells. **Results:** The mutant failed to grow diazotrophically at normal growth condition (200 rpm and 30 °C), but started to grow slowly when the aeration was decreased, suggesting that oxidative stress is responsible for growth deficiency. Indeed, the mutant showed declined Fe-SOD activity, but similar levels of its polypeptide, suggesting that a defect in the process of Fe insertion into apoSOD contributes to the decreased activity. The mutant accumulated more irons than wild type. Thus, iron shortage is not the factor causing apoSOD production. **Conclusion:** the results showing that the mutant has wild-type levels of Fe-SOD mainly as an apoform suggest a novel mechanism of Fur on the modulation of Fe-SOD activity in *A. vinelandii*.

P2.03

CAMPOTHECIN MODIFIES LIPOPOLYSACCHARIDE/PHORBOL-12-MYRISTATE-13-ACETATE INDUCTION OF INTERLEUKIN-1 RECEPTOR ANTAGONIST IN HUMAN FIBROBLASTS.

Stephen LeBlanc, John Jenkins

University of Mississippi Medical Center

Interleukin-1 receptor antagonist (IL-1Ra) is a member of the IL-1 family of cytokines. IL-1Ra has anti-inflammatory properties mediated via competitive IL-1 receptor binding, inhibiting IL-1 α /beta signaling. Lipopolysaccharide (LPS) and phorbol-12-myristate-13-acetate (PMA) have a synergistic effect on production of an intracellular form of IL-1Ra in fibroblasts. Camptothecin (CPT) is an anti-tumor drug that binds

and inhibits topoisomerase I, inducing apoptosis at high doses. We examined the effects of CPT on LPS/PMA-induced IL-1Ra in human fibroblasts. We cultured CRL-2522 (normal foreskin fibroblast), CRL-1475 (normal neonatal skin fibroblast), and synovial fibroblasts from a patient with rheumatoid arthritis with and without LPS/PMA with different concentrations of CPT. We measured IL-1Ra mRNA and protein expression by qualitative RT-PCR and sandwich ELISA respectively. High concentrations (10⁻⁴-10⁻⁵ M) of CPT inhibit the effects of LPS/PMA on IL-1Ra gene expression. LPS/PMA-induced IL-1Ra protein expression was also inhibited by high doses of CPT. Cell death and apoptosis, measured by staining techniques, did not account for this CPT-induced inhibition of IL-1Ra protein. Conversely, in low concentrations (10⁻⁶-10⁻⁷ M), CPT augments IL-1Ra gene expression. CPT elicits a biphasic dose-effect response on LPS/PMA-induced IL-1Ra in fibroblasts. This complex regulation of intracellular IL-1Ra suggests an alternate function other than binding cell surface IL-1 receptors.

P2.04

HETEROLOGOUS EXPRESSION OF HUMAN PHOSPHOLIPASE D IN BUDDING YEAST

Ilma Patel, Graham Howard, Bernadette Connors

Millsaps College

Phospholipase D (PLD) is a ubiquitous enzyme responsible for the catalysis of phospholipids in many organisms, ranging from bacteria, yeasts, plants, and mammals. Defects in PLD activity are associated with nonalcoholic fatty liver disease and also growth of effector T-lymphocytes in humans. PLD catalyzes the hydrolysis of phosphatidylcholine (PC) to form phosphatidic acid (PA) and choline. PA is further hydrolyzed by PA phosphohydrolase to form diacylglycerol (DAG), both of which are second messengers in activities of many protein kinases. Additionally, PLD is capable of performing transphosphatidyl transfer reactions in which PA is transferred from PC to a primary alcohol to form phosphatidylethanol. These activities are induced by numerous agents, such as ethanol, galactose or glucose, and potassium acetate. In *Saccharomyces cerevisiae* cells lacking PLD^{Spo14} activity show growth defects on nonfermentable carbon sources, and homozygous diploids are unable to sporulate. In an attempt to understand whether human PLD (hPLD) can function similarly to the yeast PLD^{Spo14} we cloned hPLD isoform 1 (hPLD1) downstream of the galactose-inducible *GAL1* promoter, and transformed both haploid and diploid strains of *S. cerevisiae* deleted for PLD1^{Spo14} with the recombinant plasmid. To assay for functional replacement of PLD activity, we are currently examining growth of the strain expressing hPLD1 on glycerol and ethanol, and determining sporulation efficiencies. Determining the similarities between the yeast PLD^{Spo14} and hPLD can assist us in further understanding the reactions catalyzed by PLD.

(Supported by NIH Grant Number RR 016476 from the MFGN INBRE Program of the National Center for Research Resource).

P2.05

THE ROLE OF DIA2 AND CDC20 IN UV-ACTIVATED REPAIR PATHWAYS

Bernadette Connors, Leah Strickland, Graham Howard
Millsaps College

DNA replication requires the regulation and stabilization of replication forks to ensure that the genome is replicated only once per cell cycle. One means to regulate this process is through protein degradation, accomplished in part by the Anaphase Promoting Complex (APC) and the Skp1-Cdc53/Cullin-F-box (SCF). Dia2 is a putative SCF protein that is a member of a complex involved in protein degradation. The primary focus of the research was to determine whether a relationship between Dia2 and the APC exists, and the nature of this interaction. To examine this interaction, the ability of strains carrying the temperature sensitive *cdc20-1* allele and Δ dia2 to survive when grown on various drug-containing media were determined. The capacities of the Δ dia2 and Δ dia2/*cdc20-1* mutant strains to evoke the RNR3-lacZ damage repair pathway were also examined. Strains carrying the Δ dia2/*cdc20-1* and *cdc20-1* mutations were found to have increased survival rates upon exposure to UV radiation (50-200 J/m²) relative to unirradiated samples. However, the Δ dia2 and Δ dia2/*cdc20-1* strains were diminished in their capacity to evoke the RNR3-lacZ damage repair system following exposure to UV radiation, while *cdc20-1* strains exhibited ability comparable to wild type cells. Our characterization of these mutant strains suggests that both Cdc20 and Dia2 have roles in the cell's response to UV radiation, although we anticipate that they act along different pathways. (Supported by NIH Grant Number RR 016476 from the MFGN INBRE Program).

P2.06

PRODUCTION AND CHARACTERIZATION OF MONOCLONAL ANTIBODIES TO ENDOTHELIAL MONOCYTE ACTIVATING POLYPEPTIDE II (EMAP II)

Lillian Brady², Matthias Clauss¹

¹*Indiana University School of Medicine*, ²*Alcorn State University*

EMAP II is an antiangiogenic factor and thus may be of relevance for diseases. The aim of this project was to produce large quantities of antibody as well as characterize and sub-clone a rat anti-mouse EMAP II monoclonal antibody clone, the monoclonal antibody 7/1. First, by cultivating the 7/1 clone, we tested whether the concentration of cells in growth medium affected the growth of cells after thawing. Next, we tested the ability of the 7/1 F5 clone to recognize the EMAP II antigen. Although the monoclonal antibody was reacting with EMAP II very well at higher concentrations, at lower concentrations the polyclonal antiserum turned out to be more sensitive. In order to exclude the possibility that 7/1 was not a real monoclonal line, we decided to sub clone, placing, theoretically, one cell/96-well plate. We compared the supernatants of the 7/1 F5 clone and 7/1

E10 clone with the parental 7/1 clone. The 7/1 E10 clone showed lower OD in comparison to 7/1 and 7/1 F5 at high dose of EMAP II. With the low dose of EMAP II all three clones resulted in similar OD values. It was concluded that the 7/1 hybridoma clone was established as a producer of the desired antibody against EMAP II. After testing the dose dependence of EMAP II in an ELISA, we found that at lower concentrations of EMAP II, the 7/1 was less sensitive than the polyclonal antibody.

P2.07

Affinity Of Ramelteon For Competition To 2-[125I]Iodomelatonin Binding To The Super High And High Affinity States Of The hMT1 And hMT2 Melatonin Receptors Expressed In Mammalian Cells

Desmond Henderson², Yomayra Guzman¹, Margarita Dubovich¹, Rajendram Rajnarayanan²

¹*Northwestern University*, ²*Tougaloo College*

Melatonin (5-methoxy-N-acetyltryptamine), a hormone released at night activates two G-protein coupled receptors, the MT1 and MT2. The melatonin receptor agonist ramelteon ((S)-N-[2-(1, 6, 7, 8-tetrahydro-2H-indeno-[5, 4-b] furan-8-yl) ethyl] propionamide) promotes sleep and modulates circadian rhythms (Curr Opin Inv Drugs 1:114, 2005). The goal of this project was to determine the affinity of ramelteon for competition to 2-[125I]iodomelatonin binding to the super high and high affinity states of the hMT1 and hMT2 melatonin receptors stably expressed in Chinese Hamster Ovary (CHO) (Mol Pharmacol 50:166, 1996). 2-[125I]Iodomelatonin (90 pM) binding was determined in membranes from CHO-hMT1 and CHO-hMT2 in 50 mM Tris-HCl/10 mM MgCl₂ for 1hr at 25°C, followed by rapid filtration, and counting in a γ counter. Melatonin and ramelteon (0.3pM - 100nM) competition for 2-[125I]iodomelatonin binding to the hMT1 and hMT2 receptors were biphasic. The affinity constants (IC₅₀, n=3-5) for ramelteon to the super high and high affinity states were: 5.1 + 2pM and 0.5 + 0.03nM for the hMT1, and 0.44 + 0.1pM and 1.2 + 0.2nM for the hMT2, respectively. This model will be used to assess changes in receptor affinity to the super high and high affinity states of the receptors following exposure of CHO-hMT1 and CHO-hMT2 cells to ramelteon (0.3 and 30 nM). Results from these experiments will be presented and discussed.

P2.08

MOLECULAR AND CELLULAR EFFECTS OF LEAD ON HUMAN EPITHELIAL CELLS (HACAT)

Towanta Reese, Kenneth Ndebele, Barbara Graham-Evans
Jackson State University

Lead is a highly toxic metal that has been around for many years. It is omnipresent in the environment and the quantity of exposure is commonly found in all mankind. The major environmental sources of exposure to lead include leaded paint, auto emissions, and drinking water. Despite the dramatic reduction in sources of lead exposure, lead poisoning remains a

reality for a high number of people in this country. In this study, we investigated the cellular and molecular effects of inorganic lead on human epithelial keratinocytes (HaCaT cells). This research was designed to evaluate the dose-response relationship by determining cell proliferation using the MTT [3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide] assay for cell viability. Data obtained from this assay has shown the LD50 (the lethal dose needed to kill half (50%) of a population) of HaCaT cells exposed to lead for 24 hours to be 60ppm \pm 0.04 while at 48 hours, the LD50 was 72ppm \pm 0.05. These results indicated that lead induces cytotoxicity in a dose and time dependent manner. Based on these findings, we will use lower concentrations of lead to determine the apoptotic rate and cell damage when exposed to HaCaT cells.

P2.09

EFFECTS IN SLEEP DEPRIVED RATS OF AN ANTIDEPRESSANT AND A SLEEP AID, ALONE OR IN COMBINATION ON SLEEP PATTERNS

Theresa Raymond², Jorge Lopez¹, Laura Godfrey¹, Channing McLaurin¹, Howard Roffwarg¹, James Shaffery¹
¹University of Mississippi Medical Center, ²Murrah High School

Stress and sleep deprivation, both of which are associated with depression, have been demonstrated to independently reduce sleep. Fluoxetine (FLX) is a selective serotonin reuptake inhibitor (SSRI) antidepressant that we use, alone, and, in combination with a sleep aid (SA), which regularizes sleep, to examine their independent and combined effects on sleep patterns in sleep deprived (SD) rats. This study will examine whether combined FLX and SA treatment have a positive and, perhaps, synergistic affect on sleep patterns. The sleep deprivation caused by cage-shaking at sleep-onsets has proven previously to be successful. At sleep-onsets, animals are allowed to sleep for 10-240 seconds before being awakened. SA-treated animals are expected to lose less sleep and return to sleep more quickly. The animals not being pretreated with FLX will be receiving saline on the same schedule as those animals being pretreated. Throughout the three days of SD, either a SA or an equal volume of saline will be injected to all animals. An important control in this study is that all animals are shaken the same number of times per 24-hrs in the sleep-deprivation condition. Our prediction is that the SA, alone or in combination with FLX, will promote normal sleep in SD rats.

P2.10

THE MOLECULAR MECHANISMS FOR THE EXPRESSION, SECRETION AND UNIPOLAR TARGETING OF ICSA IN SHIGELLA FLEXNERI

Triet La, Roberts Brandy, Davis Leanna, Lauren Brandon
 Mississippi University for Women

The Gram negative bacterium *Shigella flexneri* causes shigellosis, a form of dysentery, leading to 1.1 million deaths

world wide per annum. It expresses a virulence protein, IcsA that is responsible for the motility of the bacterium from one infected cell to another. An understanding of the molecular mechanisms for the expression and surface localization of IcsA will help us to further understand the mechanism of *Shigella* mediated pathogenesis. A number of complete knockout mutations have been generated by transposon mutagenesis in *Shigella flexneri* strain JS11.0 which is isogenic to wild type *Shigella* only the icsA::phoA fusion gene has replaced wild type icsA. The PhoA component of this fusion construct shows whether IcsA has been secreted across the cytoplasmic membrane to the periplasm of *Shigella* since the PhoA is only active in the periplasm. Transposition events that disrupt genes that are responsible for either the targeting of the IcsA::PhoA fusion protein at the inner face of the cytoplasmic membrane, the secretion of this protein across the cytoplasmic membrane or the expression of this protein are the focus of our research. We have currently identified 52 mutations and have mapped 19 of these mutations by complementation analysis. We are currently using complementation and/or recombination, single primer pcr and cloning to identify the remainder of these mutations. Western blot analysis has been employed to distinguish between targeting/secretion deficient mutants and expression deficient mutants.

P2.11

THE MOLECULAR AND CELLULAR MECHANISMS OF MERCURY ON HUMAN JURKAT T-CELLS

Anthony Powell, Barbara Graham-Evans, Kenneth Ndebele
 Jackson State University

Mercury is widespread and is a highly toxic pollutant. There are three different forms of mercury and they include: elemental, inorganic, and organic. It is widely known that exposure to mercury can occur through inhalation, ingestion or dermal absorption. In the human body, mercury accumulates in the kidney, liver, blood, and brain. The immune system is affected by mercury, but long term effects are not known. We hypothesize that mercury will cause adverse effects on immune cells but at a higher concentration that necessary for other cells due to immune cells ability to fight off infection and other foreign agents. In this study, we will use human Jurkat T-cells (clone E6-1) as a model to evaluate the cytotoxicity of mercury based on the MTT assay (3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide). Data obtained from this assay will show the LD10 (the lethal dose of mercury needed to kill 10% of the t-cells) when exposed to mercury. Our results show that mercury when exposed to T-cells for 24 hours had an LD10 of 120ppm \pm 0.004 while at 48hours, the LD10 was 91ppm \pm 6.0. These results indicate that mercury induces cytotoxicity in a dose and time dependent manner. Based on these findings, we will use the LD10 to determine the rate of apoptosis and DNA damage of Jurkat T-cells when exposed to inorganic mercury.

P2.12

SERUM LACTATE DEHYDROGENASE [LDH] AND BILIRUBIN [DIRECT] AS BIOMARKERS OF ARSENIC TRIOXIDE INDUCED HEPATOTOXICITY IN SPRAGUE-DAWLEY RATS.

Anita Patlolla, Donee' McAllister, Paul Tchounwou
Jackson State University

Arsenic trioxide (As₂O₃) is a known human carcinogen; it exerts its toxic effect through impairment of cellular respiration. Although the evidence of carcinogenicity of arsenic seems strong, the mechanism by which it produces tumors is not completely understood. The aim of the study was to determine the effect of As₂O₃ on the activities of specific enzymes lactate dehydrogenase [LDH] and bilirubin [direct], which may be useful as biomarkers of hepatotoxicity. Four groups of six male rats each weighing 60 ± 2 g were used in this study. As₂O₃ was intraperitoneally administered to the rats at the doses of 5, 10, 15, 20mg/kg body weight (BW), one dose per 24 hour given for five days. A control group of 6 animals was injected with distilled water. Following anesthetization blood was collected using heparinised syringes. Enzyme activities were determined using colorimetric assay kits. The absorbance was read at wavelengths of 340 nm [LDH] and 546 nm [bilirubin] using visible spectrophotometer. As₂O₃ exposure significantly elevated the level of bilirubin (direct) in the treated groups [44 – 81 µmol/L] compared to control [23µmol/L]. There was no significant effect in the serum LDH activity [70.3 ± 9.23 – 79.0 ± 3.4 U/L], however, the 20 mg/kg dose of As₂O₃ exhibited the most activity [90.6 ± 8.5 U/L] compared to control [47.6 ± 2.31]. These findings indicate that, of the two liver enzymes examined, serum bilirubin (direct) may be a better biological marker in examining arsenic-induced hepatotoxicity.

P2.13

THE HYPERTHERMOPHILIC MICROBIOLOGICAL POPULATIONS OF SUBTERRANEAN HYDROCARBON DEPOSITS

Julianna Isaac, Magan Green, Lewis Brown
Mississippi State University

In order to increase oil production from nearly depleted oil fields, microorganisms are being used. The microbes in the oil strata are in the form of ultramicrobacteria (UMB) and cannot be seen using the light microscope. At the high temperatures of some oil strata the microorganisms are even smaller. In order to detect their presence, a differential staining technique to stain DNA has been employed coupled with examination using the electron microscope. It has been shown in this project that the UMB's can be revived and will proliferate when appropriate nutrients are supplied. Specially designed culture devices are being used to incubate microorganisms at temperatures above 100°C. Proof of growth of the microbes has been confirmed by the production of carbon dioxide from the oil.

P2.14

INHIBITION POTENCY OF ORGANOPHOSPHATES ON HUMAN CARBOXYLESTERASE 1 PROTEIN

Katye Herring, Abdolsamad Borazjani, Allen Crow, Matt Ross
Mississippi State University

Hydrolysis of cholesteryl esters in macrophages is the rate-limiting step in the biochemical pathway that removes excess free cholesterol from these scavenger cells. The enzyme that catalyzes the hydrolysis of cholesteryl esters in macrophages is a carboxylesterase (CE) protein. We hypothesize that oxidized metabolites of organophosphate insecticides can inhibit the activity of human CE (human carboxylesterase 1, hCE1), which may inappropriately reduce macrophage reverse cholesterol transport. As an initial step we have examined the inhibitory effect of three organophosphates (chlorpyrifos oxon, CPO; paraoxon, PO; methyl paraoxon, MPO) on the hydrolytic activity of pure recombinant hCE1 protein. Pure hCE1 protein was incubated with increasing concentrations of oxons (0.001nM–10⁷M) in a 96-well plate for 10 min at room temperature followed by addition of an ester substrate (p-nitrophenyl valerate, pNPV). The rate of cleavage of pNPV by hCE1 was determined by the increase in absorbance at 405 nm using a plate reader. The following results were obtained. When pure hCE1 protein was treated with increasing amounts of CPO, PO, and MPO, potent inhibition of hydrolytic activity was observed in the nM range. The 50% inhibitory concentrations (IC₅₀) for PO, CPO, and MPO were 0.22±0.04 nM, 0.48±0.28 nM, and 0.91±0.29 nM, respectively. These results demonstrate that strikingly low concentrations of organophosphates can lead to inhibition of hCE1 activity and such interactions may elicit adverse effects on cholesterol metabolism in cellular and organismal contexts. [Supported by NIH R15ES015348]

P2.15

SCREENING FOR SYNTHETIC LETHAL MUTANTS OF LEXA AND DINB DELETION MUTATIONS IN ESCHERICHIA COLI.

Leonard Addae¹, Susan Cohen¹, Graham Walker¹, Leroy Johnson¹

¹Alcorn State University, ²MIT

All organisms have evolved a variety of mechanisms to ensure continuous DNA replication since it contains all the genetic information required for growth and proper functioning. Escherichia coli possess a set of SOS regulatory genes which are induced when replication is blocked by DNA damage. In an SOS induced cell, LexA, a transcriptional repressor is deactivated leading to the transcription of ~40 genes. DinB, a member of the Y family DNA polymerase (Pol IV), has been identified to be induced by the SOS response following DNA damage and allows the polymerization of DNA past lesions. This study is to identify mutants that show a synthetic lethality with deletion mutations of lexA and dinB. We applied the screening method for synthetic lethality in E.coli to select for transposon mutants that are lethal

in combination with *dinB* or *lexA* delete mutations. Mutants were selected that require the gene of interest for survival. We identified 85 potential mutants of *lexA* delete mutation, and one mutant passed all the validation tests. More screening needs to be done in order to identify a *dinB* delete mutant.

P2.16

THE AQUAPORIN GENE FAMILY: EXPRESSION IN NORMAL AND NEOPLASTIC TISSUES

Christopher Nevels¹, Hari Cohly¹, Rajendram Rajnarayanan², Cynthia Jeffries¹, Raphael Isokpehi¹

¹Jackson State University, ²Tougaloo College

The maintenance of water balance in cells is critical to the survival of all living organisms. Aquaporin water channels facilitate tumor cell migration and metastasis. Thus inhibition of aquaporins may be useful in reducing the metastatic potential of tumors. Our objective was to determine the expression of the 13 human aquaporins (AQP0 to AQP12) in normal and neoplastic tissues by analyzing Serial Analysis of Gene Expression (SAGE) Tag counts. SAGE data represent absolute expression of genes. We have developed a computational pipeline to construct a dataset of expression levels (tags per 200,000) of the human aquaporin gene family from Digital Northern results of 266 SAGE libraries (188 neoplastic and 78 normal tissues) that express two housekeeping genes glyceraldehyde-3-phosphate dehydrogenase (GAPDH) and Actin B (ACTB). The dataset was visualized using MultiExperiment Viewer (MeV) and converted into binary-encoded patterns representing evidence of gene expression. Our analysis revealed that AQP0, AQP1 and AQP3 were expressed in over 100 tissues. AQP1 and AQP4 were highly expressed in brain neoplastic tissues. AQP8 was expressed in only 5 tissues. We compared the expression levels of AQP1 and AQP4 in 20 SAGE Libraries developed from graded astrocytic tumor samples and found at least 5-fold over-expression of AQP4 in 7 samples. In conclusion, we have provided patterns of gene expression for the human aquaporin family in normal and neoplastic tissues; and provided prioritized datasets for further analysis. Acknowledgements: RCMI-CEH NIH G12RR13459-09, Mississippi NSF-EPSCoR (EPS-0556308), Mississippi Functional Genomics Network.

P2.17

AUTOMATIC EXTRACTION OF INFLUENZA VIRUS PATHOGENICITY FROM BIOMEDICAL LITERATURE

Antoneicka Harris¹, Raphael Isokpehi¹, Hari Cohly¹, Nyasha Chambwe¹, Rajendram Rajnarayanan²

¹Jackson State University, ²Tougaloo College

The ability to cause disease by avian influenza viruses is categorized as low or high pathogenicity. Both types of viruses cause influenza outbreaks in poultry worldwide. Furthermore, High-pathogenicity avian influenza (HPAI) viruses have emerged from low-pathogenicity avian influenza (LPAI) viruses. The antigenic nomenclature of Influenza A viruses includes the

combination of two groups of proteins: the Hemagglutinin (H) and Neuraminidase (N). There are 16 H types (H1-H16) and 9 N types (N1-N9) resulting in a total of 144 possible symbols. The highly pathogenic H5N1 subtype is responsible for widespread epidemics in commercial poultry. As of November 2007, 204 human deaths were due to H5N1 infection. We are interested in identifying novel inferences on the pathogenicity of influenza viruses from biomedical literature. In this study, we compiled a corpus of PubMed abstracts in which at least one nomenclature symbol was mentioned and then generated a binary matrix to determine co-occurring symbols. Our computational pipeline extracted 5,770 abstracts. Sixty-eight symbols were not mentioned in the abstracts. The 14 symbols pairing exclusively with H5N1 in 174 abstracts were H1N1, H2N2, H3N2, H3N8, H5N2, H5N3, H5N8, H5N9, H6N1, H7N1, H7N7, H9N1, H9N2, and H10N7. We are currently annotating these groups of abstracts with semantic categories and relations that will facilitate reasoning on pathogenicity of influenza viruses. Acknowledgements: Mississippi NSF EPSCoR EPS-0556308); MARC-U*STAR (5-T34-GM007672-28); and the RCMI-CEH (NIH- G12RR13459-09).

P2.18

DOES THE GENETIC POLYMORPHISM INVOLVING A VARIABLE NUMBER OF TANDEM REPEATS IN GLYCOPROTEIN IB DIRECTLY INFLUENCE PLATELET ACTIVATION BY VON WILLEBRAND FACTOR?

Stacy Brown¹, John Kermode¹

¹Alcorn State University, ²University of Mississippi Medical Center

Von Willebrand factor (VWF) is a blood glycoprotein involved in thrombosis and hemostasis. Glycoprotein Ib (GpIb) is a portion of a blood platelet receptor for von Willebrand factor; interaction of VWF with this receptor triggers platelet activation. Within the gene for GpIb there is a genetic polymorphism that involves a variable number of tandem repeats (VNTR) of a 39 base pair sequence (nucleotides 1243-1281) encoding for 13 amino acid in the extracellular portion of the GpIb. This sequence may occur once (VNTR-D allele), twice (VNTR-C), or three times (VNTR-B). A series of healthy volunteers were genotyped for the VNTR polymorphism and assessed for platelet responsiveness in vitro. The VNTR genetic polymorphism was detected by agarose gel electrophoresis of a PCR product covering the repeat region. Platelet activation was detected through [¹⁴C]serotonin release and assessment of the calcium signaling that occurs when VWF binds to the GpIb receptor. Data from our pilot study suggests that the degree of platelet activation increases in direct proportion with the number of tandem repeats in the GpIb gene. However, our sample was too small to yield a conclusive result. There was not enough consistency in the data to confirm the hypothesis. A more extensive study with a greater number of participants is required to make a definitive assessment of the influence of this polymorphism on

platelet activation.

P2.19

CELLULAR AND MOLECULAR TARGETS OF MERCURY TOXICITY IN HUMAN RENAL PROXIMAL (HK-2) CELLS

Shaneka Simmons, Dwayne Sutton, Raphael Isokpehi
Jackson State University

Mercury is amongst the most environmentally abundant nephrotoxics known to accumulate in the kidneys, leading to cellular injury and alterations in renal gene expression. However, the mechanisms underlying these events remain largely unknown. This study was designed to identify potential cellular and molecular targets of mercury toxicity in human proximal tubule (HK-2) cells. A combination of cellular assays and bioinformatics approaches were used to evaluate cytotoxicity of HK-2 cells exposed to mercury and to understand mechanistic pathways associated with genes that interact with mercury. Following 24 hour exposure of HK-2 cells to mercury, an MTT assay was performed to determine cytotoxicity. Results of these studies demonstrated that mercury exposure reduced cell viability in a dose-dependent manner. A lipid peroxidation assay was performed to evaluate the role of oxidative stress (as MDA generation) in mercury induced cytotoxicity to HK-2 cells, revealing selective peroxidative damage at 4 µg/ml. For the bioinformatics study, we retrieved 20 human genes from the Comparative Toxicogenomics Database that are curated from literature to interact with mercury. We then extracted Gene Ontology (GO) annotations assigned to the genes from the PubGene Database and constructed a citation co-occurrence gene network for each gene. Based on statistically significant values, the data extracted was used to identify potential target pathways of cellular and molecular toxicity for mercury.

Acknowledgements: Mississippi NSF-EPSCoR "Innovations through Computational Sciences" Award (EPS-0556308); CMCM (W912HZ-04-2-0002); and RCMI Center for Environmental Health (NIH-NCRR G12RR13459-09)

P2.20

Ductal Carcinoma Cell Growth is Vitiated by Vernonia Amygdalina Extracts

Lecia Gresham, Ernest Izevbieg
Jackson State University

Breast cancer is the most commonly diagnosed cancer and second leading cause of cancer-related deaths in women. Although, the incidence of breast cancer is highest in White Women (WW), African American women (AAW) have higher mortality rate than other racial groups in the U.S. One of the reported reasons for this disparity is that AAW are more likely to be diagnosed with estrogen receptor negative (ER-) breast cancer (a more aggressive breast cancer, with less treatment options). The human ductal carcinoma cells (BT549) are reported to express little or no (ER-α), and thus represent a suitable model

to study estrogen-independent cell growth. Therefore, the objective of this study was to assess the growth inhibitory activity of Vernonia amygdalina (VA) in these cells. The cells were propagated in tissue culture plates with RPMI-1640 supplemented with 10% FBS and 1% penicillin-streptomycin at 37C in a 95% air/5% CO2 humidified incubator. Mitosis was determined by DNA synthesis assays and confirmed cell counts using a hemacytometer. Exposure of BT549 to increasing concentrations of aqueous VA abrogated cell growth in a concentration-dependent fashion: VA at concentrations of 10, 100, and 1000 µg/ml inhibited BT549 cell viability by 20%, 25% (p<0.05), and 50% (p<0.05) respectively compared to the controls. Increasing concentrations of Taxol alone and in combination with VA were ineffective on DNA synthesis. These data suggest that these cells are insensitive to Taxol and ER-breast cancer patients may benefit from VA consumption.

FRIDAY MORNING

Oak

O2.11

9:00 IDENTIFYING MAMMALIAN PICOT (PROTEIN INTERACTING COUSIN OF THIOREDOXIN) INTERACTING PROTEINS

Bolanle Bukoye¹, Ning-Hui Cheng²
¹Mississippi University for Women, ²Baylor College of Medicine

Glutaredoxin is a member of the thioredoxin fold family that is involved in cellular redox homeostasis in bacteria, yeast, and mammals. It is also found in plants although its function in plants is still unclear. Glutaredoxins have been found to contain a newly identified Protein Interacting Cousin of Thioredoxin (PICOT) domain. Although, determining the function of PICOT has been challenging, the purpose of this research was to dissect the PICOT-mediated signaling involved in cell growth, proliferation, organ development, growth hormone mediated growth, and nutrient metabolism. Using yeast bait to screen a mouse cDNA library, 125 PICOT interacting proteins were identified. We isolated plasmid DNA from yeast strains harboring both bait and prey plasmid DNA and investigated four colonies in an ongoing process to determine the identify of the PICOT-domain proteins through amplification, re-transformation into a yeast two-hybrid system for confirmation, sequencing, and homology searches

O2.12

9:20 THE ROLES OF CDC20 AND RAD4 IN DOUBLE STRAND BREAK REPAIR

Bernadette Connors, Lauren Rochelle, Asela Roberts, Graham Howard, Leah Strickland
Millsaps College

Faulty DNA replication and repair can lead to severe

human diseases such as xeroderma pigmentosum (XP), a disorder characterized by extreme photosensitivity and a greater than 1000-fold increased risk of cutaneous and ocular neoplasms. Our studies have suggested a link between Cdc20, a known regulator of mitotic exit, and nucleotide excision repair (NER). Our initial experiments demonstrated that in *Saccharomyces cerevisiae* NER defective mutants containing both a deletion of RAD4 and the cdc20-1 allele are more UV sensitive than either single mutant alone. Reintroduction of RAD4 or CDC20 under the control of a galactose inducible promoter gal1 into $\Delta rad4$ and $\Delta rad4/cdc20-1$ strains returned moderate UV sensitivity to both. Double-strand break repair and the ability to evoke the RNR3 repair pathway were also significantly diminished in strains carrying $\Delta rad4/cdc20-1$ compared with those harboring $\Delta rad4$ or cdc20-1 alone. Microscopic analyses of RAD4-GFP and RAD4-GFP/cdc20-1 strains showed a significant decrease in RAD4 fluorescence upon UV irradiation when cdc20-1 was present. These data strongly support an interaction between CDC20 and RAD4. Two homologues of RAD4, RAD33 and RAD34, will also be tested in this manner to uncover any functional overlap between Rad4 and these two proteins. The ultimate goal of this research is to come to a better understanding of mechanisms related to defects in nucleotide excision repair, defects that have direct implications on development of certain types of cancer in higher eukaryotes.

O2.13

9:40 A CLPP MEDIATED REGULATORY NETWORK IN STAPHYLOCOCCUS AUREUS REVEALED BY SAMMD

Vijayaraj Nagarajan, Mohamed Elasri

Department of Biological Sciences, The University of Southern Mississippi

SAMMD is a meta-database for *Staphylococcus aureus* microarray data (SAMMD: <http://bioinformatics.org/sammd/>) that we recently developed. SAMMD contains easily retrievable data from 85 different published microarray experiments done so far in *S. aureus*, with more than 12,000 records for individual transcriptomic status of *S. aureus* genes. We mined SAMMD for the expression status of 99 known and hypothetical transcriptional regulators. Our analysis showed that stringent response, murF, clpP, sarA and cold shock as the top five conditions controlling 35, 22, 19, 18, 17 regulators respectively. Heat shock upregulates 11 regulators while none are downregulated. In contrast cold shock downregulates 14 regulators while upregulating only three. The response regulator saeR is the most affected regulator, appearing in at least 17 different experimental conditions. Nine regulators including cspC and lacR do not seem to be affected at all in any of the 80 different experiments. Several transcriptional regulators seem to be regulated in only one direction (either upregulated or downregulated), for example a fur homolog (SA1329) is upregulated at least in nine different conditions,

while it is not down regulated in any of the known conditions. We show that about half of the clpP regulated genes are actually regulated through sigB, sarA, agrA and mgrA. clpP thus acts as a major hub for proteolysis mediated regulatory network in *S. aureus*, mediating the signal and the response at least during the cold shock induced stress.

O2.14

10:00 Fast Identification of Clustered Regularly Interspaced Palindromic Repeats

Charles Bland

Mississippi Valley State University

Clustered Regularly Interspaced Palindromic Repeats (CRISPRs) are a novel type of direct repeat found in a wide range of bacteria and archaea. CRISPRs are beginning to attract attention because of their proposed mechanism; that is, defending their hosts against invading extrachromosomal elements such as viruses. Existing repeat detection tools do a poor job of identifying CRISPRs due to the presence of unique spacer sequences separating the repeats. In this study, a new tool, CRT, is introduced that rapidly and accurately identifies CRISPRs in large DNA strings, such as genomes and metagenomes. CRT's approach to detecting repetitive sequences is straightforward. It uses a simple sequential scan of a DNA sequence and detects repeats directly without any major conversion or preprocessing of the input. This leads to a program that is easy to describe and understand; yet it is very accurate, fast and memory efficient, being $O(n)$ in space and $O(nm/l)$ in time. CRT was compared to CRISPR detection tools, Patscan and Pilercr. In terms of correctness, CRT was shown to be very reliable, demonstrating significant improvements over Patscan for measures precision, recall and quality. When compared to Pilercr, CRT showed improved performance for recall and quality. In terms of speed, CRT proved to be a huge improvement over Patscan. Both CRT and Pilercr were comparable in speed, however CRT was faster for genomes containing large numbers of repeats.

O2.15

10:20 THE ROLE OF THE SSA1 GENE IN THE SPONTANEOUS FORMATION OF THE [URE3] PRION OF SACCHAROMYCES CEREVISIAE

Katie Brinkman, Ross E. Whitwam

Mississippi University for Women

Ssa1 is a chaperone protein required for propagation of stably-established [URE3] prions in *Saccharomyces cerevisiae*. We have knocked out the Ssa1 gene from a prion-free strain of *S. cerevisiae*. These yeast are still able to spontaneously convert to the prion state, suggesting that this gene is not required to establish the prion state, just to maintain it. To investigate the possibility that Ssa1, while not strictly required to establish the prion state, may aid in spontaneous prion formation, we are investigating whether the rates of spontaneous prion formation are altered in prion-free yeast that lack Ssa1. We are also

interested in the rates of prion elimination in *ssa1* strains of yeast that have spontaneously converted to the [URE3] state. This information should tell us something about *Ssa1*'s role in prion propagation.

02.16

10:40 SPONTANEOUS FORMATION OF THE [URE3] PRION IN SACCHAROMYCES CEREVISIAE IS NOT A STRICTLY RANDOM PROCESS

Mary Oyeleye, Michael Lee, Ross E. Whitam
Mississippi University for Women

Prions are misfolded and infectious forms of cellular proteins. The [URE3] prion of baker's yeast, *Saccharomyces cerevisiae*, is the prion form of the Ure2 protein. At a very low rate, the properly-folded, functional form of the Ure2 protein can spontaneously misfold into the prion form. Very little is known about the mechanism of this spontaneous misfolding and about whether misfolded Ure2 protein alone is sufficient to establish the prion state or whether additional cellular factors are required. We have followed the rates of spontaneous prion formation in prion-free cultures of yeast. The rates of spontaneous [URE3] formation in prion-free yeast were highly variable throughout the growth curve of the yeast. Certain time points in the growth curve were consistently associated with the lowest rates of spontaneous prion formation, while other time points were consistently associated with the highest rates. Investigations of parallel cultures of prion-free yeast also suggest that there are constraints on when spontaneous prion formation can occur. Together these results suggest that other cellular factors whose levels vary during culture growth are necessary to establish the stable [URE3] state and prion formation is not a strictly random process governed only by the chance misfolding of Ure2 protein.

11:00 Closing remarks, divisional meeting, and awards for poster and platform presentations.

**CHEMISTRY AND
CHEMICAL ENGINEERING**

Chair: Douglas Masterson, University of Southern Mississippi
Vice-chair: Ken Lee, Jackson State University

THURSDAY MORNING

Mahogany

03.01

9:00 ECL QUENCHING BEHAVIOR OF

RU(BPY)₃²⁺/TPRA SYSTEM BY CL⁻ AT AU ELECTRODE: DIRECT EVIDENCE OBTAINED FROM EQCM

Shijun Wang, Wujian Miao
University of Southern Mississippi

Electrogenerated chemiluminescence (ECL) is a process of light generation from electrochemical reactions. For example, light emission can be observed at an electrode placed in contact with an aqueous solution containing luminophore Ru(bpy)₃²⁺ (ruthenium (II) tris(2,2'-bipyridine) and an ECL coreactant tripropylamine (TPRA) upon anodic potential scanning. A number of factors such as the nature of the working electrode and the components of the electrolyte could affect the ECL intensity that is often proportional to the luminophore concentrations. Understanding of such effects is important in designing an ECL system that possesses highly reproducible and efficient ECL signals. We report here the influence of chloride ions on ECL at Au electrode for Ru(bpy)₃²⁺/TPRA system. Chloride ions commonly exist in biological systems, e.g., in phosphate buffer saline solutions. Direct evidence obtained from electrochemical quartz crystal microbalance (EQCM) experiments will be presented in support our proposed ECL quenching mechanism that involves the electrochemical formation of AuI/III-Cl⁻ complexes. Our data also suggest that caution must be taken when one uses a saturated calomel electrode (SCE) combined with an Au working electrode for ECL studies, since SCE contains high concentrations of chloride ions which could penetrate the porous tip of the electrode to the ECL system. Financial support from NSF-MRSEC grant (NSF-DMR 0213883) is gratefully acknowledged.

03.02

9:15 DETECTION OF CHEMICAL NERVE AGENT SIMULANTS: PROGRESS TOWARDS QCM SENSORS

Karl Wallace
University of Southern Mississippi

Quartz crystal microbalance (QCM) is a sensing tool that used for the detection of toxic chemicals. The change in frequency of the quartz crystal is attributed to the change in mass of the quartz crystal (QC). It is well known that sulfur containing functional groups can act as "anchors" to gold surfaces to form self-assembled-monoayers. The work presented here describes the synthesis of a family of dithiol monomers that contain a reactive functional group, which will bind directly to the stimulant. These monomers then form SAMs onto a gold surface, on a QC platform. The same family of monomers have also been tethered to gold to form nanospheres. The synthesis and characterization of both the monomers, SAMs and the gold nanoparticles, and our initial results using QCM as a sensor towards chemical nerve agent stimulants, will be discussed.

O3.03**9:30 APPROACHES TO THE SYNTHESIS OF A TITANANTHRACENE**Jahnavi Chatterjee¹, Neil Allison¹¹Mississippi University for Women, ²University of Arkansas

The goal of this project was to synthesize the transition metallaaromatic compound titananthracene in order to study the fundamental concept of aromaticity and how it applies to this class of metallacycles. Previous unsuccessful attempts have been made to synthesize titananthracene by the removal of a hydride or proton from titanadibenzocyclohexa-2,5-diene. This research focused on replacing a hydrogen at the saturated C(4) position of titanadibenzocyclohexa-2,5-diene with a TMS group. Removal of the TMS group with fluoride is expected to form a titananthracene. The first three steps of the proposed synthetic reaction scheme have been successfully carried out.

O3.04**9:45 VEGETABLE OIL MACROMONOMER-BASED LATEXES AND WATERBORNE INDUSTRIAL COATINGS**

Yvette Abadie, James Rawlins

The University of Southern Mississippi

Vegetable oil-based macromonomers (VOMMs) are a series of vegetable oil derivatives functionalized for facile incorporation into emulsion polymers via random copolymerization with conventional monomers. VOMMs enable good film coalescence and reduce the volatile organic compound (VOC) levels by replacing coalescing solvents in waterborne coatings. Moreover, VOMMs crosslink after application via auto-oxidation. Soybean oil-based VOMMs were synthesized and incorporated into industrial emulsion polymer models at varying VOMM concentrations. The polymers were formulated as waterborne industrial coatings using hexamethoxymethylmelamine as the crosslinker and evaluated versus a commercial latex at varying latex to crosslinker ratios. Post application crosslinking and material response to deformation was evaluated via dynamic mechanical analysis. The coatings specific properties were measured by comparing data from differential scanning calorimetry, infrared spectroscopy, and ASTM tests. The data confirm that higher VOMM levels improve coating performance mainly quantified through improved solvent and impact resistance, and flexibility testing.

O3.05**10:00 FRONTAL POLYMERIZATION WITH ENCAPSULATED INITIATORS PREPARED BY SEVERAL METHODS**

Christopher Bounds, John Pojman

The University of Southern Mississippi

We studied frontal polymerization with initiators microencapsulated by several techniques. Microcapsules were produced containing benzoyl peroxide, triethylenetetramine, and

N,N-dimethyl-p-toluidine using different encapsulation processes with sizes ranging from >400 microns to <100 microns. These microcapsules were subjected to validity and function testing. If the parameters were feasible, frontal polymerization processes were applied to an acrylate or a thiol-ene system containing these microcapsules. It was determined that stability and the size of the microcapsules were important issues in regards to the preparation of a front of polymerization using these microcapsules. When the size of the microcapsules is too large the front velocity is very slow, and in some cases, large microcapsules caused low polymer conversion.

10:15 Break**O3.06****10:30 MASS SPECTROMETRY BASED ASSAY FOR THE ENZYMATIC HYDROLYSIS OF PSEUDO-PROCHIRAL MALONATE DIESTERS**

Dale Rosado Jr., Cassie Nabors, Douglas Masterson

University of Southern Mississippi

Enzymes (i.e. Pig Liver Esterase) have been proven to be extremely efficient in hydrolyzing derivitized malonate diesters with high selectivity for the R or S enantiomer and with high chemical yield. To date, no assay exists where different conditions for these hydrolyses can be monitored in a rapid and efficient manner. Our group has developed a Mass Spectrometry based assay that allows for quick and efficient monitoring of the selectivity of various enzymes under various conditions. This assay uses pseudo-prochiral (H5, D5) malonate diesters, which need only be enantiomerically enriched, which is hydrolyzed under a variety of conditions and monitored by LDI-TOF or ESI-MS. The peak intensities and areas from the mass spectra were then used to determine an observed ratio of enantiomers, which can then be corrected to give the actual ratio. Chiral HPLC was then used to verify the accuracy of the assay.

O3.07**10:45 PREPARATION AND CHARACTERIZATION OF TRIS(2,2'-BIPYRIDYL)RUTHENIUM(II)-LOADED MICROCAPSULES AS ELECTROGENERATED CHEMILUMINESCENT LABELS FOR BIOMOLECULES DETECTION** Tommie L. Pittman* and Wujian Miao, University of Southern Mississippi, Hattiesburg, MS 39406

Tommie Pittman, Wujian Miao

University of Southern Mississippi

Polymerized liposome-based microcapsules loaded with water soluble tris(2,2'-bipyridyl)ruthenium(II) (Ru(bpy)₃²⁺) as electrogenerated chemiluminescent (ECL) labels for ultrasensitive biomolecule detection is reported. Ru(bpy)₃²⁺-loaded liposomes with a biological importance surface functional group, biotin, were prepared on the basis of our recently reported technique. The liposomes were produced from phospholipid

molecules such as DSPC and DSPE-PEG(2000)Biotin after solubilization in chloroform along with the addition of 50 mM Ru(bpy)₃Cl₂ prepared in 10 mM Tris buffer. Water (containing Ru(bpy)₃2+)-in-oil emulsion was then formed by vortexing the mixture. The resulting emulsion was layered on 0.1 M Tris buffer. The liposomal solution was transferred to warm water bath and the organic phase (chloroform) was removed by using argon and subsequent addition of low concentrations of styrene monomer and photoinitiator species before proceeding to gently agitation to form Ru(bpy)₃Cl₂ multilamellar vesicles. A micro-extruder with suitable pore-sized polycarbonate membranes was then used to produce monodisperse unilamellar vesicles while allowing the styrene monomer and photoinitiator species to penetrate through the outside lipid layer and remain in the hydrophobic zone of the liposome. Photo-polymerization process was carried out and Ru(bpy)₃2+-loaded microcapsules with a layer of polystyrene was produced. The characterization of polymerized ECL labels was carried out with scanning electron microscopy, optical microscopy, and light scattering techniques. The detection of DNA and protein with above prepared microcapsules using ECL will be discussed.

O3.08

11:00 FRONT TEMPERATURE AND FRONT VELOCITY AS A FUNCTION OF BENZOYL PEROXIDE CONCENTRATION, TRITHIOL CONCENTRATION AND FILLER LOADING IN THE FRONTAL POLYMERIZATION OF A TRIACRYLATE

Veronika Viner, John Pojman

The University of Southern Mississippi

Frontal polymerization is a localized reaction that propagates from the coupling of the Arrhenius dependence of the kinetics of an exothermic polymerization and the diffusion of thermal energy. The front temperature with multifunctional acrylates, can be as high as 250 °C. Such high temperatures result in smoking and the release of volatile compound that prevent the use indoors. We studied how the front temperature and front velocity were affected by the addition of fillers, a trithiol, a plasticizer, and benzoyl peroxide. For the monomer we used trimethylol propane triacrylate. Different types of filler (Polygloss 90 and Cabosil) were tested. As filler loading was increased, the front temperature decreased until the propagating front was quenched. As the % plasticizer and % trithiol were increased, the front temperature and front velocity decreased. As BPO concentration was increased, the front temperature and front velocity increased along with more smoke being produced.

O3.09

11:15 EXO- AND ENANTIOSELECTIVE DIELS ALDER REACTIONS: PYRAZOLIDINONE AUXILIARIES ARE ABLE TO OVERRIDE SECONDARY ORBITAL INTERACTIONS

Mukund Sibi¹, Jessica Shackelford², Levi Stanley¹, Xiaoping

Nie¹, Frances Bouret¹

¹North Dakota State University, ²University of Southern Mississippi

Due to secondary orbital interactions, the majority of Diels-Alder reactions are highly endo-selective. Despite this general rule, past research shows that there are certain methods for switching the major product of certain Diels-Alder reactions from the endo product to its exo counterpart. We hypothesized that a combination of an appropriate achiral template and a chiral Lewis acid catalyst could overcome the electronic preference to provide access to the exo adduct. Of the various Lewis acids and ligands screened, a combination of Yb(OTf)₃ and diphenyl Pybox ligand gave the best selectivity (25:75 endo:exo) while using a dienophile derived from a pyrazolidinone. Once optimal conditions were determined, the achiral template was varied to evaluate the effect of structure on the endo:exo ratio. The maximum effect was observed when the R1 position was altered to an ethyl substituent, which resulted in a 16:84 endo:exo ratio. The results of these studies will be presented.

O3.10

11:30 DETECTION OF PEROXIDE-BASED EXPLOSIVES USING ELECTROGENERATED CHEMILUMINESCENCE

Suman Parajuli, Wujian Miao

University of Southern Mississippi

Hexamethylenetriperoxidediamine(HMTD) and triacetonetriperoxide(TATP) are two commonly used peroxide-based explosives. These explosives are frequently used by terrorists because they can be easily synthesized with the readily available chemicals in the market. Herein we report their syntheses, characterization, and particularly their detection using electrogenerated chemiluminescence(ECL) technique. ECL is a process of light emission at the electrode due to energetic electron-transfer reactions between redox species generated electrochemically. The basis of ECL detection of TATP and HMTD is due to the fact that both compounds contain peroxide moieties and the later contains the tertiary amine, which could act as an ECL coreactant in the presence of an ECL luminophore such as Ru(bpy)₃2+ (ruthenium(II)tris(bipyridine)) up on anodic or cathodic potential scanning. Effects of electrode materials, enhancement by silver ions on ECL, etc. will be discussed.

THURSDAY AFTERNOON

Mahogany

O3.11

1:15 MODIFIED FOX EQUATION TO PREDICT GLASS TRANSITION TEMPERATURES OF

VEGETABLE OIL MACROMONOMER LATEXES

Charles White, James Rawlins

University of Southern Mississippi

Vegetable oil-based macromonomers (VOMMs) are vegetable oil derivatives functionalized for efficient incorporation into emulsion polymers via random copolymerization with conventional petroleum derived monomers. VOMMs enable good film coalescence as a plasticizing monomer, and reduce the volatile organic compounds (VOC) by replacing coalescing solvents in waterborne protective and decorative coatings. Moreover, VOMMs have the potential to crosslink after application via auto-oxidation. With their long fatty acid chains, VOMMs have a significant effect on the latex glass transition temperature (T_g) and minimum filming temperature (MFT). However, VOMM-based latexes have not consistently followed the traditional Fox equation used to predict random copolymer T_g s. A series of emulsion polymers were synthesized at varying proportions of VOMMs, and the resulting latexes were analyzed for T_g via differential scanning calorimetry and MFT. For predictive capabilities, modifications to the Fox equation are proposed to facilitate accurate T_g prediction for VOMM-based latexes.

O3.12

1:30 NAPHTHALIMIDE LINKED ONIUM SALTS AS POTENTIAL PHOTOACTIVATABLE DNA-CLEAVING REAGENTS

Emily Stewart, Jonathan Giurintano, Woods Curry, David Sandlin, Wolfgang Kramer
Millsaps College

Nitrogen-onium salts based on aromatic heterocycles contain a fragmentable nitrogen-oxygen bond that is homolytically cleaved upon absorption of light. The fragmentation yields a heteroaromatic radical cation as well as an alkoxy radical. It has been shown that both transient species can cleave DNA, each with a different mechanism. This shows the potential of the nitrogen onium salts for photodynamic therapy creating two separate reactive species with one photon of light. Due to the transient character of the reactive species, ground state association has to be efficient. To increase DNA binding, a naphthalimide moiety was attached to the nitrogen onium salt. A flexible, variable methylen spacer links the two functionalities and might be important to the efficiency of the binding event. The synthetic procedure involves the condensation of homologous amino alcohols with naphthalic anhydride and subsequent coupling with a heteroaromatic compound. The ground state association is determined by absorption and transmission spectroscopy. To test for photodynamic therapy potential of the newly synthesized onium salts, the photobiological impact was determined using *Saccharomyces cerevisiae* as a test system. Cytotoxicity was determined to establish a tolerance level of drug. The cells were then incubated with this concentration and subsequently irradi-

ated.

O3.13

1:45 PREPARATION OF HOMOCHIRALLY SIMILAR ISOLEUCINE ANALOGUES THROUGH A COMMON SYNTHETIC INTERMEDIATE

Sandipan Dawn, James Shows, Douglas Masterson

The University of Southern Mississippi

Preparation of different peptides containing unnatural amino acids is a huge interest among researchers last few years. These peptides usually have enhanced biological activity and/or longer half-life as proteolytic enzymes do not recognize these peptide bonds readily. Scientists around the world have been trying to synthesize α -, β -, γ - varieties of unnatural amino acids to incorporate them into these peptides. There are several different approaches to synthesize these unnatural amino acids but there is no common synthetic strategy through which one can produce all these derivatives via a common intermediate. As it currently stands, preparation of each class of amino acids requires its own special procedure. The currently used syntheses make it extremely difficult to prepare several homochirally similar amino acids simultaneously. This presentation will illustrate our effort to generate different homochirally similar isoleucine analogues through a common half-ester intermediate. It is also noteworthy that unlike other amino acids isoleucine has a chiral center at its side chain leading the synthetic project more challenging.

O3.14

2:00 STUDY IN THE REACTION OF CYANAMIDE WITH 1,3-DIAMINOPROPANE: FORMATION OF MELAMINE AND TETRAHYDRO-2-PYRIMIDINONE

Ken Lee¹, Ed Valente², Vyyyca Jones¹

¹Jackson State University, ²Mississippi College

Endogenous agmatine, which is neuroprotective and a neurotransmitter, binds to α_2 -adrenergic receptor and imidazoline binding sites, and blocks NMDA receptors and other cation ligand-gated channels. Agmatine inhibits nitric oxide synthase (NOS), and induces the release of some peptide hormones. The enzyme, agmatinase, degrades it into polyamine. We are interested in controlling the level of agmatine by inhibiting agmatinase and have designed several derivatives. A previous experiment reported that 3-aminopropyl guanidine (APG) was prepared from the coupling reaction between cyanamide and 1,3-diaminopropane. However the reaction produces APG as a minor product with two byproducts, melamine and tetrahydro-2-pyrimidinone. Two byproducts were analyzed by NMR, MASS and X-Ray Single Crystallography. The reaction mechanism has been proposed and will be discussed.

This research was supported by NIH (R21 NS054862-01 and RCMI, NIH-NCRR G12RR13459) and NSF STARGE programs (NSF-HRD-0411559).

2:15 Break

O3.15

2:30 STUDY OF CHEMICAL COMPOSITIONS OF AN AFRICAN EDIBLE PLANT VERNONIA AMYGDALINA (VA)

Xuan Luo, Daniel Oyugi, Danielle Payton, Ernest Izevbigie, Ken Lee

Jackson State University

Breast cancer is one of most frequent cancer types, among women. Our interest is in finding a novel and effective breast cancer chemotherapeutics from a folk medicine. An aqueous extract of an African edible plant, Vernonia amygdalina (VA) leaf, has been reported to be potent to breast tumor cell line MCF-7. We used 85% EtOH to extract organic components from VA leaf. The condensate was separated with two methods, liquid—liquid method (Method A) and Silica gel method (Method B). Three and five fractions were obtained from Method A and B, respectively. Comparing these fractions' bio-activity, Method A yielded more concentrated with active compounds than Method B. A-2 showed the highest bio-activity. Column Chromatography was used to separate A-2 into five parts (A-2-A, A-2-B, and so on) in methanol—chloroform solvent system. The bio-assay data indicated that active compounds still kept in A-2-B. We used TLC, UV, IR, HPLC, and NMR (1H and 13C) to analyze A-2-B. Gel filtration chromatography with Sephadex™ LH-20 was used to separate A-2-B in methanol—chloroform solvent system, and the UV data showed that it separated into five parts. The NMR spectra of separated portions will be presented with result of bio-assay. Bioassay was done on MCF-7 cell line with [3H]-thymidine method. We thank NIH (RCMI: NIH-NCRR G12RR13459, NCMHD: P20MD000534-01, and MBRS-RISE: R25GM067122-03).

O3.16

2:45 PEPTIDOMIMETICS : SYNTHESIS AND INCORPORATION OF UNNATURAL CYSTEINE ANALOGUES INTO BIOACTIVE PEPTIDE

Kinkini Roy, Douglas Masterson

The University of Southern Mississippi, Department of Chemistry and Biochemistry

It has been shown that incorporation of unnatural amino acids into protease specific sites in small peptides (somatostatin) increases the in vivo half-life of the peptide. Much attention has been given to the so called α -, β -, γ -peptides which are composed of α -, β -, γ -amino acids. The current interest in these unnatural peptides has provided an opportunity for chemists to design amino acid preparation which are simple, efficient, and general. There is a lack of general syntheses which can be used to prepare a wide variety of amino acid classes from simple, high yielding transformations. As it currently stands, the preparation of each class of amino acids requires its own special procedures. The currently used syntheses make it extremely difficult to prepare

several homochirally similar amino acids simultaneously. This presentation will illustrate our efforts to develop syntheses which can be used to construct a wide variety of cysteine analogues (α -, β -, γ -) from a common intermediate. We are now trying to prepare glutathione analogue by replacing the natural cysteine by its unnatural counterpart. We believe these unnatural peptides should have longer half life.

O3.17

3:00 CONVECTION INDUCED BY GRADIENTS IN EFFECTIVE INTERFACIAL TENSION

Joey Emfinger, John Pojman

University of Southern Mississippi

When two miscible fluids are in contact, an effective interfacial tension (EIT) can exist. This EIT eventually relaxes two zero as the fluids diffusion and create an equilibrium, uniform solution. However, for some systems near a consolute point, the concentration gradient can remain large for a significant period of time. For example, isobutyric acid and water are miscible above 26 °C, its Upper Critical Solution Temperature (UCST) and form two phase below that temperature. By heating a sample from below to above its UCST, we can create a sharp but transient interface. The fluid motion caused by imposed temperature and concentration gradients was studied.

3:15 Business Meeting and Awards

6:00 Dodgen Reception and Divisional Poster Sessions Please set up between 4:00p and 4:30p Location: Grand Ballroom

P3.01

MONO AND BINUCLEAR COPPER COMPLEXES OF SALICYLIDENE SCHIFF BASES: SYNTHESIS AND CHARACTERIZATION OF MESOGENIC PROPERTIES

V S Rao Nandiraju¹, Choudhury Trirup D¹, Paul Manoj¹, Francis Tuluri²

¹Assam University, India, ²Jackson State University

The synthesis of new mono and binuclear copper (II) complexes derived from Schiff bases viz., N (4-alkyloxysalicylidene)-4/-n-alkylanilines are carried out and their liquid crystalline properties have been investigated. The liquid crystalline phases were characterized by differential scanning calorimetry (DSC) analysis, optical polarized microscopy, and powder X-ray diffraction spectroscopy at different temperatures. The mono copper (II) complexes exhibit different smectic phases, while the binuclear copper (II) complexes exhibit viscous liquid crystalline smectic A phase. The binuclear copper (II) complexes are thermally stable even at high temperatures above the smectic-isotropic transition temperature. The isotropic-liquid crystalline transition temperatures of the binuclear complexes in general are found to be lower than their corresponding mononuclear homologues. It was found that the mononuclear

complexes exhibit sharp liquid crystalline-isotropic transition temperatures while the binuclear complexes melts over a temperature range. Temperature variation of X-ray diffraction studies revealed the difference in inter-molecular distances of mono and binuclear copper (II) complexes.

P3.02

DEOXYGUANOSINE ADDUCT FORMATION OF 2-HYDROXY-1,4-DIOXANE

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N-nitrosomorpholine is a known carcinogen, found in foods, groundwater, personal care products, and endogenous formation. Through a p450 hydroxylation reaction, N-nitrosomorpholine is converted to a more cytotoxic compound, α -hydroxy-N-nitrosomorpholine. α -hydroxy-N-nitrosomorpholine decomposes to several by-products that may be cytotoxic as well. The focus of this research was to study 2-hydroxy-1,4-dioxane, a by-product of α -hydroxy-N-nitrosomorpholine, and to determine its effect on deoxyguanosine (dG). A one milliliter solution of 100mM 2-hydroxy-1,4-dioxane and 1mM dG were reacted in Cacodylic acid buffer, pH of 7.0, at room temperature. The products were analyzed by High Pressure Liquid Chromatography (HPLC) using UV detection. The products that were found may be the proposed product or other products that were not calculated; however, stability studies, Nuclear Magnetic Resonance, and Mass Spectroscopy characterization will be carried out on those products. So far, the products have been collected and separated through HPLC. Future research would include characterizing the products that were found, but if the proposed adduct is found, it would lead to more research involving 2-hydroxy-1,4-dioxane and other nucleic acid bases, and eventually DNA. This research experience was supported by: The FASEB MARC Program (Bethesda, MD) through a Grant from NIGMS/NIH > (T36 – GM08637) for travel award funding to UMBC Summer Biomedical Training Program, a Grant from the National Cancer Institute, NIH, and the MARC Program at Jackson State University, grant (5-T34-GM007672-28).

P3.03

SYNTHESIS AND CHARACTERIZATION OF SOME FLUORINE-CONTAINING COMPLEXES OF RUTHENIUM(II): USE OF 19F NMR IN STUDYING DNA INTERACTIONS

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Several novel ruthenium(II) complexes with novel

fluorinated ligands were synthesized. The ruthenium(II) complexes were characterized by UV-visible, IR, NMR, and mass spectroscopy, and X-ray crystallography. Electrochemical studies were carried out on the complexes in CH₃CN and aqueous solutions so as to detect the redox potentials of the ruthenium(II) metal center and the effect of ligand environment on the redox potential of ruthenium(II). Detailed 19F NMR studies involving the interaction of these complexes with DNA plasmids will be discussed.

P3.04

SYNTHESES AND CHARACTERIZATIONS OF SOME TRANSITION METAL COMPLEXES CONTAINING ANALOGUES OF 2,6-PYRIDINEDICARBOXYLIC ACID

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Novel transition metal complexes containing analogues of 2,6-pyridinedicarboxylic acid with various types of amines, either coordinated or uncoordinated, have been synthesized. The metal complexes, which have been isolated and described contain cobalt(II), nickel(II), or copper(II) metal centers. Their structures have been elucidated by electronic, vibrational, and NMR spectroscopy. X-ray crystallography was also used to unambiguously elucidate their structural features. Electrochemical studies of these complexes in DMSO revealed the redox properties of the central metal ions and the ligands. Structural and reactivity properties will be discussed in terms of these experimental results.

P3.05

STABILITY OF CATFISH ANTIOXIDANT CONTAINING BIODIESEL UNDER ACCELERATED STORAGE CONDITIONS

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The effect of an antioxidant on the properties of catfish biodiesel under accelerated storage conditions was studied. The samples with (800 ppm TBHQ) and without antioxidant (control) were stored at 80°C for 28 days. At specified time intervals, samples were taken out for analysis of peroxide value, anisidine value, TBARs, acid value, iodine value, UV absorbance, and induction time. The progress in the oxidation was slow at the beginning of the storage. Only small increases in peroxide value, anisidine value, acid value, and UV absorbance were observed from both control and TBHQ added samples. The changes were, however, more pronounced in the control sample. After 21 days, peroxide value, acid value, and UV absorbance started to rise very rapidly. The induction time was increased by the addition of

TBHQ at 800 ppm. Changes during storage were not conclusive due to the variations in the measured value, especially at higher values. With the addition of an antioxidant, catfish biodiesel can withstand adverse conditions much better than the control, showing only slight changes in the measured values. Anisidine value, acid value, and UV absorbance were among the potentially oxidative index candidates that can be used to predict the quality of biodiesel related to its effect on engine performance

P3.06

ANALYSIS OF REFRACTIVE INDEX OF TEMPERED AND NON-TEMPERED FLOAT GLASS

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Associations made between glass specimens in casework are based on the theory that the variation in refractive index (RI) within a source of glass is smaller than the variation between two different sources. While it is known that refractive index and compositional analysis can be used to discriminate sources of glass, it has been theorized that by using these methods it may be possible to identify the source of this unusual glass. The purpose of this study was to observe any changes in the refractive index measurements of automotive glass. Each sample of glass was broken into very small fragments and mounted on glass microscopic slides for refractive index measurements. The GRIM 3 (Glass Refractive Index Measurement system) was used to perform the RI measurements. One specimen was identified that has a refractive index that departs significantly from that of the specimens that typically occur in casework. A second specimen was identified that has an unusually low refractive index. Both of these automobiles were manufactured outside of the United States. The refractive index measured for remainder of the specimens analyzed for this study fell within the expected values for automotive glass. This study identified one possible source of the glass with unusually high refractive indices, and one source of glass with unusually low refractive index. This research was in part supported by the Minority Access to Research Careers Undergraduate Student Training in Academic Research (MARC/*USTAR) Program (NIH-MARC 5 T34 GM007672-27).

P3.07

PREPARATION OF ACTIVATED 4-CYANODITHIO PENTANOIC ACID (CTP) AND RAFT POLYMERIZATION OF FREE AMINE CONTAINING POLYMERS

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Reversible addition- fragmentation chain transfer (RAFT) polymerization was used to create polymers capable of performing a silicon surface RAFT polymerization. To perform this RAFT polymerization, activated 4-cyandithio pentanoic acid

(CTP) was created (structure was confirmed by nuclear magnetic resonance) from a dithioester intermediate and ethyl acetate, and samples of activated CTP were reacted with two different monomers, aminoethyl methacrylamide (AEMA) and 2-acrylamido-2-methyl-1-propanesulfonic acid (AMPA). The polydispersity index (PDI) of the monomers was tested using gel permeation chromatography and resulted in a PDI of 1.12 and 1.14 for AEMA and AMPA, respectively. These polymers are now ready for a surface RAFT polymerization on a silicon wafer sonicated in toluene. Future experimentation will create a fluid with low surface friction that will have many biomedical applications, one being the creation of synthetic fluid for joints in the human body.

P3.08

ACETYLCHOLINESTERASE INHIBITORS IN HERBS AND SPICES

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Alzheimer's disease (AD) is one of the world's most dominant diseases among the elderly. More than five million people in the United States have been diagnosed with AD. AD has been known to cause memory loss, and in many cases, death. Patients with AD have a deficiency in the neurotransmitter acetylcholine (ACh) and a build up of beta-amyloid plaque. There is also a progressive loss of neurons in the fore brain. Deficiency of ACh and build up of beta-amyloid plaque on the brain impair the neurons from delivering messages. There is no real cure for AD so yet. Several treatments including acetylcholinesterase (AChE) inhibitors and glutamate regulators have been developed that can temporarily ease symptoms. AChE inhibitors slow down the degradation of ACh thereby maintaining a significant level of ACh in the brain for normal neuronal functions. One such treatment includes Galantamine, a natural product isolated from the bulbs of Caucasian snowdrops (*Galanthus nivalis*). Recent studies have shown that curcumin, the dark yellow compound with strong antioxidant activity isolated from turmeric, a yellow spice used in Asian cuisine, inhibits the build-up of beta-amyloid plaque in the brain. In this research, an attempt was made to search for acetylcholine esterase (AChE) inhibitors in herbs and spices that are used in food. Thus, people can consume such foods at an early stage of onset of AD to ease the symptoms of the disease.

P3.09

GELATIN SUSPENDED CARBON NANOTUBE ALIGNMENT AND DIFFERENTIATION UTILIZING IODIXANOL

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Carbon nanotubes (CNTs) are a cylinder formed from a sheet of graphite with diameter of the order of a nanometer. CNTs have great strength which is attributed to their being

composed entirely of sp² bonds. CNT application includes electronics, optics, and biosensors because of its novel electronic and optical properties. Single-walled CNTs production, the tubes are bundled because of the large van der Waals forces. The CNTs were encapsulated with detergents such as sodium dodecyl sulfate (SDS) and sodium cholate (SC) which have a hydrophobic tail and hydrophilic head. Sonication of the detergent and the CNT mixture was performed to increase dispersion of individual CNTs. After encapsulation and sonication, centrifugation and ultracentrifugation were utilized at varying time lengths to remove aggregates. This removed the large bundles. A new method developed at Northwestern University is able to truly separate the tubes according to bundling and even more interestingly by diameter. This method utilized centrifugation in a density gradient using iodixanol. When the initial nanotube distribution has a sufficiently small diameter distribution, like the CoMoCat sample, it is possible to separate out only metallic or only semi-conductive nanotubes by changing the ratio of SC and SDS. This is of high technological importance. A gelatin suspension was created from the top layer recovered after centrifugation and “combed” through in order to achieve aligned, individual CNTs. The degree of alignment was measured using a Cary 500 spectrometer to determine the polarization dependent absorption.

P3.10

THEORETICAL STUDY OF THE ADSORPTION OF ORGANOPHOSPHORUS COMPOUNDS ON METAL OXIDE SURFACES

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Organophosphorus compounds (OP), powerful inhibitors of the enzymes involved in nerve function, are widely used as insecticides as well as nerve agents. The high acute toxicity of these compounds underscores the need to detect, decontaminate, and destruct these chemicals in order to protect human health and ecosystems

Oxides of many metals are highly ionic and high melting, and their surfaces exhibit both Lewis base and Lewis acid character. Among these oxides calcium oxide (CaO) and zinc oxide (ZnO) were chosen for this work to investigate the adsorption and decomposition of selected organophosphorus compounds (dimethyl methylphosphonate (DMMP)).

All calculations have been carried out at the DFT/B3LYP levels of theory applying the 6-31G(d) basis set. The geometry of target molecule is fully optimized while the geometry of the oxide fragments is kept frozen. The structure, interactions and interaction energy (corrected by the basis set superposition error) of the adsorption systems have been studied. The difference in the geometrical parameters and atomic charges of adsorbed and isolated DMMP has been analyzed. DMMP was found to be chemisorbed on the non-hydroxylated ZnO and CaO surfaces.

DMMP is bound to the zinc oxide surface through the formation of strong chemical bonds between oxygen atoms of DMMP and zinc atoms of the ZnO surface. Adsorption of DMMP on calcium oxide surface occurs via formation of a P-O chemical bond. The adsorption leads to structural changes of the target molecule and to its polarization.

P3.11

CATALYTIC GASOLINE SYNTHESIS: UPGRADING OF SYNTHESIS GAS INTO GASOLINE RANGE HYDROCARBONS OVER ION EXCHANGED BIFUNCTIONAL CATALYST.

Xiaotian Liu, Amit Gujar, Hossein Toghiani
The Mississippi School for Mathematics and Science

Synthesis gas can be produced directly from gasification of the biomass. Upgrading synthesis gas into gasoline range hydrocarbons has attracted a significant amount attention as an alternative way to produce motor fuels. Many have tried to use a physical mixture of metal and zeolite catalyst to upgrade synthesis gas into gasoline range hydrocarbons, but the physical difference has limited the efficiency of the transformation process. In this experiment, copper was ion exchanged into HZSM-5 to form Cu/HZSM-5 catalyst. The catalyst was then tested in the flow reactor at 300-350°C under pressure of 700-1200 psig with 1:1 ratio of H₂: CO. It has shown that the temperature and pressure has a direct effect on hydrocarbon productivity. The composition of gas sample and the two phases of the liquid sample (hydrocarbon phase and water, alcohol phase) have been analyzed using GC. The physical characteristic of the Cu/HZSM-5 are been tested and studied. The experimental data has shown that Cu/HZSM-5 can produce gasoline range hydrocarbons efficiently and produces few little byproducts.

P3.12

ENANTIOSELECTIVE SYNTHESIS OF HETEROCYCLES USING THE DECARBOXYLATIVE PHOTOCYCLIZATION

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In the decarboxylative photocyclization a chromophore, usually phthalimide, and a γ -carboxylate are cyclized to yield a heterocycle. The reaction proceeds via a triplet biradical and is thus not stereospecific. Stereospecificity can be achieved by rotational restrictions that store any substrate chirality in the intermediate triplet biradical and yield a stereospecific product. An example is the synthesis of pyrrollo-[1,4]-benzodiazepines that has an axial chiral triplet 1,7-biradical intermediate based on the rotational barrier between anthranilic acid and phthalimide and yields only one diastereomeric isomer in the cyclization reaction. Usually, the carboxylate is generated by deprotonation with potassium carbonate. The potassium appears to serve as a template bringing the radical centers together, even a ground state association has been discussed. Other cations give lower

yields of cyclization product. Using a chiral amine adds a chiral component to the reaction mixture and leads to the formation of a chiral salt. The photoreaction then proceeds to yield an enantiomeric excess of one stereoisomer. We studied a series of cyclization reactions leading to heterocycles with different ring sizes varying the salts and monitoring the enantiomeric excess.

P3.13

ONIUM SALTS AS POTENTIAL PHOTOACTIVATABLE DNA-CLEAVING REAGENTS

David Sandlin, Emily Stewart, Jonathan Giurintano, Woods Curry, Wolfgang Kramer

Millsaps College

The fragmentable nitrogen-oxygen bond in nitrogen onium salts can be homolytically cleaved by light. This leads to the formation of a heteroaromatic radical cation and an alkoxy radical. It has been shown that both transient species can cleave DNA, each with a different mechanism. This shows the potential of the nitrogen onium salts for photodynamic therapy creating two separate reactive species with one photon of light. Due to the transient character of the reactive species, ground state association has to be efficient. To increase DNA binding, a naphthalimide moiety was attached to the nitrogen onium salt. A flexible, variable methylen spacer links the two functionalities and might be important to the efficiency of the binding event. The synthetic procedure involves the condensation of homologous amino alcohols with naphthalic anhydride and subsequent coupling with a heteroaromatic compound. The ground state association is determined by absorption and transmission spectroscopy. To test for photodynamic therapy potential of the newly synthesized onium salts, the photobiological impact was determined using *Saccharomyces cerevisiae* as a test system. Cytotoxicity was determined to establish a tolerance level of drug. The cells were then incubated with this concentration and subsequently irradiated.

P3.14

PREPARATION OF HOMOCHIRALLY SIMILAR LYSINE ANALOGUES FROM A COMMON SYNTHETIC INTERMEDIATE

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The goal of this project is to develop a way to synthesize unnatural Lysine analogues, from a common synthetic intermediate. The ultimate goal is to use these Lysine analogues to make small peptides which may potentially aid in cancer treatment. The unnatural amino acid analogues can be incorporated into peptide Somatostatin by replacing the natural lysine. It has been shown that the peptides with the unnatural analogues have a longer half life in serum than the peptides with the natural amino acids. These peptides may potentially be used to specifically deliver drugs to cancer cells. In this project,

diethylmethylmalonate is used as the starting material. N-(4-Bromobutyl)-phthalimide is then introduced as a protective side chain for lysine. This gives a prochiral diester. One of the ester groups is then selectively hydrolyzed by PLE enzyme which gave half ester with 96% enantiomeric excess. By using different simple organic synthetic pathway we can convert this half ester to unnatural α -, β -, γ - Lysine

P3.15

RESEARCH ON BIODIESEL FROM WASTE OILS

Ashley White, Bruce Wenzel, Ken Lee

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Petroleum supplies are being diminished while the worldwide demand is increasing. The US must import petroleum from politically instable areas. Therefore, there is a large research effort for liquid fuels from renewable resources within the States like to produce synthetic diesel fuel from vegetable oils including waste used oils. We have investigated pretreatment of the used oils to handle free fatty acids, water and other components, which inhibit transesterification. It included basic catalyst beside sodium methoxide. Characterization and quantification of triglycerides and the methyl ester were achieved by ¹H NMR, IR, and GC/MS. We determined the acidity of several used oils: Acidity, defined as mg KOH/ g sample, ranged from 1.0 to 14.0 for used oils, since they were degraded into short chain fatty acids, while pure vegetable oil and oleic acid have an acidity of 0.2 and 210, respectively. Water content of used oils was determined to be less than 0.1%. The yields of conversion to methyl esters were 82% and 84% for olive and vegetable oil. Data for yields of used oils will be presented. The fatty acid composition of the starting triglycerides of the vegetable oils was mainly stearic (80%) and oleic (20%), and the same for the methyl ester products. The used oils had less of these, instead it has more of short chain fatty acids. We thank DOE-MRT/SBIR DEFG3605G085002/07-08-001, NSF STARGE (HRD-0411559) and NIH-RCMI (R21 NS054862-01) programs.

P3.16

DIRECT OBSERVATION OF CELLULOSE ACETATE SEPARATED FROM SAWDUST BY SCANNING ELECTRON MICROSCOPE AND DETERMINATION OF LIGNIN FROM SAWDUST AND LEFTOVER FROM THE REACTION IN IONIC LIQUID

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Green chemistry has received a great deal of attention since it reduces the usage of hazardous materials in the chemical process. Some ionic liquids can dissolve cellulose at the elevated temperature. Therefore, we have attempted to separate the cellulosic material from lignin in soft pinewood sawdust using ionic liquid. In order to confirm the conversion other than Infra-red spectroscopy, a comparison study on the solid separated from

sawdust before and after the reaction has been done with scanning electron microscope. Sawdust before and after grinding shows its clean wall and the distinctive shape of wood. Crystalline cellulose shows the shape of aggregated fiber. The picture from the undissolved brown powder of the reaction shows the thin structure, but mostly similar shape as sawdust. Most interestingly the dark brown powder, which is soluble in ionic liquid, shows the cheese type chunk shape with non-crystalline structure. The lignin contents was analyzed for sawdust and undissolved brown powder with acetyl bromide method. Three pure lignins, lignin alkali, lignosulfonic acid and lignin carboxylate, were used for the standardized line. The lignin contents from sawdust and separated powder were determined several times. The result shows that the lignin contents in powder separated (7.9%) is slightly higher than that of sawdust (7.6%). This research was supported by the DOE-MRT/SBIR DEFG3605G085002/07-08-001, NSF STARGE (HRD-0411559) and NIH MBRS-RISE (R25GM067122-03) programs. We thank FEI Company for the Phenom (SEM).

P3.17

UNDERSTANDING THE MECHANISM OF β -ODAP NEUROTOXICITY

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β -ODAP is a neurotoxin that is found in the *Lathyrus sativus* seeds, commonly known as the grass pea. It has been known to cause neurolathyrism which is characterized by the paralysis of the legs and has many qualities that are similar to Parkinsons disease. β -ODAP is a competitive inhibitor of system xC- and a non-NMDA glutamate receptor agonist. System xC- is a transport system involved in the extracellular exchange of cystine for intracellular glutamate across the plasma membrane of a glial cell which helps in the regulation of oxidative radicals. Previous research in our lab has suggested that β -ODAP neurotoxicity may result from the sequestration of β -ODAP by glial cells mediated by system xC-. β -ODAP is hypothesized to undergo heteroexchange with extracellular cystine, resulting in overactivation of non-NMDA receptors, and eventually cell death. The second hypothesis is that β -ODAP acts as an agonist to non-NMDA glutamate receptors which inhibit glutathione synthesis which leads to oxidative cell death. The objective of this study was to synthesize β -ODAP to use HPLC to determine that β -ODAP is taken up and stored in the cell, and to demonstrate that β -ODAP undergoes heteroexchange with cystine by means of system xC-.

P3.18

A COUPLED-CLUSTER ANALYSIS OF MOLECULES CONTAINING SULFUR AND NITROGEN USING CONVENTIONAL AND THE CC-PV(X+D)Z BASIS SETS

Brian Napolion

Jackson State University

Molecules containing one sulfur and two nitrogen atoms have been of interest for sometime. The combination of an H₂S and an N₂ molecule is speculated to generate up to 10 possible isomers, and numerous intermediates and transition states in the gas phase. In this study we will consider each isomer of the singlet neutral species, and the doublet radical cations. In previous theoretical studies, the potential-energy surface of H₂SN₂ species has been studied with MP2 and DFT methods, and CCSD(T) single-point energies have been calculated at the MP2 and DFT geometries. We have extended prior theoretical works on these H₂SN₂ isomers using the CCSD(T) method to obtain geometries, relative energies, vibrational frequencies, heats of formation, and torsional barrier energies. Possible transition states that connect the reactants to products using the Intrinsic Reaction Coordinate (IRC) were found at the MP2/6-311++G(2d,2p) level. In recent years the traditional Pople and Dunning style basis sets for sulfur and other third row atoms have been criticized for giving unacceptable energy errors when compared to experiment. This error has been noted to be between 6-10 kcal/mol. The cc-pV(X+d) basis set is intended to reduce this error by adding a tight d function specifically on sulfur. We will compare the results from these different types of basis sets to gain some insight and hope to determine the relative significance of basis set effects for the systems considered in this study.

P3.19

SENSITIVE ANALYSIS OF AMINO ACIDS BY USING HPLC WITH FLUORESCENCE DETECTION

Katrina Battle, Contessa Avery, Yiming Liu

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Analysis of amino acids is very important in a variety of research areas. Gas chromatography methods have been developed for the analysis of amino acids with preparation times up to 2-1/2 hours. The goal of this work was to evaluate a sensitive HPLC method with fluorescence detection for the analysis of amino acids after Fe₃O₄ nanoparticle-based extraction. Fe₃O₄ nanoparticles coated with OH-, TCPO, DDAB, and DCA were evaluated. Glutamate, Glutamine, Valine, and Tryptophan (amino acids) was used as test compounds. The effects of properties such as polarity, extraction conditions, vortex time and nanoparticles amount was studied. Extraction efficiencies were determined for nanoparticles using HPLC and Gas Chromatography analysis was used for comparative study.

P3.20

PHOTO-INDUCED TOXICITY OF NANOCRYSTALS OF CADMIUM SELENIDE

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The goal of this study was to investigate the photo-induced toxicity of CdSe quantum dots (nanocrystals) in vivo. Bulk CdSe is toxic, but little is known about the stability and toxicity of luminescence nanocrystals of CdSe. Rats were used

as model animals. Quantum dots of CdSe stabilized with TOP/TOPO in chloroform were converted to water-soluble form by reacting with thioglycolic acid. Carboxylic acid groups were neutralized by reacting with NaOH. The precipitate resulting from the reaction was solubilized in water. A second portion of water-soluble crystals was irradiated under a 365 nm UV light for 5 h before injection. Substantial deterioration was observed in the nanocrystals as manifested by the loss of CdSe absorption maximum at 582 nm. Both UV irradiated and unirradiated nanocrystals were injected to three different groups of rats at 20, 200 and 500 $\mu\text{g/mL}$. Each rat received 1 mL injection of CdSe 5 times over three weeks (once every four days). In the end, rats were sacrificed to collect the internal organs, including the heart, liver, kidney, lungs and brain. Visual inspection revealed that liver was the main target organ impacted by the CdSe toxicity. All organs were digested in nitric acid by microwave-assisted digestion procedure and analyzed by ICP-AES to determine the distribution and accumulation rate of the nanocrystals in the organs. The results of the instrumental findings and pathology assays were statistically evaluated to elucidate the potential health risks of therapeutic exposure to CdSe nanocrystals.

P3.21

CHROMATOGRAPHIC AND NMR ANALYSIS OF 9-METHYL-10-NITROANTHRACENE AND ITS PHOTOPRODUCTS

Gernerique Stewart, Ashley Chornes, Yuguo Jiao, Hongtao Yu
Jackson State University

Nitro substituted Polycyclic Aromatic Hydrocarbons (nPAHs) are a class of carcinogenic and mutagenic compounds found in the environment. nPAHs occur several magnitudes lower than their parent PAHs and are more toxic. Nitro-PAHs undergo various chemical reactions in the environment including photochemical reaction. It has been proposed that the photochemical reaction mechanism of nPAHs depends heavily on the position of the nitro group, whether it is co-planar or perpendicular to the aromatic rings. The co-planar nPAHs usually undergo photochemical oxidation of the aromatic rings, while the perpendicular nPAHs undergo rearrangement of the nitro group first to a nitrite and then to nitroso substituted ketone, which is not stable and easily oxidized to quinones. However, the nitroso substituted ketone intermediate has never been isolated and characterized. In this study we use 9-methyl-10-nitroanthracene (I) to study the rearrangement reaction, theorizing that the presence of the methyl group will help to trap the nitroso substituted ketone intermediate. Indeed, irradiation of I with a UVA lamp (365 nm) in chloroform, methanol, or methanol/water mixture generates the main product that has the molecular mass of the nitroso substituted ketone intermediate. We then isolated and identified the it using different chromatographic techniques: TLC and Silica Gel Column Chromatography. The solvent system consisted of 88% Hexane, 10% Ethyl Acetate, and 2% Methanol. Other techniques used during the experiment were the

operation of the rotovapor, and NMR.

P3.22

CHROMATOGRAPHIC AND NMR ANALYSIS OF 4-CHLORO-1,2-PHENYLENEDIAMINE AND ITS PHOTOPRODUCTS

Shuguang Wang, Keonia Smith, Gernerique Stewart, Hongtao Yu
Jackson State University

4-Chloro-1,2-phenylenediamine (CPD) is an aromatic amino compound used as an active ingredient for the production of hair dyes. When exposed to UV light, CPD is known to be mutagenic in bacteria. It is theorized the photochemical reaction and the associated reactive species are two factors responsible for the phototoxicity of CPD. Therefore, the photochemical reaction of CPD is investigated. CPD was dissolved in water and irradiated with a solar simulator lamp (Suntest, 1500 W Xe Lamp with light output intensity of 250 J/cm²). The CPD solution was irradiated for 5 hrs and about 90% of the original CPD disappeared. One main photoproduct was detected by both High Pressure Liquid Chromatography (HPLC) and Thin Layer Chromatography (TLC). The solution was freeze-dried and a brownish solid photoproduct mixture was obtained. The brownish photoproduct was separated on a silica gel column. The solvent system consisted of 70% ethyl acetate and 30% hexane. The solvent was removed by evaporation, and a solid product collected. The product had a molecular mass at m/z 244 (100%) and an isotope ion at 246 (30 %). This molecular mass indicates that the product is likely dimerized since CPD's molecular weight is 142.6 and the isotope ratio of 3:1 for ions 244/246 indicates that only one chlorine atom remains in the photoproduct. ¹H-NMR (d₆-DMSO) was performed on a 300 MHz Bruker NMR. The results match the previously published NMR spectra for 2,3-diamino-7-c chlorophenazine, C₁₂H₉N₄Cl.

P3.23

SOLVENT EFFECT ON THE PHOTOCHEMICAL DEGRADATION OF MONO- AND DINITRO-POLYCYCLIC AROMATIC HYDROCARBONS

Gernerique Stewart, Tracy Harris, Keonia Smith, Hongtao Yu
Jackson State University

Polycyclic Aromatic Hydrocarbons (PAHs) are a class of widely spread mutagenic and tumorigenic environmental contaminants. Nitro-polycyclic aromatic hydrocarbons (nPAHs) are derivatives of PAHs, and contain two or more fused aromatic rings made of carbon and hydrogen atoms. They are formed as a result of incomplete combustion of organic material. nPAHs are of primary concern because many are more carcinogenic than their parent PAHs, and also display a great degree of mutagenicity. The photochemical degradation of 1-nitropyrene (1-NP), 2-nitrofluorene (2-NF), 2,7-dinitrofluorene (2,7-DNF), 3-nitrofluoranthene (3-NFA), 5-nitroacenaphthene (5-NAN), 6-nitrochrysene (6-NC), and 9-nitroanthracene (9-NA) were studied. Each compound was dissolved in acetonitrile (CH₃CN),

acetonitrile and water, methylene chloride (CH_2Cl_2), chloroform (CHCl_3), $\text{N,N}'$ -dimethylformamide (DMF), and DMF & H_2O respectively, and diluted to a desired concentration. All nPAHs were irradiated by a UVA Lamp. The degradation of each nPAH was monitored using a CARY 300E UV-Vis spectrophotometer. The natural logarithm ($\ln[x]$) was taken of the absorbance for each time interval, and plotted $\ln([A]_0/[A]_t)$ vs. Time. The linear equation $\ln([A]_0/[A]_t) = kt$, where $[A]_t$ is the height of the peak at time t , $[A]_0$ is the height of the peak at time 0, k is the rate constant, and t is the irradiation time, was used to determine k . The half-life ($t_{1/2}$) of each sample was determined by using the equation $t_{1/2} = 0.693/k$.

FRIDAY MORNING

Mahogany

03.18

9:00 THIOL-ENE MICROEMULSIONS - NOVEL POLYMERS

Jolanta Marszałek, John Pojman, Charles Hoyle
The University of Southern Mississippi

Novel polymeric materials have been produced through photo-polymerization of a thiol-ene based reverse microemulsion. Through the polymerization of the organic phase of the reverse microemulsion, it is possible to prepare hydrophobic polymer materials that have an aqueous phase dispersed throughout. We are greatly interested in understanding polymerization-induced aqueous phase aggregation in these systems. The photopolymerization of the 1,3-hexanedithiol/pentaerythritol allyl ether microemulsion induced crystallization of the surfactant AOT leading to white films. Films immediately after polymerization contained 5.7% of water, 17 % of the surfactant and 77 % of the monomer mixture as determined through TGA analysis. After exposure to open atmosphere for extended time there was only 1.7 % of water left, which was strongly bonded to the surfactant. The water loss occurred within the first 20 minutes of the exposure to the open atmosphere. The thiol-ene microemulsion had a 48 hour shelf life before spontaneous polymerization occurred. In conclusion novel polymeric films were produced through photopolymerization of thiol-ene based microemulsion. Formed films contain the same amount of water as the microemulsion they are formed from. Crystallization of surfactant causes the films to have white color, that is persistent after the water leaves the film.

03.19

9:15 STUDY OF THE BEHAVIOR OF MISCIBLE AND PARTIALLY MISCIBLE SYSTEMS USING SPINNING DROP TENSIOLOGY

Gloria Viner, John Pojman

The University of Southern Mississippi

We used spinning drop tensiometry to measure the effective interfacial tension between miscible and partially miscible systems. We also observed similarities in behavior between different types of miscible systems. For example, a system with an upper critical solution temperature (UCST), such as isobutyric acid (IBA) and water, had a sharp concentration gradient as did a system with a lower critical solution temperature, such as triethylamine and water. There were also differences between miscible and partially systems. For example, though a system such as IBA/water had a sharp concentration gradient, a different type of miscible system, dodecyl acrylate- poly(dodecyl acrylate), did not have a sharp concentration gradient. We also observed the effect of rotational forces on the behavior of miscible systems.

03.20

9:30 INTERACTIONS BETWEEN SULFUR CONTAINING AMINO ACIDS AND PERFLUORINATED FATTY ACIDS

Tiffani Holmes¹, Jacek Doskocz², Terrance Wright¹, Jerzy Leszczynski¹, Glake Hill¹
¹*Jackson State University*, ²*Wroclaw University of Technology, Poland*

The interaction of perfluorooctanoic acid (PFOA) with the amino acids cysteine and methionine was investigated using Density Functional Theory. Previous studies suggest that the peroxisome proliferator chemical, perfluorooctanoic acid, is circulated throughout the body by way of sulfur containing amino acids. We present conformational analysis of interactions of perfluorooctanoic acid with the sulfur containing amino acids which occur by way of hydrogen bonding where the hydrogen of the sulfhydryl group interacts with the carbonyl oxygen, and the amino nitrogen forms a hydrogen bond with the hydrogen of the -OH group of the fluorinated alkyl. We also show in our structures a recently characterized weak nonbonded interaction between divalent sulfur and a main chain carbonyl oxygen in proteins. B3LYP calculated interaction energies predict low energy conformations for complex systems of perfluorinated fatty acid interactions with cysteine, methionine, and tripeptides consisting of one of either sulfur containing amino acid with glycine end sites.

03.21

9:45 THEORETICAL COMPARISON OF PARATHION AND PARAOXON FOR THE DISCERNMENT OF ACETYLCHOLINESTERASE-PHOSPHOROTHIONATE/ORGANOPHOSPHATE INHIBITION IN MAMMALS

Jason Ford-Green, Devashis Majumdar, Jerzy Leszczynski
Jackson State University

Theoretical conformational analyses have been carried out on the neurotoxicant metabolite paraoxon. This compound is

the more toxic form of its indigenous yet still highly potent pesticide parathion (O,O-diethyl O-(4-Nitrophenyl) phosphorothioate). Studies were carried out at the density functional (DFT) B3LYP/6-31G (d,p) level of theory. The main pesticide activity is through the inhibition of the enzyme acetylcholinesterase (AChE). Six different low-energy conformers have been found for paraoxon at the B3LYP/6-31G (d,p) level of theory. The lowest low-energy conformer was found to exist in the *te* (175.38, 148.46) conformation, compared to the *tg* (176.4, 35.3) lowest low-energy conformer for parathion, illustrating that the OP nitroaromatic moiety positioning is conserved in the AChE active site. Hydration effects have also been studied at the DFT level using the polarized continuum model with a conductor-like screening reaction field (COSMO) approach for assessment of non-equilibrium energetic differentiation. The six low-energy conformers of paraoxon show more energetic favorability towards water solubility, as compared to the more hydrophobic nature of parathion. This alludes to the possibility of a more persistent systemic inhibition level. The Gibbs free energy distribution along the torsional angles bonded to the pentavalent phosphorus center relay that the paraoxon conformers require less free energy input at each low-energy conformation for flexibility.

10:00 Break

O3.22

10:15 INFLUENCE OF NON-TARGET WATER CONSTITUENTS ON THE VISIBLE-LIGHT MEDIATED TiO₂ PHOTOCATALYTIC OXIDATION OF CIPROFLOXACIN

Kelseia Blair¹, Tias Paul¹, Timm Strathmann¹
¹University of Illinois, ²Alcorn State University

This study is examining the effects that non-target water constituents, such as natural organic matter, have on the visible-light-mediated TiO₂ photocatalytic degradation of the fluoroquinolone antibacterial agent ciprofloxacin. Experiments are designed to address the following questions: 1) Do natural organic and inorganic chemical constituents present in natural water affect the photocatalytic treatment of ciprofloxacin? And 2) Does their presence slow down, accelerate, or have no effect on the reaction? Answering these questions will help us to better understand how effective these treatment processes will be when treating source waters with different properties. Individual non-target water constituents that will be examined include natural organic matter, bicarbonate, nitrite, chloride, sodium, calcium, and phosphate ions. All experiments will be conducted at pH 3 with 0.5g/L TiO₂ (anatase, Hombikat UV100) using light $\lambda > 400\text{nm}$. I anticipate that my experiments will show that ciprofloxacin will be selectively treated in the presence of most constituents, but that the reaction will slow down in the presence of a small number of constituents.

O3.23

10:30 PHOTOCHEMICAL REACTION OF A YE PRE-CURSOR 4-CHLORO-1,2-PHENYLENEDIAMINE AND ITS ASSOCIATED MUTAGENIC EFFECTS

Shuguang Wang, Charity Mosely, Gernerique Stewart, Hongtao Yu

Jackson State University

4-Chloro-1,2-phenylenediamine (4-Cl-o-PDA) is an aromatic diamine used as a precursor for manufacture of hair dyes and dyes of other purposes. 4-Cl-o-PDA has been found to be photomutagenic in bacteria when concurrently exposed to simulated sunlight irradiation. It is anticipated that the photochemical reaction and the associated reactive species generated are responsible for the photomutagenicity. Irradiation of 4-Cl-o-PDA by either outdoor sunlight or indoor lamp, one main photoproduct appeared and it was found to be 2,3-diamino-7-chlorophenazine, a dimerized product through the excited state reaction of 4-Cl-o-PDA in the presence of oxygen. The isolated yield of 13% for 2,3-diamino-7-chlorophenazine is far better than the oxidation reaction of 4-Cl-o-PDA by H₂O₂ and may therefore be used as a synthetic method. The half lives of transformation for 4-Cl-o-PDA in water (100 μM) are 39 min or 62 min, respectively, when exposed to sunlight or a 300 W Xenon lamp. The photomutagenicity of 4-Cl-o-PDA and its photoproduct were tested in *Salmonella typhimurium* TA 102. Under the same conditions, both compounds are photomutagenic. In addition, 2,3-diamino-7-chlorophenazine is both phototoxic and mutagenic.

O3.24

10:45 OPTIMIZATION AND REACTION KINETICS OF THE PRODUCTION OF BIODIESEL FROM CASTOR OIL

Scott Crymble, Rafael Hernandez, Todd French, Earl Alley
Mississippi State University

Ricinus communis, commonly known as the castor plant, has been cultivated for millennia as a source of oil for lamps and other applications. The seeds of the castor plant contain 35% to 55% oil. The major fatty acid component of castor oil is ricinoleic acid, which comprises 90% of the fatty acid profile. Ricinoleic acid is a monounsaturated, 18-carbon fatty acid with a hydroxyl functional group at C-12. This hydroxyl group causes castor oil to be highly polar, simplifying the mixing of the oil with methanol for the biodiesel reaction. Castor oil is more viscous than typical oils, which poses problems in the resulting biodiesel. A study of the esterification reaction kinetics of converting the castor oil into biodiesel was performed to determine reaction kinetics. This information can be used to engineer a biodiesel production facility with castor oil as a feedstock. Factors considered in the kinetics study included reaction temperature, catalyst concentration, ratio of methanol to oil, and reaction time. The resulting biodiesel and blends of castor biodiesel with other biodiesels (e.g., soy bean oil) were

tested for compliance with appropriate ASTM standards. Production of biodiesel from castor oil would provide two benefits: (1) a source of oil that does not compete with the food supply, and (2) reduce the US dependency on foreign oil by providing a domestic alternative to petroleum diesel.

O3.25

11:00 VIBRONIC INTENSITIES IN MOLECULAR SPECTRA, PART 1. THE THEORETICAL FOUNDATION

Dorothy M. Wood¹, Sean P. McGlynn²

¹Jackson State University, ²Louisiana State University

The ultimate objective of this work is the use of the vibronic intensity distributions in molecular spectra to determine the bond lengths of molecules in excited electronic states without having to evaluate Franck-Condon integrals (FCI.) We have achieved a novel system of mappings (FCM) by charting the exact FCI expressions. The FCIs, traditionally solved numerically, yield the vibronic intensity distribution in an electronic transition. The novel FCI equations presented here confirm the validity of that premise and, moreover, provide a direct source for bond lengths, novel details caused by slight variances in bond lengths, alternations of intensities at short bond lengths, clarifications for what otherwise might be thought of as background in an intensity distribution and even some reassignments of electronic transitions. The work presented here, while largely engrossed with theoretical foundations, will also present an illustrative, practical interpretation.

ECOLOGY AND EVOLUTIONARY BIOLOGY

Chair: Robert Hamilton, Mississippi College

THURSDAY MORNING

Chesnut

O4.01

9:00 PHYLOGENY, CLASSIFICATION, AND IDENTIFICATION OF THE TROPICAL PLANT FAMILY SAMYDACEAE

Mac Alford, Angela Dement

University of Southern Mississippi

The flowering plant family Samydaceae consists of 14 genera and about 240 species of tropical trees and shrubs. Although closely related to willows, cottonwoods, violets, and passion flowers, the family has received less attention because its species are exclusively tropical and have minute flowers, making

collection and identification difficult. In order to facilitate identification, an interactive, electronic key was created for all of the species in the family and will be demonstrated. The key was then used to check identifications of material collected for a study of relationships within the family. A previous study indicated that the largest genus in the family, *Casearia*, is not monophyletic, but the support values were generally low. In this study, we sampled the same species for different genetic regions to determine if additional variation would affirm or refute the previous hypothesis. DNA sequences from more variable plastid regions and from the nucleus proved useful, but DNA sequences from two mitochondrial regions was almost invariable (5 differences / 2000 base-pairs). Phylogenetic analyses of the DNA data affirm the previous hypothesis that *Casearia* is not monophyletic and that changes in classification are needed.

O4.02

9:15 RESPONSES OF LOWER MISSISSIPPI RIVER PHYTOPLANKTON BIOMASS AND COMPOSITION DUE TO NUTRIENT ADDITIONS

Heath E. Capello, Clifford Ochs

University of Mississippi

In large rivers like the Lower Mississippi River (LMR), abiotic features, such as discharge and light, are usually considered the major factors influencing the biomass and composition of potamoplankton. Because large rivers are often turbid, nutrient limitation is thought rarely to be an issue. However, as the light regimes change in rivers due to human alterations of lotic systems, nutrients may alter phytoplankton community dynamics. This research seeks to understand how nitrogen, phosphorus, and silica inputs can change LMR phytoplankton. Samples were taken in the main channel of the LMR at two different locations over the course of a year. After being returned to the laboratory, phytoplankton were cultured at in situ temperatures and treated with nutrients in a factorial design. Chlorophyll fluorescence and high-performance liquid chromatography were employed to track changes in biomass and community composition. Regardless of season, phosphorus, or some combination of phosphorus with other nutrients, had the greatest effect compared to the control treatments.

O4.03

9:30 MODELING THE MEDIAN TIME TO EXTINCTION IN POPULATIONS WITH AND WITHOUT INBREEDING-ENVIRONMENT INTERACTIONS

Joy Liao, David Reed

University of Mississippi

The persistence time of populations of endangered plants and animals is a central focus in conservation biology and policy decision-making. Besides genetic deterioration (genetic drift and inbreeding) and environmental stochasticity (catastrophes), mounting evidence suggests that the interactions between inbreeding and stress may also be a critical consideration in

estimating extinction probabilities, which has not been taken into account by major conservation organizations. We used computer simulation to determine whether including inbreeding-environment interactions reduces the median time to extinction (MTE), and we examined the relationship between the carrying capacity (K), the frequency of stressful environmental conditions (P), and the number of haploid lethal equivalents (B) to the decrease in extinction time. The results demonstrate that inbreeding-environment interactions reduce persistence time by approximately 30% over a wide range of carrying capacities.

O4.04

9:45 TRANSFORMATION OF ANTHRACENE BY IMMOBILIZED LACCASE FROM TRAMETES VERSICOLOR

Xiaoke Hu, Peng Wang, Xueheng Zhao, Huey-min Hwang
Jackson State University

In order to enhance the stability of the free enzyme, the laccase of *Trametes versicolor* was immobilized on the functionalized nanoparticles SBA-15 with the average diameter less than 10 nm. Laccase mediated oxidation of anthracene (ANT) were investigated in the presence of two mediators, 2,2'-azino-bis-(3-ethylbenzothiazoline-6-sulphonic acid) diammonium salt (ABTS) and 1-hydroxybenzotriazole (HBT). Our results indicated that the oxidation of ANT was more efficiently enhanced by adding 1 mM of HBT than that by adding 1 mM ABTS. After 48 h oxidation HBT group significantly oxidized ANT with residue 58% relative to 88% in the ABTS group. According to the HPLC and GC/MS analyses, the main product of ANT oxidation is anthraquinone (ANQ). The fluorescein diacetate (FDA) uptake of two human cell lines was used to assess the cytotoxicity of ANT and its oxidation product ANQ. In the HaCaT cells, treatments with ANT and ANQ at the concentration of 5 and 10 μ M exhibited significant cytotoxicity compared to the PBS control group containing 4% DMSO ($P < 0.05$). In the experiment with A3 lymphocytes, significant decreases in cell viability (the percent decreases in viability ranged from 13% to 24%) were detected for treatments with ANT and ANQ at 5 and 10 μ M, respectively. The results illustrated that the oxidation product ANQ is less toxic than the parent compound ANT as well. Both ANT and ANQ showed no significant genotoxicity at 5 and 10 Mm.

10:00 Break

O4.05

10:15 A METHOD OF PRODUCING RANDOM AMPLIFIED POLYMORPHIC DNA MARKERS IN IPOMOEA PES CAPRAE

Lili Wu, Robert Hamilton
Mississippi College

Ipomoea pes caprae (Convolvulaceae) is a widely distributed member of the Morning Glory family. Individuals of

I. pes caprae are found on coastlines and along railway lines throughout the tropics. *Ip. pes caprae* is an excellent example of a plant dispersed by ocean currents. Studies of the population genetics of *I. pes caprae* could reveal much about the population genetics of such species. Unfortunately, there is very little genetic information for *I. pes caprae*. In our research, we successfully produced DNA markers for genetic analysis of *I. pes caprae*. DNA was extracted from leaves and then used in RAPDs PCR with 10bp random primers. We separated RAPDs fragments on a polyacrylamide gel. We removed RAPDs PCR products from the gel and reamplified them with the same primers. Reamplification products were cloned and sequenced. DNA sequence data were then used to design primers specific to that sequence. Primers selected specific to the sequenced RAPDs fragments were then used to reamplify a fragments from genomic DNA specific to the specific primer. This method will be used in the future to develop a number of such fragments to be used as markers for population genetic analysis.

O4.06

10:30 ESTABLISHMENT OF MICROSATELLITE BASED PCR ANALYSIS OF SPOTTED SALAMANDER

Huihui Huang, Robert Hamilton
Mississippi College

The Spotted Salamander, *Ambystoma maculatum*, is common throughout forests of eastern North America. Destruction and fragmentation of forests in eastern North America have reduced populations of *A. maculatum*. Road building can fragment local breeding populations, possibly reducing effective population size. Recently the Natchez trace was extended through the range of a breeding population of *A. maculatum* in Jackson, Mississippi. We will use microsatellite markers to assess population genetic changes over several years as a test of the prediction that such road building reduces effective population size. Initially, we need to develop a method of analysis, which we report here. We used previously developed microsatellite primers in this study. The published protocols resulted in a large number of extra fragments in PCR reactions, requiring us to modify conditions to produce bands specific to the loci specified in the published protocol. Our adjustments included Hot Start PCR, adjustment of annealing temperatures and adjustment of the final concentration of Mg^{2+} , dNTPs, and primers.

O4.07

10:45 BACTERIOPLANKTON ABUNDANCE AND PRODUCTION IN THE LOWER MISSISSIPPI RIVER

Clifford Ochs, Heath Capello
University of Mississippi

As central as the Mississippi River is in the history, development, and identity of North America it is remarkable that

so little is known of its food web structure or biogeochemical processes. As one component of a sustained investigation of the lower Mississippi, we are conducting studies of spatial and temporal dynamics in nutrient transport, plankton community biomass and composition, and plankton production in the main channel. This presentation focuses on characteristics of the bacterioplankton community. Between June 2006 and August 2007, the abundance of free-living bacteria in the water-column ranged between 3 and 25 billion cells per liter. Rates of bacterioplankton production in river water varied from 17 to 243 micrograms C per liter per day. The pattern in bacterioplankton production is related to water temperature, with maximum rates of production in mid-summer and lowest rates in winter. From laboratory measurements of bacterial production and respiration in size-fractionated samples, we conclude that an average of 82% of whole-water bacterial production and 47% of bacterial respiration occurs by bacteria attached to suspended particles. These results suggest differences in the metabolism and possibly composition and physiology of free-living vs. attached bacteria. The relevance of these findings to the Gulf of Mexico will be explored.

O4.08

11:00 POTENTIAL EFFECTS OF SILVER CARP (HYPOPHTHALMICHTHYS MOLITRIX) ON THE PLANKTON COMMUNITY OF FOREST HOME CHUTE, WARREN COUNTY, MISSISSIPPI

Orathai Pongruktham, Clifford Ochs
University of Mississippi

A short-term, pilot study of the structure of the plankton community of Forest Home Chute was conducted between October 2006 and July 2007 to assess the potential impact of the invasive fish, silver carp (*Hypophthalmichthys molitrix*), on the plankton community of the system. Forest Home Chute is a moderately productive oxbow lake which occasionally connects to the Mississippi River. Plankton and gut contents of silver carp were collected from Forest Home Chute and analyzed by light microscopy for composition of phytoplankton and zooplankton. The most common phytoplankton observed in the water-column were euglenoid algae, cyanobacteria, and diatoms. The vast majority of zooplankton were rotifers with densities occasionally exceeding 8,000 per liter. Macrozooplankton (cladocerans and copepods) were uncommon. To evaluate the feeding behavior of the fish, we compared diversity and concentrations of plankton in the water-column with plankton in the fish guts. Our results suggest some degree of selectivity in planktivory by silver carp. For example, in October, euglenoid phytoplankton were a much bigger proportion of phytoplankton in the upper gut of the fish compared to their presence in the water column. In contrast, the relative frequency of cyanobacteria in fish guts was less than their relative frequency in the water-column. Observations revealed that some of the phytoplankton consumed by silver

carp, including diatoms and euglenoid algae, are able to survive transit through the fish gut.

11:15 Business Meeting

THURSDAY AFTERNOON

Grand Ballroom

6:00 Dodgen Reception and Divisional Poster Sessions Please set up between 4:00p and 4:30p

P4.01

THE EFFECTS OF LATE 20TH CENTURY LAND USE ON BIRD POPULATIONS AT PLYMOUTH BLUFF ENVIRONMENTAL CENTER, NORTHEASTERN MISSISSIPPI

Lauren Thead, Kristen Chipley, Paul Mack
Mississippi University for Women

Plymouth Bluff, located just southwest of Columbus, MS, is an area of land near the Tennessee-Tombigbee Waterway managed by the Mississippi University for Women (MUW). Although local bird populations were assessed in the 1930s in an area that is now primarily encompassed by the Plymouth Bluff Center, land use in the area has changed substantially over the last seventy years. To assess the effects of recent land use patterns on local bird populations, we have used circular plots to estimate population densities for a number of resident bird species in lowland hardwood forest, upland pine, and cypress swamp habitats at Plymouth Bluff. Preliminary analyses of data collected on current – primarily wintering resident – bird populations will be presented along with general comparisons of current estimates with those based on specimen collection records from the 1930's.

P4.02

RESIDUAL TOXICITY OF SOIL, WATERS AND THE IDENTIFICATION OF ACCUMULATED COMPOUNDS ON THE MISSISSIPPI GULF COAST COMPARED TO THE TOXICITY OF THE NINTH WARD OF NEW ORLEANS FOLLOWING HURRICANE KATRINA

Louis Hall, Mack Felton, Jr., Abigail S. Newsome
Mississippi Valley State University

Soil and water samples were taken from areas affected by Hurricane Katrina along the Gulf Coast and compared to soil and water samples from New Orleans to ascertain the difference in toxicity and identify residual compounds. Samples were analyzed using a DeltaTox System which is used to screen and monitor environmental samples using *Vibrio fischeri* to determine toxicity. Percent light gained indicate less toxicity and light loss indicate increased toxicity. GC/MS was performed to identify any residual, accumulated compounds remaining in the

soils and waters of the areas. The toxicity of the water sampled inshore along the Mississippi Gulf Coast ranged from -17% to +102% bioluminescence with a pH range of 7.34 to 8.38. The toxicity of the waters of the Gulf of Mexico ranged from +11% to +242%. The pH ranged from 7.12 to 7.92. The toxicity of the soil sampled ranged from -37% to +6%. The pH had a range of 6.06 to 8.10. Propanil, o-aminoacetophenone, 2-aminobenzonitrile, and trans-1,3-pentadiene were identified using GC/MS in a range of 3.79 Mcounts to 0.14 Mcounts. The toxicity of the soil samples from New Orleans ranged from -26 % to +134 % bioluminescence, with a pH range of 6.62 to 7.98. The toxicity of the water ranged from 30 % to +68 % with a pH range of 6.93 to 7.48. GC/MS confirmed the presence of various compounds ranging from 4.82 Mcounts to 0.20 Mcounts.

P4.03

STEROID HORMONES AND IMMUNE FUNCTION IN NORTHERN CARDINALS (*CARDINALIS CARDINALIS*): DO THE SEXES DIFFER AND DO HORMONES IMPACT IMMUNE FUNCTION?

Jocole Green and Jodie M. Jawor

University of Southern Mississippi

A strong immune system is important to survival; individuals with strong immune systems can live longer and can produce more progeny because they see more breeding attempts. Differences between the sexes in immune system strength have been reported due to different behaviors/energy inputs during reproduction. Additionally, testosterone (T) can negatively affect the immune system either directly on its own, or indirectly by triggering corticosterone, (CORT) production which suppresses the immune system. Both T and CORT can be elevated during reproduction. Here we investigate the activity of the immune system in male and female Northern Cardinals (*Cardinalis cardinalis*), a strongly bi-parental species, and the influences of hormones on immune actions during breeding. Plasma samples from 107 individuals (51 females, 56 males) were collected during May-August of 2007 at the Eubanks/Lake Thoreau property owned and maintained by USM in Hattiesburg, MS. Samples were analyzed for T with an ELISA-immunoassay, CORT was analyzed with a competitive binding radio-immunoassay, and immune function (complement activity, CH_{50}) was assessed with a hemolytic assay. There was a significant difference in T between the sexes with males having higher levels than females. CORT and CH_{50} scores were not significantly different between the sexes, although males tended to have higher levels of both measures. Within each sex there was no co-variation between CH_{50} score and levels of T or CORT. We found no differences between the sexes in immune response in this study. A possible reason is the weak sexual selection and the extreme parental behavior observed in this species. We also did not have co-variation between hormones and immune function, and this may be linked to the overall low levels of T and moderate levels of CORT observed in this

species.

GEOLOGY AND GEOGRAPHY

Chair: James Starnes, MS Department of Environmental Quality

Vice-chair: George Phillips, Dept. of Wildlife, Fisheries, and Parks

THURSDAY MORNING

Juniper

O5.01

9:00 MINING IN STREAMS: POLICY QUESTIONS FOR MISSISSIPPI

Michael B. E. Bograd

Mississippi Office of Geology

The issue of mining in streams elicits strong responses from two camps: those supporting exploitation of needed industrial minerals and those concerned about adverse environmental impacts. The focus in Mississippi is on in-stream dredging and excavation on bars for sand and gravel. The incentive to exploit river bars is high as county governments mine washed gravel with no overburden to provide low-cost services to taxpayers and private operators maximize profits because of lower costs. Such aggregates are vital to construction and resurfacing of roads. Local gravel resources may exist only in stream bars and alluvium. However, mining sand and gravel from bars and dredging in channels causes aesthetic and environmental impacts, including turbidity, bank sloughing, headcutting, and vegetation removal. These impacts can affect wildlife and recreational activities, damage property, even endanger bridges. Some argue this is a renewable resource, subject to natural reclamation. Areas of concern are the Bouie River near Hattiesburg, the Buttahatchie River near Columbus, and streams in southwestern Mississippi. The Amite and other rivers have been adversely affected by mining in the Florida parishes of Louisiana, and there is interest in mining along those streams in Mississippi. Mississippi's 30-year-old surface mining law allows mining in streams if a permit is issued, but the regulatory authority prohibits adverse environmental damage. Regulators must balance demands for needed aggregates with environmental consequences of mining affecting bars and stream channels.

O5.02

9:15 CHARACTERISTICS OF THE AGGREGATE

INDUSTRY AND MEMPHIS STONE AND GRAVEL COMPANY'S MODERN MINING CYCLE

Alan G. Parks, William D. Kelley, III

Memphis Stone and Gravel Company

Memphis Stone and Gravel Company mines "pre-loess" sand and gravel terrace deposits, often referred to as the Upland Complex, to produce high quality construction aggregate for the construction markets in the Memphis Metropolitan Area and Northwest Mississippi. Aggregate is broadly divided into three categories: sand, gravel, and crushed stone. These products are the basic raw materials used in the manufacture of concrete. A five part "Mining Cycle" brings these natural resources from initial discovery to the market place and returns the land for other productive use. These five parts include: exploration, planning, mining, processing, and reclamation. Construction aggregate is a high weight, high volume commodity, which trades at a relatively low unit cost. Proximity to market and efficient management is critical due to the high transportation costs. According to USGS estimates, per capita consumption of aggregate exceeds ten tons per year. It is projected that we will require as much aggregate in the next twenty-five years as we have used the previous century. Memphis Stone and Gravel Company is well positioned to meet this demand, but aggregate availability will be challenged by competing land uses, regulatory approvals, and the geological characteristics in the area. Often aggregate mining is faced with community opposition with concerns about environmental impacts, effects on property values, and increased traffic. But given the opportunity Memphis Stone and Gravel Company can demonstrate that the modern mining cycle does not require a community to accept aggregate development at the expense environmental protection and quality of life.

05.03

9:30 APPLICATION OF SATELLITE IMAGERY AND FIELD SURVEY TO ESTIMATE AGRICUL- TURAL CHEMICAL USE

Fazlay Faruque, Hui Li, Worth Williams, Teresa Carithers, Kaye Wilson

The University of Mississippi Medical Center

The purpose of this research was to estimate the amount of agricultural chemicals used on farm lands. Estimation was conducted based on crop type identified from satellite images, and then that estimation was evaluated through field survey. We had acquired a standard product from QuickBird Satellite for a rural agricultural county in Mississippi. A two-step classification: a) land use and land cover and b) crop type was performed. The land use and land cover classification (USGS Level I) involved shadow and cloud removal, texture bands calculation, unsupervised classification, and post classification processes. The overall classification accuracy was 95.31% in this region. For crop classification, the classification procedure included texture band

extraction, optimum band selection, supervised classification with Maximum Likelihood algorithm, post classification, and accuracy assessment. Overall accuracy assessment was 72.41%. Once the crop type and land area were identified, the amount of chemicals (fungicides, herbicides, and insecticides) used per acre on corn, rice, soybean, wheat, and cotton fields was calculated by multiplying the USDA recommended amount of chemicals per acre times the area of each cultivated land segment. This project also involved comparison of the estimated chemical amounts with actual chemicals applied. Data regarding the actual chemicals applied to crops were collected by surveying the farmers and gleaned from records they had kept for their own purpose. Statistical analysis suggests a lack of correlations between estimated and actual survey measures. However, crop type classification using high resolution satellite imagery was performed successfully with the exception of rice.

05.04

9:45 CATAHOULA SANDSTONE AND QUARTZITE, THE HISTORIC BUILDING STONE OF SOUTH- CENTRAL MISSISSIPPI

David T. Dockery III, D. Kenneth Davis

Mississippi Office of Geology

The Catahoula Formation contains sands, clays, sandstones, and sedimentary quartzites along its east-west outcrop belt across south-central Mississippi. Flagstone slabs of sedimentary quartzite were used in 1840 to build a culvert archway for the state's first narrow-gauge railroad near Grand Gulf in Claiborne County, a structure still standing. Catahoula sandstone was used as a facing stone for the state house, the Old Capitol Building, in Jackson, Mississippi. Skates' (1990, p. 36-37) history of the Old Capitol Building recorded the quarry site as "Mississippi Springs, a small antebellum resort east of Raymond." State architect William Nichols inspected the quarry in September of 1836 and found that the stone mason "had been diverting stone quarried for the state house to other purposes." "Nichols reported: 'the ground around the quarry is covered with headstones and footstones ... [and] large square tombs.'" Examples of such gravestones can be seen today in the old Raymond cemetery, where many have fallen into disrepair. Here, the most amazingly preserved Catahoula sandstone is found in the monument to the Alston children (died 1837) in which the inscriptions appear freshly engraved. Less competent sandstone was sent to the state house and has since been replaced. The Mississippi Springs quarry was located in September of 2007 at 32 15.836' N and 90 22.896' W, a site near the proposed Norrell Road extension from the I-20 interchange to Byram.

05.05

10:00 DELTA FLOW MODEL: THE NEXT GENERATION

Pat Mason

Mississippi Office of Land & Water Resources

The Mississippi River valley alluvial aquifer is an important groundwater resource. It is unusually prolific and very heavily used, and managing its water supply is vital to the prosperity of a large part of the state. It has unique discharge and recharge characteristics not seen in most aquifers. The area is well suited to model study and optimization due to an active monitoring network. Work is underway on a new groundwater flow model for this aquifer, to be used in predicting groundwater changes. The first and second generation models built for this aquifer, years ago, were necessarily constrained by heavy data acquisition and programming requirements. The emphasis was on gathering basic information on the aquifer, and on using simplified aquifer assumptions, with model calibration playing a large role in determining projected future heads in the aquifer. This third generation project builds on existing data, but emphasizes assumptions and approaches that will generate a model which will be as reflective of real geohydrologic conditions as possible, and will be useful for running multiple scenarios on demand. Early work has revealed several parameters which need to be addressed in new ways. These are: infiltration properties, base flow, pumping rates, boundary issues, and georeferencing. Problems, techniques, and new data sets are presented to illustrate the new approaches and tools currently in use to construct the model.

10:15 Break

O5.06

10:30 "DELTA"-BLUFF MARGIN ALLUVIAL FANS

James Starnes

Mississippi Office of Geology

Lateral migration of the Mississippi River into the river's east valley wall creates an escarpment of Peorian loess, Early Pleistocene Pre-loess terrace deposits (coarse sand and gravels of the ancestral Mississippi River), and underlying Tertiary formations (which commonly form the toe of the escarpment). As the river migrates westward from the escarpment, the trunks of dendritic drainage systems must cross an alluvial plain of low relief. Alluvial fans develop where the stream trunk enters the "Delta" as these streams lose their energy and their bed load. The fans owe their size to the extensiveness of their watersheds and are fed by an unconsolidated sedimentary section with a high susceptibility to erosion and where mass wasting events such as failures in the loess are commonplace. Streams receive spring water in their upper reaches from loess/terrace and Tertiary bedrock where lithologies permit. The trunk of the stream recharges the alluvial fan and possibly even the Mississippi River alluvial aquifer where alluvial fans and the river alluvium inter-finger. Unlike much of the Mississippi River alluvium, the "Delta"-bluff margin alluvial fans may receive recharge from surface waters over parts of the fan. The thickest accumulation of coarse-grained sediments is near the apex of the fan and this may be a local source of groundwater for agricultural

irrigation or domestic wells. The fans are elevated above the flood plain surface and are associated with running water, and therefore, they commonly contain large, well-preserved, often multi-component, archaeological deposits.

O5.07

10:45 A HEURISTIC MODEL OF TRIBUTARY AND TRUNK STREAM INTERACTIONS

Zachary Musselman

Millsaps College

The purpose of this poster is to present the Confluence Effects Model (CEM). The CEM may be used to predict the resulting geomorphological impacts within a tributary stream's mouth with varying changes in trunk stream discharge and channel morphology. Currently, there is no model that directly addresses the morphological response of a tributary stream's confluence downstream of a dam. A few models do exist that have been shown to effectively predict channel response downstream of a dam in a general qualitative way. These models do not directly address tributary responses, though they may indicate the trunk stream changes to which the tributary responds. Tributary responses to imposed trunk stream conditions are simply implied through the confluence-reach effects on the impounded mainstem. Using the relationships of sediment load, stream capacity, and discharge, six possible cases that may occur within an alluvial system, downstream of an impoundment are presented. The six cases are used to qualitatively model confluence effects in downstream reaches of a dammed alluvial river with "hungry water". This approach is similar to classification and qualitative predictive models of channel changes within mainstem streams downstream of dams. The heuristic model offered here illustrates the numerous resulting cross-sectional and channel changes possible after impoundment. The six cases in the CEM were chosen because previous work on downstream dam effects indicated a lack of attention toward the affect of trunk stream morphometric changes on tributary stream morphometry.

O5.08

11:00 MAGNETOSTRATIGRAPHY SUSCEPTIBILITY USED FOR HIGH RESOLUTION CORRELATION AMONG PALEOCENE/EOCENE BOUNDARY SEQUENCES IN EGYPT, SPAIN AND THE U.S.A.

Brooks Ellwood¹, Aziz Kafafy¹, Ahmed Kassab¹, Jonathan H. Tomkin¹, Abdelaziz Abdeldayem¹, Nageh Obaidalla¹, Kelli W. Randall¹, David E. Thompson¹

¹Department of Geology and Geophysics, ²Geology Department, Faculty of Science, Tanta University, Egypt, ³Geology Department, Faculty of Science, Assiut University, Egypt, ⁴Plum Creek Timber Co., Inc.

We have used the magnetostratigraphic susceptibility technique to establish high resolution correlation among Paleocene/Eocene (P/E) boundary sequences in Egypt, Spain and

the US with reference to the Global Boundary Stratotype Section and Point (GSSP), defining the base of the Eocene, located near Luxor in Egypt. The base of the Eocene represents the beginning of the Paleocene Eocene Thermal Maximum identified by a negative $\delta^{13}\text{C}$ excursion (CIE). While onset of the CIE is somewhat gradual in most reported P/E sections, at the GSSP it is abrupt and begins immediately after an unusual lithologic change indicating an erosional or non-depositional hiatus. Due to the hiatus in the GSSP, we have chosen a section from Zumaia, Spain, as the MS reference section for the P/E boundary interval. Because the correlation between the Zumaia section in Spain and the MGS-1 Core from the US is excellent, and because the MGS-1 data represent a longer interval of time than does the Zumaia data, we use the magnetic susceptibility (MS) data from the MGS-1 Core to extend the MS chron zonation to establish a MS composite reference section (MS CRS) for the P/E boundary interval. Orbital forcing frequencies are then identified, via spectral analysis, to determine that the portion of the Zumaia reference section sampled represents ~400 Kyr of sediment accumulation. Extending the MS chron zonation into the MS CRS allows age assignment to MS chrons for all five sections with a resolution of ~20,000 years.

THURSDAY AFTERNOON

Juniper

O5.09

1:30 SOIL CHARACTERISTICS OF THE HELEN MOYERS BIOCULTURAL RESERVE, YUCATÁN, MEXICO

Stan J. Galicki, Mia Cowgill, and Frances Davidson
Millsaps College

Samples obtained from 35 auger holes ranging up to 1.8 m in depth were analyzed for carbon content and mineralogy as part of reconnaissance soil sampling across the 1600 ha Helen Moyers Biocultural Reserve in Yucatán, Mexico. The Moyers Reserve is situated in the Bolonchen District which is composed of knobby cone karst hills developed on the Eocene Chichen Itza limestone. The pedogenic soils are composed of approximately 90% kaolinite and up to 10% calcite with traces of illite and crystalline quartz. The total carbon content averages 14.8% with organic content values averaging 10.8%. Soils exhibit a decrease in organic carbon content with depth. Samples in the upper 10 cm contain significantly greater inorganic carbon and average $14.24\% \pm 2.38$. Samples at depth average $8.43\% \pm 3.79$. No change in inorganic carbon was observed with depth. The mineralogy and carbon content of samples taken within a natural depression, or aguada, were not significantly different from the samples taken from the surrounding area. The deepest auger

hole within the aguada recovered angular limestone fragments at 1.8 m. The aguada, reportedly an important source of water to the ancient Maya, appears to have originated due to dissolution and collapse of the limestone bedrock.

O5.10

1:45 HYDROSTRATIGRAPHIC RELATIONSHIPS OF THE WILCOX AND CLAIBORNE GROUPS IN NORTHWESTERN MISSISSIPPI AND WESTERN TENNESSEE

Daniel Larsen¹, Kasey Hundt¹, Angela Owen¹, Brian Waldron¹, Roy Van Arsdale¹, David N. Lumsden¹, Ryan Csontos¹
¹Dept. of Earth Sciences, The University of Memphis, ²Ground Water Institute, The University of Memphis

Detailed lithostratigraphic correlation of Paleocene through Eocene Wilcox and Claiborne Group strata in northwestern Mississippi and western Tennessee is being conducted to address correlation problems and assess hydrostratigraphic relationships across the state line. Specifically, borehole geophysical log and limited outcrop data are used to clarify stratigraphic relationships among these intervals and identify correlation problems that require additional data to resolve. Stratigraphic correlations of Wilcox and Claiborne strata in the northern Mississippi Embayment are hampered by absence of fossiliferous marine units, limited exposure and few detailed stratigraphic core studies. Traditionally, stratigraphic nomenclature and interpretations for the Wilcox and Claiborne in northern Mississippi have been tied to correlative marine units in the southern part of the state. Although lithostratigraphic correlations of Wilcox strata in western Tennessee are generally matched to similar intervals in northern Mississippi, specific formations in the Wilcox of Mississippi (Nanafalia, Tusahoma, and Hatchitigbee/Bashi) are difficult to directly correlate to those of western Tennessee (Fort Pillow and Flour Island). In the lower and middle Claiborne, five formations identified in northern Mississippi correlate to a single formation, the Memphis Sand, in western Tennessee. The results from the lithostratigraphic correlation suggest that the Memphis and Fort Pillow aquifers are complexly related to several thinner aquifer intervals in northern Mississippi.

O5.11

2:00 SURFACE GEOLOGY OF THE MOSCOW 7.5-MINUTE QUADRANGLE, SOUTHWESTERN KEMPER COUNTY, MISSISSIPPI

David E. Thompson

Mississippi Office of Geology

The recent announcement of a proposed lignite mine and adjacent coal-gasification power plant in Kemper County, Mississippi, to be underway by 2013, would constitute the second mine-mouth lignite power plant in the state. The Mississippi Office of Geology has completed a surface geologic map of the Moscow 7.5-Minute Quadrangle, which includes the pro-

posed mine site. Stratigraphic units present in the quadrangle (listed in ascending order) include the Grampian Hills Member of the Nanafalia Formation and the Tusahoma Formation, both of Paleocene age, the Hatchetigbee Formation of Eocene age, and Holocene Alluvium. The lignitic interval in Kemper County is approximately 165 feet thick, includes interbedded to interlaminated sand, silt, and clay, and is positioned largely within the Tusahoma Formation. The lignite ore body is comprised of four, primary, economic seams and three, thin, uneconomic seams. Correlation of geologic units and lignite seams to the existing mine and power plant in Choctaw County, Mississippi, indicates that the lignite ore body in Kemper County includes some equivalent correlative seams, and incorporates some younger seams as well. One seam in particular, the 'J Seam', may be 10, or more, feet thick. Mapping subdivides the Tusahoma Formation into three, informal, units; lower, middle and upper. The lowest seam of the lignitic interval is positioned approximately 145 feet above the coarse-grained clastics of the Nanafalia Formation (Lower Wilcox Aquifer). The Hatchetigbee Formation is represented in the quadrangle by a grouping of small hilltop outliers in the southwestern portion of the quadrangle.

05.12

2:15 UPPER LEAF RIVER BASIN BASEFLOW STUDY: A PRELIMINARY STUDY FOR SURFACE WATER/GROUNDWATER INTERACTIONS WITHIN THE PASCAGOULA BASIN

Leonard Rawlings

Mississippi Office of Land and Water Resources

The Pascagoula River System is the nation's largest, unregulated and pristine river system. Streams in the Pascagoula Basin are generally the first to be affected during times of drought. With the presence of several industries in this basin that use surface water, staff of MDEQ/OLWR are conducting studies within the basin to determine the sources of baseflow for the basin's streams. During October 2007, 25 sites near 7Q10 were individually measured during a baseflow study conducted in the Upper Leaf River Basin utilizing SonTek Flowtracker Acoustical Doppler Velocity meters. The Upper Leaf drains 1,752 mi² and has been in drought conditions throughout the year. The baseflow sites' discharge ranged from no-flow observations to a basin high of 375 ft³/s discharging into the Lower Leaf River Basin. Utilizing ArcGIS, the basin's topography, geology and hydrology was mapped and analyzed. Results indicated that geology plays a pivotal role in the distribution of ground water flow into the surface water streams based on unit discharges per square mile. Generally, flows in the northern third of the Upper Leaf were non-existent correlating to geology. In the southern third, ground water discharge is more prevalent also correlating to the basin's geology. This study will form the foundation for further studies in the basin for ground water/surface interactions utilizing the mappable Miocene aquifer units and stream incision to locate

significant ground water contributions. These methodologies can then be applied to the entirety of Pascagoula River Basin.

2:30 Break

05.13

2:45 BASELINE ASSESSMENT OF NUTRIENT LOADING AND SEDIMENT GEOCHEMISTRY OF TOWN CREEK, JACKSON, MS

Brad Winton and Stan J. Galicki, Millsaps College

An assessment of aqueous nutrient loading and organic sediment geochemistry from five sites on Town Creek provide baseline chemical data for the urban watershed. Jackson, Mississippi has a population of over 184,000 residents in the 174 km² city limit. Seven of the ten larger creeks that flow through the city originate within the city limits and are tributaries of the Pearl River. Land use within the 34 km² Town Creek watershed ranges from residential to industrial. Nitrate and sulfate concentrations increase from the headwater to the mouth with concentrations averaging 11.80 and 3.55 mg/l respectively. Soluble reactive phosphorus averages 1.05 mg/l and has been detected at concentrations in excess of 2.75 mg/l. The greatest soluble reactive phosphorus concentrations occur in the sampling site immediately downstream of the Sonny Guy Municipal Golf Course. Total dissolved solids average 325 mg/l; total suspended solids are negligible. The concentrations of 16 EPA priority pollutants were evaluated using EPA 8270C protocol. Polycyclic aromatic hydrocarbons (PAH) present in sediment fines were typical of pyrogenic compounds found in urban stream sediment. Sample sites within 2 km of the mouth contained detectable PAHs.

05.14

3:00 MISSISSIPPI GEOLOGY OF NATIVE LITHIC MATERIALS

James Starnes

Mississippi Office of Geology

Man has likely occupied Mississippi more than 12,000 years. Raw materials location and utilization, provided by geological exposures, was essential for the survival of early Mississippians. While projectile point styles are excellent indicators of successive cultural time periods, analyses of lithic raw materials offers the only window into the migration patterns and trade routes of early Mississippians. Exquisite cherts of the Fort Payne Formation were some the earliest utilized materials. The Fort Payne was a dominant lithic source of the earliest Clovis peoples, the first known inhabitants of Mississippi, migrating from the Tennessee River Valley. Over time, waves of immigrants made their way into Mississippi and began to utilize more local materials such as chert and other rock-type gravels from the Tuscaloosa Formation, Citronelle Formation, and pre-loess terrace deposits, and their derived units such as stream terraces and alluvium. In their search for native geological

materials, they also began to comb Tertiary outcrops and found localized, high-quality, orthoquartzites in outcrops of the Tallahatta Formation, Kosciusko Formation, Catahoula Formation, and Hattiesburg Formation (the latter of the two orthoquartzite occurrences have only recently been reported). To a lesser degree, though just as important, was the utilization of limestone, ironstone, and sandstones, which today can be traced to outcrop sources and show the remarkable awareness Native Americans had of the State's bedrock geology. The accurate petrological identification of lithic artifacts on prehistoric sites is essential to the interpretation of Mississippi's rich archaeological record.

05.15

3:15 SHALLOW SEISMIC REFLECTION IMAGING OF THE PENITENTIARY FAULT AND ITS ASSOCIATION WITH THE COMMERCE GEOPHYSICAL LINEAMENT, TAMMS, SOUTHERN ILLINOIS

Erin Elliott, James Harris

Millsaps College

The surface expression of the Commerce Geophysical Lineament (CGL), a series of northeast-trending gravity and magnetic anomalies extending from northeast Arkansas to central Indiana, is characterized by numerous areas of structural deformation. Previous studies have associated the Penitentiary Fault (PF), in southern Illinois, with a portion of the CGL. The surficial projection of the PF is coincident with a linear segment of the east-facing bluff line that separates the Cache River Valley (CRV) from the adjacent upland. To further examine the PF, a one-kilometer-long seismic reflection profile was collected near Tamms, Illinois, crossing the surficial projection of the PF. The shear-wave seismic reflection data were acquired using a 12-channel landstreamer and a sledgehammer/I-beam seismic energy source. Field records showed an abundance of shallow reflection arrivals and the processed profile was of good quality with coherent reflections from the bedrock surface (eroded Paleozoic carbonates) and overlying Quaternary deposits. East of the bluff line, in the CRV, depth to bedrock was interpreted to range from approximately 30-50 meters. To the west, in the uplands, depth to bedrock is approximately 10 meters. Beneath the bluff line, a complex zone of high-angle faults, consistent with the PF, was interpreted. In addition, shallow deformation was imaged in the CRV sediments, possibly associated with a previously unidentified fault zone.

3:30 Division Meeting and Chair Elections

FRIDAY AFTERNOON

Chesnut

2:45 Joint Division Session with History and Philosophy of Science

A HISTORY OF THE MISSISSIPPI GEM AND MINERAL SOCIETY: A HALF CENTURY OF FOSTERING INTEREST IN EARTH SCIENCE.

John Davis

Mississippi Museum of Natural Science volunteer

Archival research and interviews explain the 50 year success of the Mississippi Gem And Mineral Society. From its inception the Society has functioned through cooperation by academics, businessmen, community leaders and engaged amateurs. On October 15 1957, then Assistant Professor of Geology Wendell Johnson requested space at Millsaps College for "A lapidary club for people interested in this hobby." The Society's first president was J. W. Tucker, founder of the Jackson Daily News. It recruited scientists like Fred Mellen, discoverer of the Tinsley Dome, to give programs. Wendell Johnson, Chairman of Geology at Millsaps, held classes in mineralogy and paleontology. Robert Paxton of Sun Oil conducted field trips. The first woman president, Sue Pitts, and her architect husband Leslie, developed rich relationships with the business community. The Society offered "fun" activities, with Martha Johnson teaching classes in jewelry making and other lapidary skills. In 1960 the Society initiated its show for minerals, rocks, lapidary work and fossils. The 2007 show drew 4,000 visitors and commercial vendors. A bulletin educates the membership and chronicles their activities. Youth members like David Dockery have found inspiration and career development. Members have discovered significant specimens such as the Zygorhiza whale state fossil. Field trip records are used to locate minerals and fossils. The Society now has about 200 members and is completing a facility in Florence MS equipped for lapidary and earth science education. The Mississippi Gem And Mineral Society demonstrates that public interest in science can be maintained.

HEALTH SCIENCES

Co-Chair: Ibrahim Farah, Jackson State University

Co-Chair: LaToya Richards, University of
Mississippi Medical Center

Co-Vice Chair: Stacy Vance, University of
Mississippi Medical Center

Co-Vice Chair: Kenneth Butler, University of
Mississippi Medical Center

THURSDAY MORNING

Grand Ballroom

Session 1: Biomedical, Dental, Microbiology, Epidemiology, and Animal Model Research
O6.01
8:00 A STUDY OF GLYCOGEN CLEAVAGE BY HEPATIC GLYCOGEN PHOSPHORYLASE, PART 1. THE CHALLENGE IN THE DETERMINATION OF MECHANISMS

Candace M. Jones, Dorothy M. Wood
Jackson State University

The general intent of this work is a study of certain biophosphate effector molecules that promote the catalytic release of energy-rich glucose-1-phosphate (G1P) by hepatic glycogen phosphorylase (GP or phosphorylase, code name: E. C. 2.4.1.1). Reasons to study this particular system are primarily two-fold: (1) Awry phosphorylase mechanisms cause debilitating diseases associated with hereditary glycogen storage defects and, (2) such phosphorus mechanisms are ubiquitous in nature; if successful, this work will provide a powerful tool, and many more such studies will follow. In part 1, we discuss particular challenges that have encumbered the elucidation of these mechanisms.

O6.02
8:15 METHODOLOGY TO IMPROVE HEALTH DATA GEOCODING RESULTS THROUGH INCREASED ACCURACY OF DATA

Hui Li, Worth Williams, Fazlay Faruque
University of Mississippi Medical Center

The matched rate of street-level geocoding, depending on the quality of address data to be matched and reference data, is a major concern in scientific research, because it might impact the research result. Typing errors are a major factor impacting the quality of address data. The goal of this research is to develop a methodology to automatically correct the misinformation in address data caused by human error and thus improve geocoding results in an efficient manner. To reach this goal, the University of Mississippi Medical Center has developed a methodology to correct this misinformation automatically, which combines three steps. First, misspelled city name is corrected using a pattern-matching algorithm against the reference address data. Second, misspelled street name or zip code is corrected through the following approaches: (1) finding all potential address candidates from the reference address data based on the first two characters of the street name, city name, and state; and (2) correcting the street name or zip code according to the identified address with the highest matched score among its potential address candidates. The score a sum of individual scores for each part of an address (e.g. street name, prefix, street type, suffix, suftype, and zip code) based on the similarity between an address and its potential address candidates. Third,

correct the house number if it is outside the range of the house numbers in the reference data. It is shown that this methodology improves the street-level geocoding result by approximately 5%-8%.

O6.03
8:30 FIRE ANT VENOM ALKALOIDS (SOLENOPO-SINS) INDUCE APOPTOSIS IN HUMAN CELLS.

R. W. Rockhold¹, D. Sullivan¹, K. Kelly¹, B. Chapman¹, H. White¹, R. Deshazo¹, H.M.T. Bandara Herath², N.P.D. Nanayakkara²

¹*University of Mississippi Medical Center*, ²*University of Mississippi*

Toxic effects of solenopsins A (Sol A) and B (Sol B) and isosolenopsins A (Iso A) and B (Iso B), on the viability of U937 human monocytic cells were examined. Cells were exposed to 6 concentrations (3-30 μ M) of each solenopsin. Sol B, the most toxic compound, decreased cell viability by >70% at 30 mM. Sol B induced lactate dehydrogenase release, with levels at 38% and 62% of maximum activity at 1 and 6 hours, respectively. Cells treated with Actinomycin D (a known inducer of apoptosis) or Sol B demonstrated the typical apoptotic DNA ladder on agarose gel electrophoresis. Microarray analysis of 15,067 known human genes and ESTs was used to identify altered gene transcription in U937 cells following incubation with Sol B (13 mM) for 1 or 6 hours. Following treatment, 661 and 620 genes/ESTs were up regulated 1.5 fold at 1 and 6 hr, respectively, compared to control. Caspase 4 and 8 as well as Ataxia telangiectasia mutated (ATM), Talin 1 (TALIN), and PTK2 protein tyrosine kinase 2 (FAK) genes, involved in apoptosis, were up-regulated in response to Sol B. Fewer than 15 genes were down-regulated by more than 50% at any time point. A synthetic fire ant venom alkaloid, Sol B, induces cell death in human cell lines by activation of the apoptotic pathway choreographed by the caspases. (Supported in part by the Howard Hughes Medical Institute Precollege Program)

O6.04
8:45 EFFECTS OF PERIAPICAL TOOTH ABSCESES ON THE UTERUS OF PREGNANT RATS

Meredith Bierdeman, Jennifer Bain, S. Lester, J. Naftel, Roger Johnson

University of Mississippi Medical School

The objective: To determine the effects of periapical tooth abscesses on the pregnant rat uterus.

Methods: Sprague-Dawley rats were divided into two groups: pregnant rats with induced pulpal inflammation (n=16) and sham-operated control pregnant rats (n=16). The pulps of the first and second maxillary right molars were exposed using a 1/4 round burr. Rats became pregnant two weeks following pulp exposure. Following the delivery of the pups, the mothers were sacrificed and serum and uterine horns were removed. The left uterine horn was embedded in paraffin, sectioned, and stained

with H and E and anti-IL-6, IL-1-beta, and anti-TNF-alpha. A digital photograph was made of a serial cross-section of each uterine horn at 40 micrometer intervals. The thickness of the endometrium was measured at random sites using Sigma Pro software. Data were compared by factorial ANOVA and a post-hoc Tukey test. Results: Rats with periapical abscesses had significantly higher concentrations of IL-6 ($p<0.05$) and VEGF ($p<0.05$) and significantly lower concentrations of IL-10 ($p<0.05$) within the uterine horn, as compared to controls. Serum TNF-alpha and IL-6 were significantly higher in the animals with periapical abscesses compared to controls. The thickness of the endometrium from animals with periapical abscesses was significantly less than control ($p<0.05$). Conclusions: Periapical tooth abscesses could produce uterine inflammation and changes in the uterine lining which could result in developmental defects in the offspring.

O6.05

9:00 INTYRAOSSEOUS DENTAL IMPLANTS: THE RELATIONSHIP BETWEEN MORPHOLOGIC CONFIGURATION AND BIOLOGIC RESPONSE; THOUGHTS FOR CONSIDERATION

Robert DeVille

U. of Mississippi Medical Center

Archaeological studies indicate that dental implants have been used by a number of civilizations as early as several centuries B.C. Many materials (including teeth) were tried. Today, implant placement is relatively common. Great strides have been made over the last century in knowledge of biomaterials, patient selection factors, and placement and loading techniques. Still, the question of biologic "acceptance" or "rejection" of foreign materials in the oral cavity remains a crucial question. "Success rates" are difficult to establish as practitioners and manufacturers alike are reluctant to discuss their "failures," and there is no consensus regarding a "minimum time" for declaring "success." Also the question remains as to what other factors, may obscure the outcome of a given case. We have learned that many factors such as location within the mouth, bone quality and density at the implant site, etc., can dramatically affect success rates. Current implants are increasingly predictable. This paper reviews implant literature and calls for research into areas that move us in the direction of "evidence based" implant design. The design and shape of implants has received very little systematic study to date. Further research into the relationship between the shape and configuration of implants, should lead to scientific principles of optimal design configuration for implant selection. Currently implant design appears to be driven more by factors such as "marketing departments," cost, and "user friendliness" than evidence based research.

O6.06

9:15 BEHAVIORAL RISK FACTORS ASSOCIATED WITH ADULT OBSEITY IN TWO EXTREME

STATES; COLORADO AND MISSISSIPPI

Shelia Crump, Elgenaid Hamadain

School of Health Related Professions, University of Mississippi Medical Center

Obesity is a gateway to heart disease, diabetes, and a host of other diseases. Obese population in Mississippi exceeds 30% over a three-year average, and two-thirds of its citizens are either overweight or obese by CDC standards. We compare prevalence of physical activity and trends in fruit and vegetable consumption among adults in Mississippi (most obese state), and Colorado (the leanest state) to investigate possible behavioral risk factors contributing to the observed difference in obesity rates among the two states. Data was obtained from Behavioral Risk Factor Surveillance System. On the average, 13.1% more adults participated in monthly physical activity from 1998 to 2006 in Colorado than in Mississippi. Participation in physical activity among adults in Mississippi increased from 66.2% in 1998 to 68.9% in 2006, while adult physical activity in Colorado increased from 78.7 % in 1998 to 82.6% in 2006. Also, adults who consumed less than 5 servings of fruits and vegetables in Mississippi decreased from 84.4% in 1998 to 80.8% in 2002. An increase was noted from 80.8% in 2002 to 83.5% in 2005. In 1998, Colorado showed an increase from 74.0% adults that consumed less than 5 fruits and vegetables to 75.5% in 2005. Public awareness interventions and knowledge can be an effective way to encourage dietary and physical activity in adults as well as children. Early childhood prevention is one of the most effective ways to combat obesity in Mississippi or Colorado.

O6.07

9:30 CHARACTERIZATION OF PROTEASE PRODUCTION IN A PSEUDOMONAS AERUGINOSA MUTANT

Steven Thorton

Belhaven College

Pseudomonas aeruginosa is an opportunistic pathogen that causes several diseases and conditions, including burn wounds infections and corneal infections. Extracellular proteases are reported to be involved in *P. aeruginosa* virulence, especially ocular virulence. A *P. aeruginosa* mutant believed to be deficient in four proteases was analyzed to determine if the mutant was deficient in the specific proteases. Previously characterized mutants deficient in fewer proteases, as well as PA01 wild type, were used as a control. Protease production was analyzed using zymography and western blotting. On the zymogram two bands were detected, one at a high molecular weight and one at a low weight. Western blotting showed the lower band to be a protease that the mutant was believed to produce, PASP. The higher band was not clearly identified, but may have been Protease IV, a high molecular weight protease the mutant was believed to be deficient in or an aggregate of PASP

9:45 Break

O6.08

10:00 THE AVIAN VESTIBULAR SYSTEM: FUNCTIONAL AND ANATOMICAL RECOVERY AFTER OTOTOXIC DAMAGE

Asim Haque¹, Mridha Zakir², J. David Dickman²

¹University of Mississippi School of Medicine, ²Washington University School of Medicine

Integrating sensory and motor information via a complex neural network, the vestibular system controls compensatory responses of the eye, head, and body. Since gaze stabilizing responses depend on input from the vestibular system, these quantifiable behaviors can be used as important barometers for the functional viability of the vestibular system. Aminoglycosidic insults have been shown to elicit repair and regenerative responses in various submammalian classes via a mechanism that is not yet fully understood. This investigation examined anatomical changes in the vestibular labyrinth during regenerative recovery along with measuring the return of gaze stabilization over a long period of time. Specifically, contributions of eye and head movements in normal pigeons and quails were quantified in response to a broadband battery of rotational stimuli. The two species presently utilized differed in their compensatory strategies, with the pigeon relying primarily on head movement when the head was free to move, whereas the quail utilized both eyes and head near equally. Next, a group of pigeons was lesioned with streptomycin to kill hair cells and alter afferent connectivity. Gaze stabilization responses, which were then monitored longitudinally, showed recovery to near normal levels. Gaze responses to fast head movements recovered first, followed by low frequency responses. Conjointly, afferent innervation morphologies were examined in the semicircular canal neuroepithelia and a unique 3-dimensional surface mapping of the organs generated for both normal and regenerated conditions. These studies show that functional vestibular recovery during regeneration occurs over a period of time nearly corresponding with anatomic recovery.

O6.09

10:15 METHODOLOGY TO ESTIMATE POLLUTANTS USING NEAR REAL-TIME AIR QUALITY AND SATELLITE DATA FOR A SURVEILLANCE SYSTEM

Hui Li, Fazlay Faruque

University of Mississippi Medical Center

As part of developing an integrated surveillance system to track pollution and pollution-related diseases, the University of Mississippi Medical Center (UMMC) developed a near real-time pollution system to estimate air pollutants, PM2.5 and Ozone, using air quality and satellite Moderate Resolution Imaging Spectroradiometer (MODIS) Aerosol Optical Depth (AOD) data. This abstract focuses on the methodology for estimating pollutants in an integrated surveillance system. Near real-time air quality and satellite Terra MOD data are automati-

cally obtained from the AirNow gateway FTP site and the Goddard Earth Sciences (GES) FTP site via a FTP client service on a daily basis respectively. A 220 km buffer area surrounding the state of Mississippi is used to identify the air quality monitoring inside the study area. Data from those identified stations only are loaded into the database. Satellite data are identified for their geographical area according to their acquired time, and those data outside the study area are excluded from the system. PM2.5 values are estimated from the MOD data via a PM2.5-MOD regression model, and a control procedure is used to remove the bias, caused in the satellite data observation, in the MODIS-derived PM2.5. A PM2.5 surface is created from the model derived PM2.5 and daily average values of both air quality and MOD data using an interpolative algorithm. An Ozone surface is created directly from air quality ground data using the interpolative algorithm.

Session II: Cell Line and Cell Studies

O6.10

10:30 IN-VITRO CYTOTOXIC AND GENOTOXIC EFFECT OF ARSENIC TRIOXIDE ON JURKAT T- CELLS

La'Mont Sutton, Clement Yedjou, Paul Tchounwou

Jackson State University

Arsenic trioxide (As2O3) has cytotoxic effects on several cancer cell lines. However, the molecular mechanisms of action remain to be elucidated. Hence, the aim of the present study was to evaluate the cytotoxicity and genotoxicity induced by As2O3 in a human Jurkat T-cell line using the MTT and Comet assays, respectively. Jurkat T-cells were treated with different doses of As2O3 for 24 h prior to cytogenetic assessment. Data obtained from the MTT assay indicated that As2O3 significantly ($p < 0.05$) reduced the viability of Jurkat T-cells in a dose-dependent manner, showing a LD50 value of $15 \pm 3.84 \mu\text{g/mL}$, upon 24 hours of exposure. Similar data was obtained with the trypan blue exclusion test. Data generated from the comet assay also indicated a significant dose-dependent increase in DNA damage in Jurkat T-cells associated with As2O3 exposure. We observed a significant increase ($P < 0.05$) in comet tail-length, tail arm and tail moment, as well as in percentages of DNA cleavage at all doses tested, showing an evidence As2O3 of -induced genotoxic damage in Jurkat T-cells. This study confirms that the comet assay is a sensitive and effective method to detect DNA damage caused by heavy metals such as arsenic. Taken together, our findings suggest that As2O3 exposure significantly ($p < 0.05$) reduces cellular viability and induces DNA damage in Jurkat T-cells.

O6.11

10:45 THE EFFECTS OF LPS AND TNF ALPHA ON MACROPHAGE CELLULAR PHOSPHOLIPIDS AND CYTOKINE PRODUCTION

Felicia Tardy, Ham Benghuzzi, Rodney Baker, Michelle Tucci
University of Mississippi Medical Center

Macrophages are activated by a wide variety of stimuli including microbial products (LPS), tissue injury, and inflammatory cytokine production. The outcome of cellular signaling is similar regardless of challenge and; therefore, it is possible that both TNF alpha and LPS affect similar phospholipase signaling pathways. The current study was conducted to evaluate the effects of LPS or TNF alpha treatment on RAW264.7 macrophages. RAW cells were challenged with LPS or TNF, and the subsequent pro-inflammatory cytokine production was measured. Macrophages were treated with LPS at concentrations of 0.2, 2, 10 ug/mL resulting in an increase in the phospholipids phosphatidic acid (4x) and phosphatidylserine. Similar results were found when cells were treated with TNF alpha (0.5, 5 and 50 ng/mL), phosphatidic acid was increased (2x) with increased phosphatidylserine fractions. Both, LPS and TNF alpha, treatments increased production of both IL-1 and IL-6. These results suggest the possibility that inflammatory cytokine production is mediated through a similar pathway. Unmasking the pathway can lead to new targets for drug therapies.

O6.12

11:00 N-ACETYL-L-CYSTEINE (NAC) INHIBITS OXIDATIVE STRESS AND GENOTOXICITY IN LEAD NITRATE-TREATED HEPG2 CELLS.

Daren Waters, Clement Yedjou, Paul Tchounwou
Jackson State University

Previous studies in our laboratory have shown that lead nitrate induces cytotoxicity and oxidative stress to HepG2 cells in a dose-dependent manner. In this research, we hypothesized that the antioxidant, n-acetyl-l-cysteine attenuates oxidative stress and genotoxicity, and thereby provides cellular protection against lead toxicity. To this hypothesis, we performed the thiobarbituric acid test for lipid peroxidation and the comet assay for genotoxicity. The results of thiobarbituric acid test showed a significant reduction of lipid peroxidation by-product in HepG2 cells co-exposed to NAC and lead nitrate compared to lead nitrate alone. Incubation of HepG2 cells with increasing concentrations of NAC decreased the amount of MDA formation progressively in lead nitrate-treated HepG2 cells. Data obtained from the comet assay indicated a strong dose-response relationship with regard to lead nitrate-induced DNA damage in HepG2 cells. However, the addition of NAC in vitro showed a significant reduction ($p < 0.05$) in the comet tail length, percentage of DNA cleavage, comet tail moment, as well as comet tail arm respectively in cells co-treated with NAC and lead nitrate. Findings from these studies demonstrated that NAC inhibits MDA production and genotoxicity in lead nitrate-treated HepG2 cells in a dose-dependent manner. Under this in vitro condition, NAC was found to be effective in reducing MDA formation, cellular injury, and genotoxic damage in HepG2 cells exposed to lead nitrate.

O6.13

11:15 DOES HYPOXIA INDUCE INFLAMMATORY CYTOKINES IN PLACENTAL CELLS?

Francesca Branch, Sakeli Hall, William Bennett, Kedra Wallace
University of Mississippi Medical Center

Preeclampsia is a life-threatening disease that occurs during pregnancy. Evidence has demonstrated that the remodeling of trophoblast is thought to play part in the hypoxia-reperfusion seen with preeclampsia. In addition to this, clinical studies have also shown an increase in serum levels of inflammatory cytokines in women with preeclampsia. The hypothesis of this study is that hypoxia-reperfusion increases inflammatory cytokines at the molecular level, as demonstrated by upregulation of Interleukin-1beta (IL-1b), interleukin-6 (IL-6) and Tumor necrosis factor – alpha (TNF-a).

Trophoblast cells and placental explants were subjected to hypoxia-reperfusion. Methods and collection of samples were done in collaboration with another investigator (Hall et al.). mRNA was extracted and underwent Reverse Transcription - Polymerase Chain Reaction. IL-1b, IL-6, and TNF-a primers were obtained, and gene expression was analyzed. Glyceraldehyde-3-phosphate dehydrogenase (GAPDH) was used as a housekeeping gene.

Both the tissues and cells demonstrated an increase ($p > 0.05$) in IL-1b and IL-6, while there were no significant ($p < 0.05$) changes in the regulation of TNF-a after 6 hours of hypoxia exposure.

Reperfusion after hypoxia upregulates inflammatory cytokines at both the cellular and tissue level. Based on the results from this study we can determine that hypoxia reperfusion increases the production of inflammatory cytokines at the molecular level. Further studies need to be done, to determine if this is an acute or chronic change.

O6.14

11:30 ESTRADIOL ENHANCES CELLULAR PROLIFERATION IN HUMAN JURKAT T-CELLS AND HUMAN LEUKEMIA (HL-60) CELLS.

Laurette Thuisseu, Clement Yedjou
Jackson State University

β -estradiol is the most potent estrogen of a group of endogenous estrogen steroids which includes estrone and estrinol. This steroid hormone is the most potent natural estrogen, produced mainly by the ovary, placenta, and in smaller amounts by the adrenal cortex, and the male testes. Although β -estradiol protects the renal and cardiovascular systems, the mechanisms involved remain unclear. In this research, we performed both MTT assay and trypan blue exclusion test to evaluate the effect of β -estradiol in HL-60 and Jurkat T-cells; and to compare the sensitivity of these two cell types. The Bradford method was also performed for the measurement of total proteins. The results from both MTT assay and trypan blue exclusion test demonstrated that low, physiological levels of β -estradiol induce cellular proliferation in both HL-60 and Jurkat T-cells. At higher

dose of exposure (0.5-2 μ M), β -estradiol decreases the viability of HL-60 cells by inducing cell death and increases the viability of Jurkat T-cells compared to the control cells, indicating that HL-60 cells are more sensitive to β -estradiol than Jurkat T-cells. Data obtained from the Bradford method resulted in the same amount of protein levels in β -estradiol-treated cells compared to the control. In summary, the results of the present study demonstrate that physiological levels of β -estradiol induce cell growth, and cellular proliferation of HL-60 and Jurkat T-cells.

THURSDAY AFTERNOON

Grand Ballroom

2:00-4:00 **Session III: Poster Session I**
(Poster Preparation 1:15-1:45)

P6.01

HIGH DOSES OF β -ESTRADIOL-INDUCED TOXICITY AND OXIDATIVE STRESS JURKAT T-CELLS

Michael Johnson¹, Erika Brown², Clement Yedjou², Joseph A. Cameron²

¹Hinds Community College, ²Jackson State University

Although β -estradiol is well known to protect the renal and cardiovascular systems, the molecular mechanisms of action involved in this protection remain unclear. Therefore, the purpose of the present investigation was to determine whether oxidative stress plays important role in β -estradiol induced toxicity in human Jurkat T-cells beyond the physiological doses. To reach this goal, we performed the MTT and the trypan blue exclusion test for cell viability, and lipid hydroperoxide (LPO) assay for assessing the levels of the degradation products of polyunsaturated fatty acid (PUFA) hydroperoxide in Jurkat T-cells subjected to β -estradiol. Data obtained from the MTT assay indicated a somewhat biphasic response that encompasses a slight increase in cell viability between (0-2 μ M) of β -estradiol, and a gradual decrease in cell viability above 2 μ M of β -estradiol, indicating the stimulatory effect of this compound a low doses and inhibitory effect at doses of exposure in a dose and time-dependent manner. Data generated from LPO assay resulted in a significant increase ($p < 0.05$) in the production of hydroperoxide with increasing doses of β -estradiol. In summary the results of the present study demonstrate that physiological levels of β -estradiol induce cell growth, and cellular proliferation of Jurkat T-cells whereas higher doses inhibit cell growth and induce cell death. The LPO assay demonstrated that β -estradiol toxicity is associated with oxidative stress. (Supported in part by NIGMS-NIH GM05117 Grant)

P6.02

THE IMPACT OF MICA FUNGIN ON THE CELLULAR INTEGRITY OF OSTEOBLAST CELLS IN VITRO: A PRELIMINARY STUDY

P.I. Sealy, Michelle Tucci, Ham Benghuzzi

University of Mississippi Medical Center

To assess the impact of micafungin at low, 0.128; medium, 64; and high, 125 μ g/mL concentrations on MG-63 osteoblast cell growth and viability. Fungal osteomyelitis is a rare and possibly life-threatening condition. Factors that increase the risk of bone infection include the use of indwelling catheters, immunosuppressive agents (cyclosporine and corticosteroids) in organ transplantation, aggressive anticancer chemotherapy, total parenteral nutrition, and broad spectrum antibiotics; immunocompromised hosts (HIV) and individuals who have suffered burns, have diabetes mellitus or have undergone abdominal surgery. Treatment involves the use of intravenously administered antifungal agents, including micafungin, initially, followed by long term oral suppressive therapy. Apoptosis, glutathione, and malondialdehyde assays, Hematoxylin and Eosin stains and the proliferation rate were used to characterize the MG-63 cell (1 x 10⁴ cells/well) for growth and viability, after exposure to low, medium and high concentrations of micafungin at 24, 48 and 72 hours in tissue culture. Preliminary studies show a cyclic pattern of cell proliferation and intracellular glutathione content at medium and high concentrations compared with control. Low concentrations had similar growth and glutathione content compared to control. Cells do not show cellular membrane damage for the duration of the study. This cyclic pattern of cell growth and glutathione changes suggests that micafungin may affect an enzymatic pathway by zero order kinetics. Collectively, micafungin (low, medium and high concentrations) minimally affects the cellular integrity of MG-63 cells relative to control (untreated cells) at 24, 48 and 72 hours in tissue culture medium.

P6.03

EVALUATION OF MG-63 CELLS AS A MODEL TO STUDY OSTEONECROSIS IN VITRO FOLLOWING EXPOSURE TO ETHANOL AND CORTISOL

Ameze Adah¹, Robert(Lamar) Cochran¹, Michelle Tucci¹, Ham Benghuzzi¹, George Russell¹

¹University of Mississippi Medical Center, ²Howard University

Osteonecrosis can occur from loss of blood supply due to traumatic or atraumatic conditions. Two main causes of osteonecrosis include long term therapies with cortisol and alcohol. The mechanism in which steroids affect bone is mediated through annexins. Studies show that annexin enhances the growth of granulocyte-macrophage colony-forming unit (CFU-GM) the earliest precursor cell leading to the formation of osteoclast, the primary cell responsible for bone resorption. Despite the fact that alcohol is a major factor influencing osteonecrosis there is no known mechanism in which it mediates it affect on bone. Objectives: (1). determine the pathway in which

alcohol induces osteonecrosis, and (2). determine the comparative effects of cortisol and alcohol on osteosarcoma cells. Results: low (10g/dL), medium (50g/dL), and high (100g/dL) of cortisol significantly reduced MG63 cell proliferation at 24, 48 and 72 hours. Cell treated with low (20 mM) and high (40 mM) concentrations of ethanol showed significant cellular suppression at 48 and 72 hours. Cellular glutathione levels were not significantly different in cortisol treated cells; whereas, the levels were decreased at all time points by ethanol. Cellular membrane damage was evident in both cortisol and ethanol treated cells at 24, 48 and 72 hours. Conclusions: Overall, the differences in growth patterns, cellular biochemical markers, along with visible differences in morphology suggest the possibility that the compounds do not target the similar pathways leading to osteonecrosis. Evaluation of cellular signaling is needed to provide a clearer understanding of the pathophysiology of osteonecrosis.

P6.04

THE EFFECTS OF ALENDRONATE ON MACROPHAGE CELL FUNCTION

John Leasure, Mallori McBride, Gregory Stauble, Ham Benghuzzi, Michelle Tucci

University of Mississippi Medical Center

Bisphosphonates are used treatment for osteoporosis. Bisphosphonates disrupt intracellular signaling in osteoclasts that lead to the prevention of bone resorption. Macrophages are of the same lineage as osteoclasts and the focus of this investigation was to determine if the bisphosphonate, alendronate, also inhibits activated macrophage cellular function. Macrophages were either activated with lipopolysaccharide (2g/mL) prior to low (0.2g/mL), medium (2g/mL), and high dose (20g/mL) alendronate treatment or given alendronate treatment alone, and cell morphology, cell viability, nitric oxide production, and cellular glutathione levels were determined after 24, 48, and 72 hours and compared with control untreated or LPS treated cells. Low dose treatment did not alter cellular function in either activated or non-challenged macrophages. Medium and high dose treatment inhibited cellular nitric oxide by 50% at 72 hours in LPS activated cells. Cellular glutathione levels were decreased in medium and high dose treatment by 50% at 48 and 72 hours; whereas, LPS activated cells treated with medium and high dose alendronate showed 50% suppression of glutathione after 72 hours. Cell proliferation was depressed at 48-72 hours in non-challenged cells, and was unchanged in cells activated with LPS. Overall, the effects of alendronate are both dose and time dependent with the greatest effects on cellular function seen after treatment with medium and high doses at 48-72 hours. This is in contrast to early studies, which evaluated the drug after 24 hours of culture, and suggest further evaluation of the alendronate is warranted.

P6.05

THE EFFECTS OF ANGIOTENSIN II ON MRC-5 CELLULAR VIABILITY AND FUNCTION

Ursula Henderson, Anita White, Ham Benghuzzi, Michelle Tucci
University of Mississippi Medical Center

Renin-angiotensin system (RAS) is a hormone system that helps regulate long-term blood pressure and extracellular volume in the body. Renin cleaves an inactive peptide called angiotensinogen, converting it into angiotensin I, which travels in the circulation to the lung capillaries where it is converted to angiotensin II (AII). The goal was to determine the effects of AII within the lung tissue where concentrations would be the highest in the body. MRC-5 lung fibroblast cells were treated with low (0.01 M), medium (0.1 M) or high (1 M) doses of AII and cellular viability and function were determined following 24, 48, and 72 hours of treatment. Cellular proliferation and viability were not different between the treatment groups and control group for the duration of the study. Hydrophic swelling was evident in all treatment groups for the duration of the study. Significant increases in cellular glutathione levels were detected in all treated groups at 48 and 72 hours. It is known that AII increases the production of reactive oxygen species and may play a significant role in cellular signaling leading to cellular hypertrophy and fibrosis. Glutathione is likely to bind to protein thiols on Cys residues a process termed S-glutathiolation. The small molecular weight protein Ras modulates diverse signaling through the S-glutathiolation process which can lead to hypertrophy and secretion of IL-6. A more indepth study to address cellular signaling via Ras and IL-6 production by MRC-5 treated with AII is warranted.

P6.06

AGE DEPENDENT CHANGES IN PURKINJE CELLS VACUOLES IN SCA1

La'Mont Sutton, Marie Lopez, Parminder Vig
University of Mississippi Medical Center

Spinocerebellar ataxia type 1 (SCA1) is an autosomal dominant neurodegenerative disorder caused by the expansion of the polyglutamine repeat within the disease protein, ataxin-1. Overexpression of the mutated protein results in the formation of cytoplasmic vacuoles within Purkinje neurons of the cerebellum in SCA1 transgenic mice. The mechanism of this vacuolar formation is not known. The objective of this study was to investigate the distribution of cytoplasmic vacuoles in different age groups (2, 4, and 6 weeks) and in various lines of SCA1 mice. The sagittal immunostained sections of cerebellum were used to study the number of vacuoles present in Purkinje cells localizing to lobule I, II and III of the anterior vermis. Vacuoles were immunostained for S100B and for Purkinje cells with calbindin. Purkinje cells and Purkinje cells with vacuoles were counted. The size and shape of the vacuoles were determined. No vacuoles were seen in Purkinje cells of wildtype and calbindin null mice. In contrast, SCA1 and SCA1-calbindin double mutant mice showed a steady increase in vacuole formation as age

progressed. However, SCA1-IGF-I double mutants showed a decrease in the number of cytoplasmic vacuoles in Purkinje neurons with increasing postnatal age. These findings suggest that there may be a correlation between neuronal loss and vacuole formation. While the vacuole development is specific to mutant ataxin-1 expression in SCA1, further research is needed to elucidate the role of vacuoles in SCA1 pathology.

P6.07

CELLULAR EFFECTS OF PLATELET RICH PLASMA: INTERLEUKIN-1 RELEASE FROM PRP TREATED MACROPHAGES

James Woodall, Jr.¹, Michelle Tucci¹, Allan Mishra¹, Ham Benghuzzi¹

¹University Of Mississippi Medical Center, ²Stanford University Medical Center

The therapeutic use of Platelet Rich Plasma as a biological tool to enhance soft tissue and bone healing has recently yielded encouraging results in many areas of clinical medicine. PRP is a specific portion of whole blood that contains a high concentration of platelets. The local treatment of bone and soft tissue injuries with this autologous blood product has become increasingly common in recent years. There is still little known about the mechanism by which PRP acts at the cellular level. The macrophage cell has been shown to be critical to the healing of tissues. In this study the macrophage release of a specific pro-inflammatory factor, interleukin-1, was evaluated in macrophage cells activated and treated with platelets as compared to control macrophages in culture. The results show that platelets caused an initial suppression of IL-1 release from activated macrophage compared to controls. The initial suppression was followed by an increase in IL-1 release at day seven over control and activated macrophages that had ceased release of IL-1 at day seven. The initial suppression of the inflammatory response to activation during days 1, 2 and 3 could have broad implications in the explanation of a mechanism by which PRP acts. If PRP can truly be used as a transient anti-inflammatory agent that initially suppresses inflammation and then stimulates a late healing response, then indications for use of PRP may expand beyond the current scope of treatment.

P6.08

BIOCHEMICAL CHANGES TO FIBROBLAST CELLS SUBJECTED TO IONIZING RADIATION

Pamala Jones¹, La'Toya Richards², Michelle Tucci², Ham Benghuzzi²

¹University of Southern Mississippi, ²University of Mississippi Medical Center

Free radicals are extremely reactive compounds that are naturally unstable. They contain superfluous energy and react with certain chemicals in the body, which may interfere with the cells' ability to function normally. Ionizing radiation can generate free radicals, if enough occur, and can be destructive to

biological organisms. Overuse of it can be hazardous to human health. The objective of this study was to assess biochemical changes to fibroblast by evaluating the MRC-5 cells l protein, glutathione and MDA levels after multiple exposures to X-ray. Following exposure 2, 3, or 4 times with a single dose of (10Gy), the cells were incubated and tested. After 24 hours the protein levels decreased in all treatment groups, however after 48 and 72 hours the levels increased tremendously, ($p < 0.001$). The most significant increase in protein was seen with exposure 2(X) after 72 hours. The MDA levels increased significantly with the increased radiation exposure. An increase was seen after 2(X), 3(X) and 4(X) of exposure, indicating damage to the cells. The glutathione levels increased slightly after 24 and 72 hours when compared to the control. However, after 48 hours the levels decreased with radiation exposure 4(X), but increased slightly with 2(X) and 3(X). From the results of this study it is possible to conclude that multiple exposures to a single dose of radiation can result in significant damage earlier than a one time single exposure seen in previous research.

P6.09

THE EFFECTS OF CORTISOL ON LPS STIMULATED MACROPHAGES

Renee Wilkins, Laura Franklin, Ham Benghuzzi, Michelle Tucci
University of Mississippi Medical Center

A high cortisol level for prolonged periods can increase the risk of infection by suppression of various populations of leukocytes, and decreased platelet function. The effects on activated macrophage cells have not been clearly defined. Therefore, the effect of cortisol concentrations on the production of NO by the macrophage cell line RAW-264.7 was investigated. Stimulation of the cells with lipopolysaccharide (LPS 2ug/mL) resulted in a accumulation of NO₂- in the medium at 48 hours and returned toward normal control values at 72 hours. Concomitant incubation of the cells for 24, 48, and 72h with cortisol (5ug/dL-50ug/dL) caused a concentration and time-dependent increase in NO₂. Initial measurements of LPS treated macrophages increased cell proliferation at 24 hours without evidence of cellular membrane damage. Addition of LPS to macrophages treated with low or high cortisol delayed the increase in cell numbers until 72 hours. Cellular damage was not evident in cells treated with cortisol and LPS. In conclusion, cortisol did not inhibit nitric oxide production by RAW cells suggesting cortisol does not interfere with mounting an inflammatory response.

P6.10

HEALTH IMPACT OF DIETARY EDIBLE FAT CONSUMPTION: THE ROLE OF HEALTHY/ UNHEALTHY LIPIDS IN THE MEDIATION OF CELLULAR VIABILITY IN THE A549 CELL LINE

JoAnna Hulitt, Samantha Hubbard, Ibrahim Farah, Joseph A. Cameron
Jackson State University

Health risks from dietary food consumption cannot be over emphasized. We know that fat consumption is tied to many chronic disease conditions such as CVD, diabetes, nephropathy, hepatopathy, neuro-endocrine and neuropathic syndrome, arthritis and cancer. Saturated fats are considered non-essential and are designated unhealthy. The differential role of healthy and unhealthy lipids at the cellular level is not precisely elucidated in the literature. Therefore, we hypothesized that the exposure of bodily cells (A549) to dietary saturated and trans-fats (unhealthy) will induce adiposity and adipo-mediated cytokines leading to membrane-generated bioactive lipids as well as chronic inflammation and pathophysiologic signaling. In contrast, exposure to healthy dietary fats will not induce the same adverse effects. Our study objectives are to understand the in vitro role of edible fat intake in health, to design study for proof of the principle, to propose a fat dietary advisory, and to translate findings into application. We selected three unhealthy fatty acids and one fat carrier extracted from lard, butter, margarine and glycerol and four healthy fatty acids extracted from olive oil, fish oil, flaxseed oil, and avocados. The A549 lung carcinoma cell line was exposed to 8 of these lipids for 48 hours and was tested using the MTT cell proliferation assay to assess viability and phase-contrast microscopy to assess cellular damage. Results showed various levels of destruction impacts on the A549 cells exposed to various lipids irrespective of the type used. Supported in part by NIH-NIGMS Grant # GM050117.

P6.11

THE EFFECTS OF NATURAL PRODUCTS EXTRACTED FROM MUSHROOM ON THE VIABILITY AND FUNCTION OF MACROPHAGE CELLS

JaQuita Nickelson¹, Bradley Adams¹, Michelle Tucci², Joseph A. Cameron¹, Ham Benghuzzi²

¹Jackson State University, ²University of Mississippi Medical Center

Natural products have been shown to have antibacterial properties, as well as enhance the capability of the cell to eliminate bacteria. The goals of this experiment are: (1) to determine the dose of the drugs which do not inhibit cell growth, and (2) to determine if products A, B, and C, exhibit antibacterial properties or enhance bacterial uptake and killing by the macrophage. The results show that natural compounds A, B, and C were not damaging to macrophage cells for the first 48 hours. Cells treated with compound A after 72 hours began to show signs of cell number loss. The results also showed that natural compounds A, B, and C did not have any aseptic properties on their own. Macrophages treated with compound C had increased phagocytosis of fluorescent labeled as well as unlabeled bacteria, but was not more efficient at killing those bacteria within the first 24 hours. In conclusion, compound A and B showed little effect on increasing the ability of the macrophage to phagocytosis and kill bacteria more efficiently than control at 1 and 4 hours. Compound C was able to cause a significant increase in the

number of bacteria taken into the cells, but it was not clear if the cells were able to kill the bacteria after 1 and 24 hours; therefore, longer time periods of 36 and 48 hours are needed to determine if compound C enhances bacterial killing or is bacteria static. (Supported in part by NIGMS-NIH GM05117 Grant)

P6.12

THE EFFECTS OF NEUROTRANSMITTERS ON THE PROLIFERATION AND VIABILITY OF MRC-5 FIBROBLAST AND MACROPHAGE CELL LINES.

Bradley Adams¹, JaQuita Nickelson¹, Michelle Tucci², Joseph A. Cameron¹, Ham Benghuzzi²

¹Jackson State University, ²University of Mississippi Medical Center

Asthma is particularly common in Blacks living in urban environments (affecting about 7%). The most common and important characteristic of asthma is airway obstruction. Acetylcholine and other components of the cholinergic system are expressed in a number of non-neuronal cells in the airways. Non-neuronal ACh may affect fibroblasts, as well as inflammatory cells in lung tissue. The goals of this experiment were: 1). To determine the effects of various concentrations of acetylcholine on the cellular proliferation, damage and morphology of lung fibroblasts. 2). To compare fibroblast responses to acetylcholine with acetylcholine stimulated macrophages. Results: MRC-5 cells treated various concentrations of acetylcholine showed significant decreases in cell numbers at 24, 48, and 72 hours. Hydropic swelling occurred with all cells treated with acetylcholine at 24 hours and remained evident in the low dose treatment for the duration of the study. Low dose treatment showed a significant decrease in glutathione content after 72 hours. Macrophage cells treated with acetylcholine for 24 hours exhibited a slight increase in cell number for the low and medium dose treatments, while high dose treated cells were similar in number to control. Glutathione data revealed decreases in all treatment with the highest dose treatment exhibiting the greatest inhibition. The morphology confirmed the glutathione data, where the cells appeared more round and hyperchromatic indicating a significant cellular response. In conclusion, the different cell types found in the airway respond differently to acetylcholine and may play a significant role in the pathophysiology of asthma.

P6.13

ASSESSING THE ROLE OF RETINOIC ACID AND CITRAL IN MODULATING THE VIABILITY OF THE A549 CELL LINE

Quannesha Trimble, Ibrahim Farah

Jackson State University

Retinoic acid and retinyl esters are the oxidized forms of Vitamin A in the body. They maintain many functions as hormones which affect the development of vision, bone growth, reproduction, cellular division, and differentiation at low

concentrations. Excesses in Vitamin A can be detrimental, leading to teratogenic outcomes. Their roles in cancer were discussed in the literature, but their role in cancer therapy was not clearly elucidated. Recent publications have found retinoids to be an effective, therapeutic target in some cancer cell lines. We hypothesized that retinoic acid and retinyl esters will negatively impact cancer cells in vitro and exposure to higher concentrations of retinoids will differentiate and damage cancer cells. The aim of this study was to expose A549 carcinoma cells to various concentrations of retinoic acid, retinyl esters, and citrals. Growth patterns of the cells were screened during time intervals ranging from 24-72 hours. The effects of each were measured through phase microscopy and the cell proliferation MTT assay. Citrals were used as an inhibitor to reverse the retinoid effects. Data generated from phase contrast microscopy and MTT assays showed a decrease in the viability of A549 cells after 72 hours of exposure to retinoic acids and retinyl esters. Observation of toxic effects exhibited with citrals (cis and trans vs. diethyl acetal) suggests the reversal of differentiation and an increase in cell destruction. We conclude that modulation of cancer cell survival through natural organics is very promising and is warranting further investigation. NIH-RISE grant # 632288.

P6.14

INVESTIGATING THE ROLE OF VARIOUS DIETARY LIPIDS IN THE MODULATION OF CELL SURVIVAL IN THE A549 CELL LINE

Tomeka Nailer, Ibrahim Farah

Jackson State University

Recent studies have shown that lipid intake can be interrelated to several chronic diseases, including cancer and arthritis. The role of lipid accumulation is designated as being feeble. Recent publications have shown the effects of fats at the molecular level, but, not yet at the cellular levels. Therefore, we hypothesize that exposure of A549 cells to unsaturated and saturated fats will initiate adiposity and bioactive lipids vs. exposure to unsaturated fats which will not initiate similar hostile adverse effects. The generated bioactive lipids play an important role in processes involving cell-cell communication, inflammation, host-defense mechanisms, and ischemia-reperfusion. The target of this study was to expose human lung carcinoma cells (A549) to various concentrations of unsaturated and saturated fats. A549 cells were exposed to 8 lipids during time intervals ranging from 24-72 hours. Our data was collected using MTT assay to measure cell proliferation /death in response to the exposure to these fats upon the cells. Phase-contrast microscopy was used to assess morphogenic impacts. Results confirmed that butter, margarine, lard and glycerol (saturated) exhibited cellular destruction (incorporation and enlargement of the cell membrane) as opposed to olive oil, fish oil, flax seed and avocados (unsaturated; which showed no such changes). These promising findings warrant further studies. This grant is supported by the

National Institute of Health –Research Initiative for Scientific Enhancement NIH_RISE grant # 632288.

P6.15

THE ROLE OF EPIGALLOCATECHIN GALLATE (EGCG) IN ATTENUATING THE TOXIC SIDE EFFECT SEEN FOLLOWING CYCLOSPORINE ADMINISTRATION

Stacy Hull Vance, Tamika Taylor, Michelle Tucci, Ham Benghuzzi
University of Mississippi Medical Center

Cyclosporine-A (CsA) is an effective immunosuppressive drug that has dramatically improved the survival of kidney allografts. Cyclosporine-A is the primary drug used in transplant recipients; however, it also responsible for increasing the production of reactive oxygen species and at toxic levels induces nephrotoxicity. The exact mechanism for CsA toxicity is still unknown. Studies suggest a possible role of free radicals or structural and functional deterioration of the kidney by renal lipid peroxidation. The specific objectives of this study were to investigate the effects of CsA alone and in combination with the antioxidant, Epigallocatechin gallate (EGCG), on the proliferation and lipid peroxidation of kidney epithelial cells (KEC). KEC were divided into six equal groups. Group 1 untreated cells (Control), Group 2 was treated with CsA 10 uM, Group 3 was treated with CsA 10uM + EGCG 50 uM , Group 4 was treated with CsA 50 uM, Group 5 was treated with CsA 50 uM+ EGCG 50 uM, and Group 6 was treated with EGCG 50 uM. Epithelial damage was evident 24, 48, and 72 hours after receiving CsA 10uM. MDA levels were decreased in groups 5 and 6 after 24, 48, and 72 hours. Nitric oxide levels were elevated in all treatment groups in comparison to the control. The data suggests that further studies need to be conducted to determine the full impact of antioxidants on KEC function and its ability to attenuate the side effects of CsA.

P6.16

ANALYSIS OF PITUITARY STRUCTURE AND FUNCTION WITH LOSS OF CHD7 EXPRESSION DURING MOUSE DEVELOPMENT

Donna Martin¹, Wanda Layman¹, Elizabeth Hurd¹, Renada Scott²

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CHARGE syndrome is a multiple congenital anomaly condition. Many patients with CHARGE display delayed growth, but only 9% of children tested for growth hormone (GH) levels are deficient. Testosterone levels are decreased in many males with CHARGE, and many females display no luteinizing hormone (LH) or follicle-stimulating hormone (FSH) response to GnRH stimulation. Based on these observations, we hypothesize that loss of Chd7 disrupts hypothalamic-pituitary signaling during development. In order to study the role of CHD7, we generated a mouse line carrying a Chd7Gt allele derived from

Chd7 deficient gene trapped lacZ reporter embryonic stem cells. Chd7Gt/Gt embryos survive only until embryonic day 10.5, whereas Chd7Gt/+ mice exhibit growth delays as early as postnatal day 7. β -galactosidase expression from the lacZ reporter in Chd7Gt/+ mice shows expression of Chd7Gt in the embryonic pituitary. Histological examination and in situ hybridization for Pitx2, a pituitary marker, show no significant differences in pituitary morphology of Chd7Gt/+ and Chd7+/+ embryos at e12.5, 14.5 or 18.5. However, immunofluorescence of littermate Chd7Gt/+ and Chd7+/+ embryos at e18.5 show an increase in GH positive cells, a decrease in LH positive cells, and ectopic expression of adrenocorticotropin (ACTH) in the Chd7Gt/+ pituitary. These studies suggest that the morphology of the Chd7Gt/+ pituitary appears intact, but there may be subtle differences in hormone expressing specific cell types in the pituitary. Thus, Chd7Gt/+ mice are a useful model for understanding the pathogenesis of growth delays and endocrine dysfunction in human CHARGE syndrome.

P6.17

EFFECTS OF RESVERATROL ON TRIPLE NEGATIVE (ER-, PR-, HER2-) BREAST CANCER CELLS

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Triple negative breast cancer is a subtype of cancer which lacks the three "receptors" known to fuel most breast cancers: estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor 2 (HER2). While the most successful treatments for breast cancer target these receptors, there is no targeted therapy for "triple negative" breast cancers. Resveratrol, found in the skin of red grapes, is associated with a number of health benefits, such as anti-cancer. Therefore, in order to investigate potential new treatment or chemopreventive options for "triple negative" patients, we investigated the effects of resveratrol on "triple negative" breast cancer cell lines. Using MDA-MB-231 and HCC1937 (BRCA1 mut) breast cancer cells, we show that resveratrol inhibits cell proliferation in a dose dependent fashion. Cell growth was inhibited at 100 nM, which may be due to apoptosis or senescence depending on the cell line. Results also show that HCC1937 (BRCA1 mut) is more sensitive to the resveratrol than HCC1937+wild-type BRCA1 cells, suggesting that BRCA1 may play a role. Non-malignant breast cells, MCF10A, were not as sensitive to resveratrol as the breast cancer cell lines. Our data also suggest that low concentrations of resveratrol (1-10 nM) may increase cell growth and telomerase activity. These studies provide insight into the dose dependent effects of resveratrol on breast cancer cells and the potential of resveratrol to be included in breast cancer treatment or chemoprevention regimens. (Supported in part by NIGMS-NIG Grant No. R25GM67592)

P6.18

RETROSPECTIVE ANALYSIS OF PROSTATE, BREAST, AND LUNG CANCER TRIALS FOR FACTORS IMPACTING PATIENTS' ACCRUAL

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¹Cooperative Intern Program with the Mississippi Gulf Coast Community College—Jackson County Campus Honors Biology Students, ²Singing River Hospital Systems Regional Cancer Center, ³The national Aeronautics and Space Administration

The purpose of the project was to address disparities in cancer care among minorities and the underserved, especially in relations to accrual to clinical trials. The investigators had documentation of case-finding results for patients screened for research studies at the Singing River Hospital—Cancer Center in an Excel spreadsheet, tracking pertinent information on individual cases using the following variables from September 5-October 1, 2007: screen data, patient identifiers, age, gender, race, referring physicians, RCC physician(s), disease site and stage study(ies) available, accrual status, reason for not accruing, and final treatment plan. This study used the Case finding database to identify prostate, breast, and lung cancer cases for which an active study was potentially available and explored the factors relating to their ineligibility to participate in the study. The data obtained through the Retrospective Analysis provided the investigators with more specific information pertaining to reasons for ineligibility with a focus on age, performance status, fatigue, pain, insurance, and co-morbidities. This study had the Case finding database to identify all cases for which an active study was potentially available at the time of screening. Retrospective chart/EMR review was conducted to document the factor(s) involved in determining eligibility/ineligibility for study participation, accrual status, and final treatment plan.

P6.19

THE EFFECTS OF 5-FU AND EGCG ON PANC-1 CELLS

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Five fluorouracil (5-FU) is one of the oldest chemotherapy drugs, and has been around and in use for decades. It is an active medicine against many cancers including pancreatic cancer, but has side effects. The half life of 5-FU in the tissues is short, and it exerts its anticancer effects on the cell by binding to an enzyme inside the cancer cell called thymidilate synthetase. The action of this drug stops the cells in the S phase of the cell cycle. The goal of investigation was to determine if combining 5-FU with a component of green tea, EGCG, which halts cell division in the G1/G2 phase of the cell cycle would inhibit pancreatic cell growth and function and provide a more tolerable chemotherapeutic dosing regime. Concentrations of 5-FU ranging from 5-25M caused significant reductions in PANC-1 cells and cellular glutathione for 24, 48, and 72 hours with 25M showing the largest suppressive effects. Treatments of 30 and 50M EGCG resulted in suppression in cell numbers without

altering cellular glutathione levels. Combining 5M 5-FU with 10, 30 or 50M EGCG caused significant cellular suppression by 24 hours (50%) and maintained the suppressive effects for 72 hours. Cellular glutathione levels were also suppressed in the combination treatment. During the first 48 hours the suppressive effects in both cell number and glutathione levels were dose dependent. Overall combining EGCG with low dose 5-FU is a safe effective chemotherapeutic strategy for PANC-1 cellular reduction.

P6.20

THE EFFECTS OF A SELECTIVE COX-2 INHIBITOR ON PANC-1 CELLULAR FUNCTION

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Expression of proinflammatory mediators, such as prostaglandins, is up-regulated in cancer tissues and is linked to invasive cancer growth. One important step of prostaglandin synthesis is the conversion of arachidonic acid to prostaglandins, a process facilitated by cyclooxygenases (COXs). The use of non-steroidal anti-inflammatory drugs is of great interest in the prevention and treatment of cancer, although their precise mechanisms of action remain unclear. To elucidate whether specific inhibition of COX-2 with a selective inhibitor, NS-398, is able to inhibit cellular proliferation of pancreatic cancer cells and whether this inhibition is modulated through alterations in cellular function. Panc-1 cells were treated with 0.01, 0.1, or 1 M NS-398 and evaluated for cellular proliferation, cellular morphology, nitric oxide, and MDA levels after 24, 48, and 72 hours. Treatment with NS-398 significantly increased cell proliferation in Panc-1 cells as early as 24 hours in medium and high dose treatments and remained elevated for the duration of the study. Increases in nitric oxide were elevated in high dose treatment at 24, 48, and 72 hours. NS-398 did not induce cell damage as evidenced by a lack of increased cellular MDA. These results are from our lab using colon cancer cell lines where concentrations of 0.1 M decreased cellular proliferation after 48 hours with increased levels of cellular MDA and nitric oxide. The data presented that the use of NS-398 has limited effects as a chemoprevention agent for pancreatic cancer.

P6.21

CHEMOTHERAPEUTIC POTENTIAL OF WATER-SOLUBLE EXTRACTS OF NATURAL COMPOUNDS

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¹Mississippi College, ²Belhaven College, ³University of Mississippi Medical Center

For centuries Asian healers have promoted the use of edible mushrooms as tonics to promote good health. Researchers in Japan have recently been studying the medicinal effects of mushrooms for the treatment of high blood pressure, cholesterol, immune dysfunction, and cancer. This investigation studied the effects of three water soluble mushroom extracts for eradication

of pancreatic cancer cells for periods of 24, 48, and 72 hours. PANC-1 cells were treated with 2 mg/mL A, 2.4 mg/mL B, and 5.5 mg/mL C and cell numbers, morphology, cellular glutathione, and cellular damage was evaluated at each time point. Product C significantly reduced cellular proliferation after 48 hours and maintained suppression at 72 hours. As cellular proliferation decreased, cellular levels of glutathione increased at 48 hours in cells treated with both products B and C; however, this transient increase returned toward normal values by 72 hours. The compounds did not induce cellular damage as determined by lack of increases in cellular MDA levels for the duration of the experiment. The results indicate the compounds have a greater effect on cellular metabolism as opposed to induction of cell membrane damage. Overall, product C was able to significantly suppress cell proliferation, and more advanced studies are needed to elucidate the mechanism or mechanisms involved in inhibiting cell growth over time.

P6.22

A COMPARISON OF TOTAL, FREE, AND %FREE PSA FOR THE SERODIAGNOSIS OF PROSTATE CANCER IN AFRICAN-AMERICAN AND CAUCASIAN-AMERICAN MALES

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University of Southern Mississippi

There were 234,460 new cases and 27,350 deaths due to prostate cancer in the USA during 2006, making it the leading non-skin cancer in males. Serum levels of prostate specific antigen (PSA) have been used to screen for prostate cancer. Genetic biases have not been described but Fowler et al reported higher %Free PSA ratios in African-American males. The objectives of this study were to: a) compare a manual assay (Diagnostic Automation, Inc) with an automated assay (Beckman Access, Inc) for PSA and Free PSA, and 2) compare Total PSA and %Free results in African-American males with Caucasian-American males. It was hypothesized there would be a genetic bias for PSA and that the manual test would be superior to the automated one. Analytical parameters were good for both assays. Sera from 413 healthy adult males (334 Caucasian-Americans, 68 African-Americans, 11 other) were assayed for Total, Free, and %Free PSA and the results compared. There was no significant difference between the results. Sera from 974 patients (155 prostate cancer, 819 non-prostate cancer) were assayed for Total PSA and Free PSA and the predictive values calculated. Diagnostic sensitivities ranged from 75% (Beckman) to 98% (Diagnostic Automation) for %Free PSA and from 10% (Diagnostic Automation) to 18% (Beckman) for Total PSA. Both hypotheses were rejected.

P6.23

DISTRIBUTION AND LEVELS OF GFAP IN THE ORBITOFRONTAL CORTEX IN ALCOHOLIC AND DEPRESSED SUBJECTS

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Changes in cell densities of glia and neurons characterize the prefrontal cortex of subjects with depression and alcoholism. This study examined post-mortem tissue for distribution and levels of glial fibrillary acidic protein immunoreactivity (GFAPi, a marker of astroglia) in the orbitofrontal cortex (ORB) of subjects with: 1) major depression (MDD, n = 9), 2) alcoholism (ALC, n = 10), and 3) depression comorbid with alcoholism (MDA, n = 7). Young and old subjects were used, including age-matched controls (CTRL, n = 10). Area fraction of GFAP-immunoreactive structures was estimated in frozen sections. In addition, levels of GFAP were determined in Western blots from adjacent sections. The level of GFAP was decreased in groups 1-3 as compared with controls, with MDD subjects having the lowest levels. Area fractions of GFAPi were significantly increased over the lifespan in ALC subjects. A smaller increase in GFAPi area fraction occurred in CTRL subjects. MDD subjects had the lowest levels of GFAP and smaller area fractions of immunoreactivity as compared with all other subjects. While area fraction of GFAPi in ALC subjects was as large as in controls, the level of GFAP was lower in ALC subjects than in CTRL subjects. This suggests that the amounts of GFAP in individual GFAP-containing astrocytes may be smaller.

P6.24

CARDIOVASCULAR RESPONSES FOLLOWING DIFFERENT TYPE OF BREATHING EXERCISES

Min Huang, Mark D Weber, Lisa J Barnes, Paula Stubbs, Neva Greenwald

University of Mississippi Medical Center

Purpose: The purpose of this study is to determine the effect of different type of breathing exercises on blood pressure, heart rate, and respiratory rate. **Subjects:** The study was performed on 45 healthy volunteer subjects ranging from 21-50 years of age. **Methods:** Subjects were randomly divided into three groups: control breathing (C, n=15), shallow breathing (SB, n=15) and combined breathing (CB, n=15). Blood pressure (BP), heart rate (HR), and respiratory rate (RR) were recorded before and after the breathing exercises. Each subject was instructed on proper breathing techniques and given a demonstration of their specific breathing exercise. Each subject performed the assigned breathing exercise for fifteen minutes. All data were analyzed using repeated analysis of variance. **Results:** The mean RR in C group before and after breathing exercises was 14.27±2.84 and 14.53±4.61, respectively. The mean RR in SB group before and after breathing exercises was 15.27±3.26 and 17.47±4.07, respectively. The mean RR in CB group was 14.33±3.75 and 12.67±2.50, respectively. SB had significantly increased RR (P<0.05) and CB had significantly decreased RR (P<0.05). There were no significant changes in blood pressure and heart rate. **Conclusion:** This study shows 15 minutes of breathing exercises

have no effect on BP and RR, but have significant impact on RR. This study suggest that proper breathing technique can be used to relieve stress and to increase respiratory efficiency.

P6.25

PULSE PRESSURE AS AN INDEPENDENT RISK FACTOR FOR INCIDENT CORONARY HEART DISEASE: THE ATHEROSCLEROSIS RISK IN COMMUNITIES (ARIC) STUDY

Kenneth Butler, Alan Penman, Thomas Mosley

University of Mississippi Medical Center

There are conflicting reports regarding the usefulness of pulse pressure (PP) in predicting coronary heart disease (CHD). We compared PP, systolic blood pressure (SBP), and diastolic blood pressure (DBP) individually and in combination as predictors of incident CHD. A total of 9080 men and women aged 50-69 years participating in the ARIC study, free of CHD and not taking anti-hypertensive therapy, were followed over 14 years (1990-2004) for incident CHD. Cox proportional hazard regression was used to assess the relationship between blood pressure components and CHD risk after adjustment for confounders. The association with CHD risk was positive for SBP, DBP, and PP individually. Of the three, PP yielded the largest hazard ratio (1.4 per 1-SD of PP; 95% CI, 1.3-1.5). When SBP and DBP were entered together into the multivariable model, the association with CHD risk was positive for SBP (HR, 1.3; 95% CI, 1.2-1.4) and negative for DBP (HR, 0.8; 95% CI, 0.7 to 0.9). There was no incremental value of either SBP or DBP when entered into a multivariable model already containing PP. Except for persons with SBP >160 mm Hg, the risk of CHD was inversely related to DBP within each subgroup of SBP (<120, 120-139, 140-159 mm Hg). The risk of CHD was positively related to PP within all subgroups of SBP. In this middle aged and elderly cohort, PP was an independent risk factor for incident CHD.

FRIDAY MORNING

Grand Ballroom

Session I: Health Fair (Blood pressure monitoring, glucose testing, body mass index, etc.)

8:30-10:30

Session II: Poster Session II

10:30-11:45a & 1:45-2:30p

P6.26

MECHANISM OF TRICHOMONAS RESISTANCE

Mary Hamilton Chestnut¹

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Trichomonas vaginalis is a flagellated parasite, predominantly found in the female vagina. Once in the human host, it causes a common sexually transmitted disease. Trichomoniasis has infected over 8 million people in North America alone, as well as others all over the world. While this disease can be treated successfully with the drug metronidazole, a synthetic antibacterial and antiprotozoal agent, *Trichomonas* has started to show increasing resistance to the drug. A previous study done on resistance and susceptible strains using the differential display assay, has shown several transcripts to be either up-regulated or down-regulated in the resistant vs. non-resistant strains. One of these transcripts, a calcium driven sarcoplasmic pump ATPase (SERCA), was associated with resistant strains. Our purpose was to verify that the role of SERCA contributes to metronidazole resistant in *Trichomonas*. In this experiment, cell cultures of differing susceptibilities were grown out.

RNA was isolated from them and subsequently probed on a Northern blot with a 32Phosphorus probe specific for the SERCA transcript. Published susceptibilities were validated by growing *Trichomonas* in modified Diamonds media and exposing the parasite to two-fold dilutions of metronidazole 1000 ug/ml. The Northern blot showed a greater up-regulation of SERCA for the resistant strains relative to the non-resistant strains. Susceptibilities were verified for all strains. It appears that SERCA does contribute to the resistance of *Trichomonas*, but further research is needed to clarify the role of this transcriptome.

P6.27

THE EFFECT OF ARABINOGALACTAN AND ELLAGIC ACID INJECTED INDIVIDUALLY AND SYNERGISTICALLY IN TRYPANOSOMA LEWISI INFECTED RATS

Rumbi Chiposi, Peter Mittwede, Steven Thorton, Jerry Zifodya
Belhaven College

Trypanosoma lewisi is a non-pathogenic relative of the blood parasite that causes African sleeping sickness. In this experiment, the effects of ellagic acid and arabinogalactan on the level of parasitemia in rats were studied. Ellagic acid has been demonstrated to be anti-proliferative and arabinogalactan has been shown to enhance the immune system. Thirty-two rats were placed into eight groups of four rats each: positive and negative control groups, high and low dose groups for arabinogalactan and ellagic acid separately, and high and low dose synergistic groups that received both arabinogalactan and ellagic acid. All doses were shown to reduce the initial level and reduce the duration on parasitemia as compared to the control. In the synergistic high and arabinogalactan low dose groups the level of infection stayed below the positive control group throughout the duration of the infection. In addition, the synergistic low and arabinogalactan high doses delayed the initial peak of parasites observed in the other groups.

P6.28

MORPHOLOGICAL EVALUATION OF EPIGALLOCATECHIN-3-GALLATE, THYMOQUINONE, AND TANNIC ACID ON LNCAP CELLS

La'Toya Richards¹, Pamala Jones¹, Ham Benghuzzi¹, Michelle Tucci¹

¹University of Mississippi Medical Center, ²University of Southern Mississippi

Epidemiological evidence has suggested that certain antioxidants, such as vitamin E, lycopene, and their derivatives may be effective in combating prostate cancer and decreasing the risk of prostate cancer in men. Ongoing studies are examining these agents in specific populations and in prostate epithelial cell lines to determine whether risk is reduced and the magnitude of risk reduction (Ni et al., 2007 and Morrissey et al., 2007). In this study, we analyzed three antioxidants, epigallocatechin -3-gallate (EGCG), thymoquinone (TQ), and tannic acid (TA) and their morphological responses to conventional treatment with both low and high doses of EGCG, TQ, and TA at 24, 48, and 72 hours. Groups treated with low doses of EGCG, TQ, and TA demonstrated cells that were irregular, hyperchromatic, and reduced in number after 48 and 72 hours of incubation. Cells treated with high doses of EGCG and TQ were also fewer in number and irregular in appearance in comparison to the control after 48 and 72 hours of incubation. Overall findings of this study demonstrated that conventional treatment with EGCG, TQ, and TA suppressed cell number and cell growth by causing disruptions in certain cell-cycle checkpoints. The results of this study also revealed that antioxidants may be remarkable candidates with chemopreventive and chemotherapeutic properties against prostate cancer. Since understanding is limited regarding the processes involved in prostate cancer initiation and growth, more research is needed in this era so that physicians caring for men with prostate cancer can be aware of these remedies.

P6.29

IN VITRO ANALYSIS OF TOBRAMYCIN RELEASE FROM BETA TRICALCIUM PHOSPHATE DRUG DELIVERY SYSTEM

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The purpose of this pilot study was to determine the in-vitro release properties of tobramycin by TCP delivery capsules. In addition, two different forms of TCP capsules; matrix and reservoir, were characterized. Three types of TCP ceramic capsules were constructed: six sham matrix capsules (Group A), six tobramycin loaded matrix capsules (Group B), and four hollow tobramycin loaded reservoir capsules (Group C). The capsules were submerged in PBS and 1 mL of elutant was collected, centrifuged, and analyzed via spectrometry for 14 days. In addition, elutant from selected capsules was bleached onto bacterial discs and placed on confluent *Staphylococcus Aureus* agar plates to evaluate zones of inhibition. Their was a

statistically significant difference in the concentration of tobramycin released between Group A versus Group B and Group C capsules and a statistically significant difference in the concentration of tobramycin released between Group B and Group C capsules all 14 days. Bacterial discs containing Group A elutant did not have a visible zone of inhibition, while both Group B and C elutant discs had an appreciable zone of inhibition all 14 days. Group A sham capsules eluted no antibiotics implying that TCP by itself lacks any antibacterial property. Group B matrix and Group C reservoir capsules eluted sustained tobramycin concentrations that were bactericidal all 14 days. The data from this study demonstrates that the sustained release property of tobramycin loaded TCP matrix and reservoir capsules make them a suitable mode for local antibiotic delivery.

P6.30

EVALUATION OF GROWTH FACTORS FOR TREATMENT OF DEGENERATIVE DISC DISEASE USING THE ADULT MALE RAT AS A MODEL

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Degenerative disc disease is a leading source of back pain in the United States, and research efforts into understanding the pathophysiology of this disease are necessary for the development of new treatments. Addition of growth factors to stimulate chondrocyte development are on the horizon as new treatment modalities for degenerative disc disease, but increasing growth factor concentrations in the body may have adverse affects on vital organs. The objectives of this study were to investigate the use of local sustained delivery of IGF-1 and TGF- β for treatment of degenerative discs using the adult male rat as a model, and to evaluate the vital organs for possible systemic sides of the locally delivered growth factors. The results showed a substantial positive increase in chondrocyte proliferation, and decreased apoptosis at the traumatized disc after 28 days without increases in inflammatory cytokine, IL-1. Analysis of the vital organs results showed slight decreases in kidney and prostate wet weights. Closer histomorphometric evaluation of the tissue revealed changes in the kidney proximal tubules. Further investigations to evaluate the potential physiological or pathophysiological effects of the growth factors at the organ levels are warranted before use as therapeutic agent to treat degenerative disc disease.

P6.31

E F F E C T O F 3 , 4 - METHYLENEDIOXYMETHAMPHETAMINE (MDMA) ON THE EXTRACELLULAR CONCENTRATION OF GLUCOSE IN THE RAT BRAIN

Jennifer Sims¹, Gary Gudelsky²

¹Jackson State University, ²University of Cincinnati

Previous studies have shown that acute administration of 3,4-Methylenedioxymethamphetamine (MDMA) promotes glycogenolysis and increases extracellular concentration of glucose in the striatum. The goal of the present study was to assess whether MDMA increases glucose in the prefrontal cortex of the rat. Furthermore, we investigated whether the MDMA induced increase in brain glucose of the rat is blunted following exposure to a neurotoxic regimen of MDMA. The extracellular concentration of glucose was determined using in vivo microdialysis. Treatment with MDMA (10mg/kg, i.p.) resulted in a significant and sustained increase (50-75%) in the extracellular concentration of glucose in the prefrontal cortex. In the second study, the effect of MDMA on brain glucose was determined in rats treated seven days earlier with a neurotoxic regimen of MDMA (10mg/kg, i.p., every two hours for a total of 4 injections) or the vehicle. Whereas the injection of MDMA elevated extracellular glucose by 130% in control animals, the acute injection of MDMA increased extracellular glucose by only 25% in animals previously exposed to the neurotoxic regimen of MDMA. The present results suggest that MDMA increases extracellular glucose in multiple brain regions including the prefrontal cortex. Moreover, MDMA induced 5-HT neurotoxicity is accompanied by a diminished ability of MDMA to increase the concentration of brain glucose in the striatum.

P6.32

CONTRIBUTION OF PLY, PSPA, AND PSPC TO PNEUMOCOCCAL VIRULENCE

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Streptococcus pneumoniae, pneumococcus, is an important pathogen that causes worldwide morbidity and mortality. We previously produced a mutant in a serotype 2 strain (Δ PAC) that lacked pneumolysin (Ply) and pneumococcal surface proteins A (PspA) and C (PspC) and found that mutant to be avirulent in mice. The purpose of this study was to examine the role of these proteins in a different pneumococcal capsular serotype. We constructed a mutant of *S. pneumoniae* TIGR4, a serotype 4 pneumococcus, that failed to express Ply, PspA, and PspC and designated the mutant TIGR4 Δ PAC. We used an in vitro competitive growth assay to determine if the mutations affected the growth rate of the mutant. A mouse model of systemic infection was used to assess the virulence of TIGR4 Δ PAC. TIGR4 Δ PAC was able to compete and grow at a rate similar to the wild-type in the in vitro assay. Following intravenous challenge of mice at 24 hours, there were $4.4 \times 10^3 \pm 1.2 \times 10^3$ colony forming units (CFU)/ml of blood of TIGR4 Δ PAC compared to $5.1 \times 10^9 \pm 3.7 \times 10^9$ CFU/ml of blood of TIGR4. Our data demonstrates that mutations in Ply, PspA, and PspC do not affect the in vitro growth rate of pneumococci. However, our results show there is a significant reduction in the

virulence of TIGR4 Δ PAC as compared to the wild-type. Despite this reduction in virulence, TIGR4 Δ PAC was not avirulent as had been seen with Δ PAC.

P6.33

SYNTHESIS, CHARACTERIZATION, AND STRUCTURAL STUDIES OF BENZOPHENONE THIOSEMICARBAZONE AND ITS DERIVATIVES WITH DICHLORODIPHENYL TIN(IV)

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Thiosemicarbazones exhibit antibacterial, antiviral, and antineoplastic activities. In solution, thiosemicarbazone molecules can exist in thione – tautomeric form. As a ligand, they form structurally different complexes with many metal ions in which thiosemicarbazones act as a bidentate ligand and bind to the metals through the sulfur and azomethine nitrogen atom. Metal complexes often display enhanced activities when compared with the parent compound. Among the metal complexes, organotin compounds are of interest due to their agricultural and biological applications. In this research, we synthesized 3-thiosemicarbazone, N(4)-ethyl-3-thiosemicarbazone, N(4)-phenyl-3-thiosemicarbazone of benzophenone by using benzophenone and corresponding thiosemicarbazide in a 1:1 molar ratio in ethanol. The tin(IV) complex of the ligand, was synthesized by using diphenyltin(IV) dichloride and the respective thiosemicarbazones in a 1: 2 mole ratio in ethanol. The synthesized compounds were characterized by IR spectroscopy in the solid state. Electrical conductance, UV/Vis and multinuclear (1H, 13C) NMR spectroscopic studies were carried out in solution phase. Based on the data obtained, the ligand revealed to be monomeric in nature. Based on the electrical conductivity studies, the tin complexes are found to be nonionic. The metal complexes are penta co-ordinated showing a distorted tetrahedral geometry. The Sn atom can either coordinate with thione sulfur or through the azomethine nitrogen atom and thione sulfur atom. (Supported in part by NIGMS-NIH GM05117 Grant)

P6.34

DOES HYPOXIA INDUCE INFLAMMATORY CYTOKINES?

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Preeclampsia, a disorder of pregnancy, is characterized by altered trophoblast remodeling and a reduction in uteroplacental blood flow (hypoxia). Serum from preeclamptic women has a high expression of inflammatory cytokines, interleukin -6 (IL-6), interleukin 1 beta (IL-1B), and tumor necrosis factor alpha (TNF-a). In some studies of cardiac ischemia, reperfusion after ischemia/hypoxia has been shown to increase the secretion of inflammatory cytokines. The aim of this study was to investigate the effects of hypoxia and reperfusion on

placenta explant production of these inflammatory cytokines.

Placentas from non-laboring women were collected and tissue was used for hypoxia experimentation. Each experiment was done for 1 hour, 3 hours, and 6 hours, the media and tissue from each experiment was collected and saved for further analysis. Enzyme Linked Immunosorbent Assay (ELISA) was performed on each media sample. ELISA was used to measure the amount of IL-6, IL-1B, and TNF-a present.

Hypoxia increased the production of IL-6 after one hour, while reperfusion reversed the effects. There were no further differences in IL-6 secretion between the groups after 1 hr. Hypoxia also increased the secretion of IL-1B at both 3 and 6hrs, while reperfusion reversed the effects of hypoxia. There were no differences among TNF-a secretion among any of the groups.

P6.35

DEVELOPMENT OF METHODOLOGY TO EVALUATE ANTIOXIDANT PROPERTIES OF WATER-SOLUBLE EXTRACTS OF NATURAL COMPOUNDS

Jerry Zifodya¹, Omonuwa Adah¹, Michelle Tucci¹, Ham Benghuzzi¹

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Cells contain enzymatic and non-enzymatic antioxidant systems that are important for the prevention of oxidative stress and cellular damage. Lipid soluble and water-soluble antioxidants are involved in these processes. Given the array of antioxidant pathways and their importance in cell survival necessitates a need to quantitatively measure the total antioxidant capacity of potential compounds for use in cellular systems. Oxygen radical absorbance capacity (ORAC) is a method of measuring antioxidant capacities of different compounds. It was developed at the National Institute on Aging and is a widely accepted method. The assay measures the oxidative degradation of fluorescein after being mixed with peroxy radical. The kits are expensive and a need for development of an inexpensive method for prescreening potential compounds is needed. The goal of this investigation was to evaluate three water soluble natural compound extracts as potential antioxidants to interfere with the production of lipid radicals (TBARS assay) as well as inhibition of xanthine-xanthine oxidase radicals (end point determination of uric acid). The compounds were diluted to 2 mg/mL and 0.2 mg/mL and compared with a known antioxidant EGCG. The results indicated that higher concentrations of extract induced the formation of lipid radicals within the TBARS assays, reducing the concentrations 10 fold showed only one product and EGCG reduced TBAR formation. In the uric acid assay EGCG, and compounds A and B showed inhibition of uric acid formation. Overall, the two methods were capable of effectively prescreening potential antioxidants.

6.36

THE EFFECT OF ESTROGEN WITHDRAWAL ON THE

BODY AND VITAL ORGANS OF ADULT FEMALE RATS.

Michelle Tucci, Zelma Cason, Steven Farris, Alex Whittington, Tamika Taylor, Cindel Krantz, Ham Benghuzzi
University Mississippi Medical Center

Estrogen is responsible for ovulation, and during menopause, estrogen levels decline rapidly, halting ovulating. Reduced estrogen also seems to play a major role in menopausal weight gain. As the ovaries produce less estrogen, the body looks for other places to produce the needed estrogen. Fat cells in the body can produce estrogen, so the body works harder to convert calories into fat to increase estrogen levels. The focus of this study was to investigate the distribution of body fat, as well as, changes in wet weights of vital organs over time. A total of 12 adult female rats were equally divided into two groups control and ovariectomized (OVX). Initial body weights were 230 ± 22 g for control animals and 222 ± 25 g for OVX animals. After 4 weeks of removing the ovaries the animals in the OVX groups had a 30% increase in body weight compared to control. Evaluation of the vital organs showed significant increases in adrenal gland, heart, and spleen weights. Fallopian tubes, vagina, and cervix had substantially greater percentage of fat encasing the organs than control. OVX animals eight weeks of estrogen withdrawal still maintained a 27% in body weights compared with control animals. Significant increases in fat content surrounding the remaining reproductive organs in OVX was evident, as well as increased liver, spleen, and heart weights. Interestingly, the adrenal weights were lower than the control animals. More in depth histological evaluation of the organs is needed to understand the body's physiological response to estrogen withdrawal.

P6.37

KNOWLEDGE VS CHOICE ASSESSMENT IN PURSUING CAREERS IN HEALTH RELATED PROFESSIONS

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University of Mississippi Medical Center - SHRP, United Kingdom

The aim of this study was to assess the magnitude of knowledge of various student groups toward health related professions (HRP), and to contribute information that may contribute to revising/upgrading recruitment efforts and admission policies. A questionnaire was given to students enrolled in various SHRP's programs CLS (21), CYTO (15), DH (36), EMT (19), HIM (27), OT (134), and PT (72) for the 2006-2007 academic year. The major goals of the study were: (a) to assess student's knowledge and interest in various SHRP programs before enrollment, (b) to determine the first contact efforts the student had in the programs, and (c) to determine if they were informed of and participated in Program Awareness Day (PAD). A total of 324 questionnaires were distributed and returned completed. The results of this study revealed the student's knowledge base for HRP was from the following sources:

counselors (7%); friends and family (44%); PAD (6%); and Other (43%). The data supported that students developed an interest in HRP while either in college (50%) or high school (30%). Post graduate and other sources accounted for 13% and 7%; respectively of their awareness. The data showed interested students contacted faculty and SHRP students 60% of the time and recruiter and other sources 40% of the time. Interestingly, 22% of the students were aware of PAD, and 24% of the students attended PAD. These results provide significant information that can be utilized to efficiently and effectively improve the recruitment process.

P6.38

AN EVALUATION OF GROWTH AND VIABILITY RESPONSES OF THE A549 CELL LINE UPON EXPOSURE TO ORGANIC INHIBITORS OF GLYCOLYSIS.

Veshell Lewis, Ibrahim Farah
Jackson State University

Lung cancer is one of the most prevalent and deadly cancers in United States. In 2007, the United States reported over 213,000 new lung cancer diagnoses and 160,390 deaths caused by lung cancer. Research has shown that cancer cells exhibit higher glycolytic rates than normal cells. We hypothesize that exposure of A549 cells to organic inhibitors of glycolysis would have a negative impact on their survival and will alter their growth and viability due to a vast decrease in the glycolytic rate. Therefore, the objective of this research was to assess the differential role of eleven organic glycolytic inhibitors in controlling lung cancer in vitro. These organic reagents are fructose diphosphate, sodium citrate, ascorbic acid, crude honey, sodium bicarbonate, D-glucose, oxalic acid, glycerol, zinc acetate, pyruvic acid, and sodium ascorbate. The human alveolar epithelial cell line A549 was selected to represent lung cancer in vitro. These cells were maintained and exposed to different organic reagents at concentration levels ranging from 31.3-2,000 $\mu\text{g/ml}$ in 96 well plates in triplets. Data was analyzed statistically to determine the survival and or death parameters. Our results indicate that exposure of A549 cells to organics resulted in concentration dependent cell destruction / cell proliferation. Most of the organic reagents used were responsible for concentration dependent cell destruction of the A549 cells except for pyruvic acid which increased proliferation. We conclude that organics impaired glycolysis in A549 which is crucial to their survival. Supported by NIH-RISE grant # 63228.

P6.39

EVALUATION OF ATP AND SEROTONIN RELEASE BY ACTIVATED HUMAN PLATELETS

Phillip Hankins, James Woodall, Jr, Michelle Tucci, Stacy Vance, and Ham Benghuzzi
University of Mississippi Medical Center

Platelets in mammals are anuclear and discoid and can be rapidly depleted. They contain RNA, mitochondria, a

canalicular system, and several different types of granules; lysosomes, dense granules (containing ADP, ATP, serotonin, histamine, and calcium), and alpha granules (containing fibrinogen, factor V, vitronectin, thrombospondin and von Willebrand factor), the contents of which are released upon activation of the platelet. The goal of this study is to determine the release profile of serotonin and ATP in thrombin activated and non-activated platelets over a period ranging from 1 minute to 10 days. The results show platelets and thrombin activated platelets release serotonin ranging from 100 ng/mL to 500 ng/mL with an average release of 300 ng/mL over the first 60 minutes. The activated platelets show continuous release of serotonin at days 1 and 3. Interestingly, at day 10 there is a substantial increase in serotonin concentrations in both the activated and non activated platelet group. A similar trend was also observed in the release characteristics for ATP. Activated platelets released 25% less ATP than non activated platelets over the first 24 hours. More information is needed in determining the release profiles of the dense granules and their role in inflammation.

P6.40

THE EFFECT OF EGCG ON RAW264.7 CELLS CHALLENGED WITH BACTERIA AND LPS

Shunna Smith, LaQuanda Walton, Stacy Vance, and Ham Benghuzzi

University of Mississippi Medical Center

During innate immunity, microbial products such as lipopolysaccharides (LPS) act to directly stimulate mononuclear phagocytes to secrete their cytokines. LPS is able to bind to their receptors with dissociation constants (K_d) in the range of 10-10 to 10-12 M. As a consequence a very small amount of LPS is needed to occupy receptors in order to elicit a biological response. Green tea is a popular beverage consumed worldwide. The epicatechin derivatives have been shown to decrease LPS-induced cytokine production and septicemia in mice treated with endotoxin. The literature lacks information regarding the response of Macrophages to a challenge with either gram negative LPS or a challenge with bacteria. The overall goal of this investigation was to determine if the active component of green tea, EGCG, can enhance the nitric oxide burst by RAW 264.7 macrophages as well as protect the cell from cellular damage. The results indicate that live bacteria or just the LPS can increase the production of nitric oxide by macrophage cells. Interestingly, cell numbers were increased after 24 hours with just LPS treatment whereas bacteria challenge had little effects on cell number after 24 hours. By 72 hours, cell numbers in both treated groups were significantly decreased and cell damage was markedly increased when compared to control cells. In addition, our findings suggest that green tea at various concentrations is bactericidal. Green tea is able to increase bacteria cell death, without altering the macrophages ability to mount an inflammatory response.

P6.41

THE EFFECTS OF CORTISOL AND THYMOQUINONE ON PANCREATIC CELL VIABILITY AND FUNCTION

Vickie Tillis, Monica Brown, Stacy Vance, and Ham Benghuzzi
University of Mississippi Medical Center

Cortisol is a vital hormone involved in the response to stress. Cortisol increases blood pressure, blood sugar, and has immunosuppressive action. Understanding the relationship between cortisol and pancreatic tissue is pertinent. It is not clear from the literature whether cortisol plays a direct affect on the pancreatic cell numbers or if cortisol inhibits insulin secretion. Normally, the body has mechanisms in place to deactivate the effects of hormones and compounds which can be harmful at the cellular level, and is highly expressed in the kidney, colon, pancreas, and placenta. Increased levels of cortisol have been shown to be elevated in disease processes like diabetes leading to increased reactive oxygen species which further damage the pancreatic cells. Compounds like thymoquinone (TQ) have been shown to lower glucose levels, scavenge ROS, and higher concentrations can lead to cell death. The purpose of this experiment is to determine the concentration of TQ that protects the cells from cortisol induced damage, without altering the cell cycle. The results show that supraphysiological levels of cortisol increase cellular damage over time without altering cellular numbers or glutathione levels. Low levels of TQ protect the cells from the damage induced by supraphysiological levels of cortisol, and as the levels of TQ increase there is a rise in both cell damage and cellular glutathione. More information is needed to determine the effects of cortisol and TQ on the islet and pancreatic delta cells to determine if the effects are similar to these exocrine cell types.

FRIDAY AFTERNOON

Grand Ballroom

Session II: Poster Session II continued
10:30-11:45a & 1:45-2:30p

2:30- 3:30 Divisional Meeting

HISTORY AND PHILOSOPHY OF SCIENCE

Chair: John D. Davis, Jackson, MS
Vice-chair: Mac H. Alford, University of Southern Mississippi

FRIDAY MORNING

Chesnut

O7.01

8:30 IS SCIENCE FREE?

Kant Vaipayee

University of Southern Mississippi

Since its beginning science has been the basis of material progress. One reason it has helped us get this far is that it has been relatively free in the past to generate fundamental knowledge of nature. Recently however, it has been losing its freedom. It is increasingly getting under the grip of profit-driven market forces. Such forces dictate the direction of discovery to the effect that science is becoming less free to do what interests its worshipers. The only science advancing today is the one that has potential for the market. The scientists' hands have been tightened behind their backs; or should I say that their brains have been fenced!. Science's freedom today must be compatible with the needs of the governments and their agencies, and/or the dreams of the wealthy donors, or their foundations/trusts, who are enlightened enough to appreciate the importance of science to humanity. In such situations science becomes less divine since it caters to the needs of the body, not of the soul. A science that is not dictated by the desires of the scientists is less enjoyable, less romantic, less heavenly. Enslaved science is dry and earthly, a chore. The domestication of science by the market forces is perhaps similar to its treatment by the religious forces at its infancy. Free science serves humanity better by fulfilling the spiritual needs as well.

O7.02

9:00 INDUCTION AND ABDUCTION AS MODELS OF SCIENTIFIC EXPLANATION: CAN THE INFERENCE TO THE BEST EXPLANATION SAVE SCIENCE FROM UNCERTAINTY?

Michael Dodge

University of Mississippi School of Law

Contemporaneously, there are extant many modes of scientific explanation. Of these, some claim more authority than others; however, a danger inheres in many of these systems because the need for completeness compels any one of them to extend their boundaries so thin that they are opened up for attack via counterfactuals and absent data. It may be that no system exists which is immune to criticism, but even so such completeness of theory may be unnecessary for practical explanatory value. To keep clean the conscience of science, the arrogance of certainty must be abrogated by careful and considered contemplation of the vagaries which permeate the field. Such uncertainty is not an indictment of science; rather, it is a tenant almost universally realized and which, in admitting the inherent weakness of any given proposition, actually strengthens scientific

explanation over and above mere generalities and the suppositions of supraphysical explanans—i.e., religion, mysticism, and the like. Indeed, the explanatory prowess of science may stem largely from a willingness to rely on abductive inferences. Bas van Fraassen has noted that "scientific inference is inference to the best explanation", and Peirce relied on abduction as the truly novel way for the genesis of knowledge in scientific endeavors. This presentation will explicate notions in both inductive and abductive logic, and it will conclude that these models are useful at elucidating persistent problems in biophilosophy. In particular, the Species-As-Individual hypothesis, as well as the notion of individuating biological entities are discussed.

9:30 Break

O7.03

9:45 A CRITICAL ASSESSMENT OF THE RESURRECTION OF LOGICAL PROBABILITY

John Sylvia IV

University of Southern Mississippi

Recent arguments presented by J. Franklin for the resurrection of the logical interpretation of probability are examined and argued against. The argument is that logical probability, as laid out, is either a confusion of frequency probability or provides so little information such as not to be useful for decision making, especially within the context of scientific theories. Specifically two counter-arguments are presented. In response to Franklin's assertion that some priors have no weight, but that others can be assigned weight based on a statistical syllogism and that this method is only available to the logical probabilist, it is argued that this formulation is based on the concept of frequency probability and thus does nothing to help the case of logical probability. Second, in response to Franklin's assertion that background information for determining probability is ubiquitous and based on the conceptual framework, it is argued that this understanding would lead to a system where anything is either logically possible (1), or not (0), and that this is not useful for the decision making process.

O7.04

10:15 METHODOLOGICAL NATURALISM AND ITS CRITICS

John Davis

Mississippi Museum of Natural Science volunteer

The scientific method has assumed the principle of methodological naturalism since the sixteenth century. This is the philosophical position that observable effects in nature can be explained by natural causes without recourse to the existence or non-existence of supernatural agents. Although "intelligent design" is often viewed as a ploy for inserting creationism into public education, ID is an assault on methodological naturalism. The 2005 decision against ID as science drew on methodological naturalism. It is therefore necessary to understand methodologi-

cal naturalism, its history, definition and the positions of its critics in the philosophical and scientific communities. It is also necessary to differentiate methodological naturalism from metaphysical naturalism, the philosophical position that the natural world is all that exists and there is no supernatural. Creationists and naive "scientific atheists" like Richard Dawkins often confabulate methodological with metaphysical naturalism in their arguments. The principle of methodological naturalism had its origins in pre-Socratic philosophy, was revived by medieval natural philosophers like Nicole Oresme and informed the work of Galileo, Newton and Francis Bacon. The term itself has been credited to philosopher Paul deVries. Karl Popper criticized methodological naturalism as a form of induction. Philosopher Alvin Plantinga argues that exclusion of the supernatural may exclude real causality. The ID promoting Center for Science and Culture finds methodological naturalism an orthodoxy to be overthrown by a different approach. Meanwhile, among practicing scientists who identify themselves as religious, only the creationist and ID communities challenge methodological naturalism in their work.

10:45 Break

07.05

11:00 BIOLOGICAL INDIVIDUALS: A CRITIQUE OF PLURALISTIC AND MONISTIC APPROACHES

Malachi Martin¹, Michael Dodge²

¹University of Southern Mississippi, ²University of Mississippi

Ontological questions about the individuality of biological entities and epistemological concerns about the individuation of organisms have arisen in part due to the emergence of the species-as-individuals (SAI) thesis. In this presentation, we will explore two approaches to biological individuals: Pluralistic and monistic. Pluralism characterizes the approaches of philosopher Jack Wilson and biologist John Harper. J. Wilson argues that there are at least four kinds of biological individuals: Genetic, functional, developmental, and historical. J. Harper maintains that some plant populations may be divided into genets and ramets; genets are the all the descendents of an initial zygote, including the clones, and ramets are the morphologically well-defined "layman's" individuals, or discrete plant bodies. We consider pluralism and contrast it with extant forms of monism, including the "degrees of individuality" view of Julian Huxley and the radical monism of Ronald de Sousa. We also consider more recent efforts to explicate living things and organisms as homeostatic property cluster (HPC) kinds by Robert A. Wilson. On the HPC account biological entities need not satisfy all of the properties in the homeostatic property cluster of these kinds to be considered individuals of these kinds. The HPC approach also has implications for the SAI debate, and these will briefly be discussed. We maintain that both pluralism and monism have merit. Perhaps an ontological monism and an epistemological pluralism about individuals is called for; concrete individuals

exist, yet conceptual individuals may retain their usefulness to biology and philosophy.

FRIDAY AFTERNOON

Chesnut

07.06

1:30 IN THE MIDST OF A WORLD-RIDDLE: THE LEGACY OF ERNST HAECKEL'S BIOPOLITICS

Malachi Martin

University of Southern Mississippi

In his book, *The Scientific Origins of National Socialism*, Daniel Gasman posits that it was 19th century German scientific biology generally and the biophilosophy of Ernst Haeckel specifically laid the ideological groundwork of the Third Reich and the radical policies of Nazi biopolitics. Nazi ideas on organic community, racial hygiene, and rootedness in the land ("Blood and Soil"), Gasman contends, has its etiology specifically in the ideas of Haeckel. Haeckel's book, *Die Welträthsel* (or *The Riddle of the Universe*) fuses many elements of philosophy, cosmology, biology, ethnology and politics, with biopolitical implications that Gasman maintains is protofascism and embryonic Nazism. Gasman's thesis has largely been accepted by the scholarly community and is advocated implicitly in many accounts of Nazism's development. Some historians, however, maintain that Gasman's thesis is at least in part erroneous in its over-emphasis on Haeckel; Richard J. Evans exudes at least a partially questioning posture to Gasman's arguments in his book *The Coming of the Third Reich*, and historian Robert J. Richards also challenges Gasman's arguments. This presentation is a philosophical critique of Gasman's arguments about causality and contingency, and I will endeavor to show that they are erroneous. Social Darwinism was diffuse and widespread, as was nationalistic sentiment, and very important in etiological accounts of Nazism is the plight of Germany in the wake of a World War that left it impoverished, spiritually and materially. These factors take an unnecessary backseat to Haeckel in Gasman's configurations.

07.07

2:00 HISTORY OF THE HERBARIUM OF THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Mac Alford

University of Southern Mississippi

The history of the Herbarium, or museum of dried plant specimens, of the University of Southern Mississippi was studied. In order to better understand the current contents of the collection, former curators were interviewed and University documents were consulted. The collection began in the early

1960s and was utilized in an NSF-funded Flora of Mississippi project under the direction of Samuel B. Jones, Jr. Jones later moved to Georgia, and most of the collection was distributed elsewhere upon his departure. He was followed by Ken E. Rogers, who had a keen eye for plants and helped convince the University of the importance of the botanically rich Ragland Hills just southeast of Hattiesburg. His career was shortened by bad personal decisions, and none of his collections now remain in the USM collection. Jean W. Wooten followed Rogers and built the collection to nearly 20,000 specimens, primarily by her collections of wetland plants and by active exchange. After her retirement, Samuel W. Rosso became curator and augmented the collections with about 5000 specimens from Camps Shelby and McCain as part of a Long Term Ecological Research project. Those collections were repossessed by the military in 2007 and moved to Camp Shelby. After Hurricane Katrina, specimens from the Gulf Coast Research Laboratory were moved to USM. Currently, an NSF-funded project is underway to digitize and database the collection.

2:30 Break

07.08

2:45 A HISTORY OF THE MISSISSIPPI GEM AND MINERAL SOCIETY: A HALF CENTURY OF FOSTERING INTEREST IN EARTH SCIENCE.

John Davis

Mississippi Museum of Natural Science volunteer

Archival research and interviews explain the 50 year success of the Mississippi Gem And Mineral Society. From its inception the Society has functioned through cooperation by academics, businessmen, community leaders and engaged amateurs. On October 15 1957, then Assistant Professor of Geology Wendell Johnson requested space at Millsaps College for "A lapidary club for people interested in this hobby." The Society's first president was J. W. Tucker, founder of the Jackson Daily News. It recruited scientists like Fred Mellen, discoverer of the Tinsley Dome, to give programs. Wendell Johnson, Chairman of Geology at Millsaps, held classes in mineralogy and paleontology. Robert Paxton of Sun Oil conducted field trips. The first woman president, Sue Pitts, and her architect husband Leslie, developed rich relationships with the business community. The Society offered "fun" activities, with Martha Johnson teaching classes in jewelry making and other lapidary skills. In 1960 the Society initiated its show for minerals, rocks, lapidary work and fossils. The 2007 show drew 4,000 visitors and commercial vendors. A bulletin educates the membership and chronicles their activities. Youth members like David Dockery have found inspiration and career development. Members have discovered significant specimens such as the Zygorhiza whale state fossil. Field trip records are used to locate minerals and fossils. The Society now has about 200 members and is completing a facility in Florence MS equipped for lapidary and earth

science education. The Mississippi Gem And Mineral Society demonstrates that public interest in science can be maintained.

3:15 Division Business Meeting and Awards

MARINE AND ATMOSPHERIC SCIENCES

Chair: Zikri Arslan, Jackson State University

Vice-chair: Hyun J. Cho, Jackson State University

FRIDAY MORNING

Elm

9:00 Divisional Meeting

08.01

9:30 COMPARISON OF ENVIRONMENTAL PARAMETERS OF THE BAY OF ST. LOUIS, MISSISSIPPI, BEFORE AND AFTER HURRICANE KATRINA

Matthew Stone, Donald Redalje, Allison Mojzis

University of Southern Mississippi

The Bay of St. Louis is a shallow estuary in the northern Gulf of Mexico, roughly 85 km² in area, with freshwater inputs from the Jordan and Wolfe Rivers, and several bayous. Environmental quality studies were conducted in 2003-2004 and are continuing through 2008 in the Bay of St. Louis. We sampled temperature, salinity, depth, dissolved oxygen, and turbidity at each of nine standard stations, eight located in the bay and one in the adjacent Mississippi Sound. In this study, we have compared environmental characteristics both before and after the Hurricane Katrina with the goal of determining if the storm had an effect on by conditions. We found that the bay characteristics did not vary after the storm from values obtained prior to the storm through use of statistical analyses for spatial and temporal variation.

08.02

9:50 INFLUENCE OF MONSOON WINDS ON THE MAKASSAR STRAIT THROUGHFLOW

David Rosenfield, Dmitri Nechaev, Vladimir Kamenkovich

University of Southern Mississippi

The flow through the Indonesian Seas, or Indonesian Throughflow (ITF), from the Pacific to the Indian Ocean, is an important part of the Earth's climate system. Numerical simulation of this flow is a challenging task because this region restricts water flow between narrow constrictions, above shallow sills (50 - 1,500 m), and through a maze of over 18,000 islands. Since a major portion of the ITF flows through the Makassar Strait, a simulation using a higher resolution model of this region is being

developed currently. To improve the simulation, a procedure was created which assimilates in-situ data using an established variational data assimilation technique. An optimal set of boundary conditions minimizes the model-data misfit -- the difference between model and in-situ data. To date, a comprehensive dataset from moored buoys (1996-1998) has been acquired, while a newer dataset (2003-2006) will be available soon. To improve the simulation further, the NOGAPS wind stress climatology has been acquired and will be used as a surface boundary condition. Preliminary data will be presented, while ideas for further avenues of study will be discussed.

O8.03

10:10 ATMOSPHERIC CONDITIONS FOR FOG AND DEW EVENTS IN MISSISSIPPI

Loren White, Imani Morris

Jackson State University

Using data from surface synoptic observing stations, cases of widespread fog in the vicinity of Mississippi Mesonet observing stations have been identified, as well as nights favorable for dew formation. The vertical variation between 2 m and 10 m of temperature, humidity, and wind are then examined during these events in order to understand how these parameters evolve differently under fog versus dewfall conditions. The fog conditions are further differentiated according to whether associated with precipitation. A preliminary seasonal climatology of fog and dew events can also be assembled from the data.

10:45-11:45 Poster Session

Location: Grand Ballroom

P8.01

COPRECIPITATION OF TRACE ELEMENTS BY YTTERBIUM HYDROXIDE FROM FISH OTOLITHS

Domingos D. Afonso¹, Zikri Arslan¹, Anthony J. Bednar²

¹*Jackson State University*, ²*US Army Engineer Research and Development Center (ERDC)*

Fish otoliths grow throughout the life of fish and record the trace element chemistry of the fish's aqueous environment. This feature has been very useful to draw inferences about the life histories of fish populations and their migration routes. However, the determination of small concentrations trace elements from otoliths is a challenging task since accuracy is usually hindered by the interferences of high calcium matrix. The analytical techniques affording the sensitivity for analysis of otoliths for trace elements requires the elimination of calcium matrix or selective separation of the elements by means of coprecipitation. In this study, the merits of ytterbium hydroxide coprecipitation was investigated for the determination of several trace elements, including cadmium (Cd), chromium (Cr), copper (Cu), iron (Fe), manganese (Mn), nickel (Ni) and zinc (Zn). Precipitation was carried out by adding sodium hydroxide solution to otolith solution spiked ytterbium chloride solution (25

μL). At and above pH 9, Yb(OH)₃ precipitates resulting in the coprecipitation of the elements from calcium matrix. The precipitates was isolated by centrifugation and dissolved in dilute HNO₃ and then analyzed by ICP-AES and ICP-MS. Results from the spiked otolith solutions varied between 85% (Fe) and 102%. (Mn). Calcium concentrations were reduced from 10,000 μg/mL to as low as 20 μg/mL. The interferences of calcium matrix on the ion signal from ICP-MS were completely alleviated. The method was applied to the determination of the trace elements from fish otolith certified reference material.

P8.02

ASSESSMENT OF HEAVY METAL PROFILES IN EAST BILOXI AFTER HURRICANE KATRINA

Domingos D. Afonso¹, Zikri Arslan¹, Pao-Chiang Yuan¹, Anthony J. Bednar²

¹*Jackson State University*, ²*US Army Engineer Research and Development Center (ERDC)*

The goal of this study is to investigate the health impact of Hurricane Katrina in the city of Biloxi, MS. The damage caused by the hurricane was catastrophic leaving many people homeless and millions of dollars loss in the economy. In addition, the storm caused substantial environmental pollution with regard to the heavy metals and persistent chemicals in soil and sediments and water resources. Biloxi is the most populated city in the area where residential areas of African American and Vietnamese population were badly affected by the storm. To date, there has been no study to investigate the catastrophic impact of the storm on the life conditions and health of the residents. In an effort to understand the potential health risks, soil and sediment samples were collected from different locations of Biloxi. The study area is between east of highway 110 and Biloxi, including the waterfront and back-bay areas. Samples were analyzed for toxic heavy metal composition, including arsenic (As), cadmium (Cd), chromium (Cr), mercury (Hg) and lead (Pb). Digested was made in a mixture of nitric and hydrofluoric acids using a microwave digestion system. Soil and sediment standard reference materials were analyzed for quality control. Measurements were performed by ICP-AES and ICP-MS. The results indicate that soil and sediments contain elevated levels of chromium ranging between 15 and 40 μg/g. Levels of Pb were also significant (50 and 450 μg/g). The levels of other elements were below the maximum allowed contaminant levels.

P8.03

FISH DIVERSITY AND ABUNDANCE IN FRESHWATER AREAS WITHIN THE GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE/GRAND BAY NATIONAL WILDLIFE REFUGE

Rachel Cooley¹, Ryan Knobf¹, Gretchen Grammer¹, Jake Walker²

¹*Cooperative Intern Program with the Mississippi Gulf Coast Community College-Jackson County Campus Honors Biology*

Students, ²Grand Bay National Estuarine Research Reserve, Mississippi Department of Marine Resources, ³The national Aeronautics and Space Administration

The species diversity and abundance of fishes inhabiting freshwater areas of the Grant Bay National Estuarine Research Reserve/Grand Bay National Wildlife Refuge (Grand Bay NERR/NWR), Jackson County, MS are affected by pond size and the naturalness of the area. Seven ponds located within the Grand Bay NERR/NWR property were sampled once a month for three months (October–December 2007). A stratified, randomized sampling design was used to determine sampling sites for each month. The area of each pond was determined using remotely sensed imagery and GIS and designated as man-made or natural. The dominate vegetation type around each pond was characterized. A ten-foot seine net with 1/8 inch mesh was used to collect fish from each of the seven freshwater ponds. Fish were then preserved, identified to the lowest possible taxon and measured (mm standard length). Larger, natural freshwater areas appeared to have higher species diversity and abundances than smaller, man-made ponds.

P8.04

ACCUMULATION PROFILE OF CADMIUM, LEAD, AND MERCURY IN OTOLITH ORGANS OF GOLDFISH

Critina Nica¹, Zikri Arslan¹, Anthony J. Bednar²

¹Jackson State University, ²US Army Engineer Research and Development Center (ERDC)

Fish otolith biominerals contain unique proteins that aid in the precipitation of calcium and carbonate ions in the endolymphatic space, and also determine the otolith's function and crystal structure. Toxic substances impact the otolith's growth and hence lead to balance disorders due to the otolith malfunction. Heavy metals, such as cadmium (Cd), mercury (Hg) and lead (Pb), are among the most detrimental to both fish and human health. In this study, the accumulation profile Cd, Hg and Pb on the otoliths was investigated with goldfish to elucidate the relative impact of these heavy metals on the sensory disorders. Goldfish were exposed to three different concentrations of Cd, Hg and Pb for five weeks. The concentrations were 0.5, 2 and 10 µg/L for Cd and Pb, and 0.1, 0.5 and 2 µg/L for Hg. Replicates were run consecutively. At the end of exposure, fish were removed from tanks and euthanized and dissected to extract the otoliths from the head. Extracted otoliths were cleaned in ultrasonic water-bath to remove the adhering tissue, dried and then dissolved in nitric acid and analyzed by ICP-MS for metal content. Fish otolith reference material was also analyzed for quality control. Results indicated that the magnitude of accumulation in the otolith increased with increasing concentration in water. Lead accumulated to significantly higher levels than Cd and Hg.

P8.05

ANTARCTIC FIRN ANNUAL EMISSIVITY TRENDS AT

THE SKI HI AUTOMATIC WEATHER STATION FROM IN-SITU AND SSM/I BRIGHTNESS TEMPERATURES

Gregory McGee¹, Alicia Kirk¹, Travis Smith¹

¹Mississippi Valley State University, ²Fayetteville State University, ³Elizabeth City State University

The ECSU summer 2007 URE Antarctic Temperature Mapping Team created an analytic model of annual emissivity (ε) at the Ski Hi AWS from 1994-1998 using previously compiled satellite and in-situ AWS temperature records and satellite microwave brightness temperatures. Time permitting, Ski Hi ε trends will be compared with ε trends derived at selected stations on the West Antarctic Ice Sheet (WAIS) bordering an interior region without AWS coverage. The other AWS stations whose temperature records could provide the basis for calculating emissivity trends are: Brianna (1994-1997), Byrd (1981-99), Elizabeth (1996-99), Erin (1996-99), Patrick (1986-91), Swithenbank (1998-99), and Theresa (1994-99).

(AWS temperatures were obtained from the AWS Project data archive at the University of Wisconsin's Space Science and Engineering Center (SSEC). Values of TB (1994-1998) for the Ski Hi site were obtained from Dr. Chris Schuman at NASA Goddard Space Flight Center.)

Future work will use AWS and SSM/I TB data to establish continuous emissivity and TS trends at other AWS and across spatial and temporal data gaps. The 2007 URE work is thus a necessary intermediate step toward deriving surface temperature trends across the entire Antarctic ice sheet over the last 28 years.

P8.06

MARINE FUNGI AS INDICATORS OF HUMAN DISTURBANCE ON COASTAL ENVIRONMENTS

Magan Palmer¹, Allison Walker², Jinx Campbell¹

¹Cooperative Intern Program with the Mississippi Gulf Coast Community College-Jackson County Campus Honors Biology Students, ²Gulf Coast Research Laboratory

Marine fungi were first described in 1846, but fungi that existed solely in marine environments were not recognized until about 40 years ago. These marine fungi are found mainly in intertidal habitats such as sandy beaches. Human impact can drastically change a coastal environment and because marine fungi are sensitive to pollution, they can be used as indicators of the level of human disturbance. The purpose of this project was to investigate differences in the species of fungi found on barrier island beaches compared to those found on beaches variously impacted by human disturbance. Substrates, such as driftwood, algae, sand and flotsam, were collected from pristine and disturbed beaches on the Mississippi Gulf Coast and examined for the presence of marine fungi. The fungal communities were compared among the habitats, and differences in key marine fungal species used as qualitative indicators of the level of human impact on different coastal zones.

P8.07

SIMULATING ON-SHORE SALINE TRANSPORT DURING HURRICANE KATRINA

Jay Wallmark, Vladimir Kamenkovich, Dmitri Nechaev

University of Southern Mississippi

One of the many phenomena observed during the landfall of Hurricane Katrina along the Gulf Coast in August of 2005 was the transport of relatively high-salinity water from the Gulf of Mexico up onto the continental shelf and in-shore with the storm surge. The authors will attempt to simulate this transport using a coupled wave-current model forced by a modeled Hurricane Katrina wind field. The current model proposed will be the Princeton Ocean Model (POM). The wave model proposed was developed George Mellor and Mark Donelan, as described the paper "A Surface Wave Model for Coupling with Numerical Ocean Circulation Models", Mellor and Donelan, 2006. This new wave model incorporates depth-dependent wave current coupling terms, and it is hoped that this will allow a more accurate simulation of wave-current interactions under extreme weather conditions.

P8.08

CONSEQUENCES OF WIND PROFILE ASSUMPTIONS IN DETERMINATION OF WIND CHILL

Loren White

Jackson State University

Since the National Weather Service's surface synoptic observing network monitors wind speeds only at a height of 10 m above ground level (AGL), the official wind chill formula/table is calibrated for use of 10 m wind speeds. However the application of wind chill is to determine risks for a human being at approximately the standard temperature observing height of 2 m. In order to do this, the developers of the formula made an assumption that the 2 m wind speed will be one-half of the speed at 10 m. By using data from mesonet observing systems that measure winds at both 2 m and 10 m, we can examine what impact this assumption has on the wind chill. The influence of different stability regimes during night and day are shown in terms of the resulting probability density functions of the difference between the two possible determinations of wind chill. Regional differences are also considered, using data from both Mississippi and Oklahoma.

P8.09

REANALYSIS OF THE 1945 HOMESTEAD HURRICANE

Christopher Luckett, Christopher Landsea, Remata Reddy

Jackson State University

On September 12, 1945, Homestead, FL was the site of a Category 3 hurricane that killed 26 people, caused 60 million dollars in damages, and destroyed the NAS Richmond Air Force Base. Data from COA Data (Comprehensive Ocean-Atmospheric Dataset) collected from September 12th through the 19th. The maximum wind recorded was 105 knots and the lowest pressure recorded was 28.09 inches; all recorded from Homestead. Data

reanalysis indicated variation of peak winds, landfall time, and intensity. Much of the original hurricane data from 1945 was overestimated, but with updated data analysis, we were able to downgrade the storm to a Category 3, alter the hurricane track, and downgrade inland winds over Florida.

P8.10

GENE EXPRESSION PATTERNS IN PELAGIC MARINE BACTERIA: SHORT-TERM COMMUNITY RESPONSE TO ENVIRONMENTAL STIMULI

Dmitri Sobolev, Martha Ragwar

Jackson State University

To assess short-term microbial community responses to environmental stimuli, gene expression patterns were analyzed in natural pelagic marine communities. Communities were exposed to various stimuli (nutrients, light) and community RNA and genomic DNA were collected, RNA poly-A tagged and reverse-transcribed. Select genetic markers were amplified using previously described primers and community fingerprint produced by separating those marker fragments by denaturing gradient gel electrophoresis. Community fingerprint analysis confirmed that many organisms present in the community fail to express their genomes, whereas organisms detected in cDNA are undetectable in genomic DNA analysis. Likewise, changes in the external environment brought about changes in gene expression patterns. The above findings suggest that microbial diversity and abundance as assessed by genomic DNA analysis may not be representative of the current state of the system, but rather of a long-term pattern of factors, that seemingly abundant species may play only a limited role in the environment and that the role of certain low abundance organisms in forcing environmental processes may be disproportionately high. Further studies of environmental gene expression and regulation are needed to elucidate those matters.

FRIDAY AFTERNOON

Elm

O8.04

1:30 A STUDY OF OCEAN-ATMOSPHERIC INTERACTIONS AND HURRICANE PREDICTIVE INDEX (HPI) ASSOCIATED WITH LAND FALLING HURRICANE CHARLEY

R. Suseela Reddy, Christopher Luckett, Harene Natarajan

Jackson State University

Previous studies by Reddy et al., (1998, 2003) have indicated a strong Ocean-Atmospheric coupling during the development of tropical cyclone/hurricane activity over the Gulf of Mexico. We extend these investigations to the hurricane Charley, which developed over the Caribbean and made land fall over the west coast of Florida during August 9-14, 2004. NOAA

GOES satellite, NDBC Buoy and NHC dropsonde data for sea surface temperature and meteorological variables including air temperature, wind speed and sea level pressure were used for computations. A Hurricane Predictive Index (HPI) has been developed for land falling hurricane forecast of Charley over the Gulf of Mexico. HPI computes air-sea interface over the marine boundary, pressure tendency, intensity change and stability using the satellite and buoy data. A positive index indicates the weakening of the system and a negative index indicates developing the system into hurricane activity. The study suggested strong heat flux before and during the formation of the hurricane with an evidence of 2-5 day oscillations in heat flux. These findings are in conformity with the previous studies. The HPI indicated a strong negative index during the development of hurricane Charley.

O8.05

1:50 MAPPING THE SEAFLOOR USING A MULTI-BEAM ECHOSOUNDER IN AN AUTONOMOUS UNDERSEA VEHICLE (AUV)

Vernon Asper, Jeff Williams

The University of Southern Mississippi

A Simrad EM2000 200 kHz multibeam echosounder was installed in an ISE (International Submarine Engineering) Explorer Class AUV for the purpose of acquiring high resolution bathymetric maps of the seafloor in water depths up to 2,200m. The echosounder produces 111 beams and provides a swath coverage of 150m at an altitude of 50m above bottom or a horizontal resolution of just over 1 meter. The vehicle is guided by a Kearfott SeaDeViL integrated inertial and acoustic Doppler navigation system that uses GPS aiding on the surface, acoustic bottom lock when close to the sea floor, and inertial (24cm laser ring gyroscope) sensor when no other aiding is available. The system has been deployed in the Hudson Canyon, Georgetown Hole, Oculina Banks, and over some "blue holes" located near Miami. Future plans include a survey of the Straits of Messina (Italy) and the incorporation of experimental sensor and systems including a mass spectrometer, high resolution camera systems, and acoustic sensors for high precision sub-bottom profiling.

O8.06

2:10 VEGETATION INDICES FOR REMOTE SENSING OF CANOPY FORMING SUBMERGED VEGETATION

Fanen Kwembe, Hyun Jung Cho

Jackson State University

Remote sensing of submerged plants is often limited due to the water absorption of NIR and the light scattering from suspended particles which make it difficult to use common vegetation indices such as the Normalized Difference Vegetation Index (NDVI). We hypothesized that the currently used vegetation indices can be used to delineate the near-surface canopies. We used a GER 1500 spectroradiometer to obtain the depth-

induced variations in the spectral responses of common aquatic plant species in order to better understand the effects of depth and turbidity in the use of NDVI and on the remote detection of underwater plants. A mixture of *Myriophyllum aquaticum* and *Ceratophyllum demersum* was fixed on the bottom of a 100 gallon outdoor tank; and the water was continuously siphoned out with spectral measurements taken every 1.0 cm in water-depth change. Reflectance data were plotted against the wavelengths 400-900 nm and vegetation index (VI) values were then calculated for each depth. In both clear and turbid waters, as the water depth increased, the VI values decreased, even in shallow water depths (<10 cm). The NIR region that appears as a high plateau in terrestrial plants became two peaks at approximately 710-720 nm and 810-820 nm in the submerged plants. Incorporation of these unique NIR reflectance peaks of submerged plants appears to improve the use of hyperspectral aerial photographs in locating and estimating aerial covers of canopy-forming aquatic vegetation beds.

O8.07

2:30 VISUALIZATION OF SHORT-TERM TEMPORAL CHANGES IN SEAGRASS ABUNDANCE AND DISTRIBUTION AT GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE

Jonathan Jones¹, Hyun Jung Cho¹, Christopher May²

¹*Jackson State University*, ²*Grand Bay National Estuarine Research Reserve*

Seagrasses are angiosperms that complete their life cycles in estuarine or marine waters. Seagrass beds provide nursery and foraging grounds for aquatic life and aid in prevention of coastal erosion. Through monitoring this coastal resource, one can indirectly understand changes in the environmental quality of nearby areas. We conducted biannual transect surveys at 5 sites in Grand Bay National Estuarine Research Reserve (NERR) in order to understand temporal and spatial changes in the seagrass distribution and abundance. Transect surveyed data were stored as text files and imported into ArcGIS 9.2. Transect lines were drawn in ArcEditor and used as routes. *Ruppia maritima* and *Halodule wrightii* patch data were added as line events onto the routes in ArcMap. GIS visualization shows that total seagrass was more abundant in summer than fall. The significant seasonal changes were mainly attributed to the *R. maritima* decline in the fall. The majority of seagrass beds were located in water depths less than 1m on shores protected from the dominant wind driven waves. Our results also include visualization of how potential seagrass habitat would increase with water clarity improvements.

2:50 Break

O8.08

3:00 SEED GERMINATION STUDY USING THE COASTAL SUBMERGED AQUATIC VEGETATION

TION, *RUPPIA MARITIMA*

Yvonne Sanders¹, Hyun Jung Cho¹, Christopher May²
¹Jackson State University, ²Grand Bay National Estuarine Research Reserve

Submerged Aquatic Vegetation (SAV) is vascular plants that complete their life cycle underwater. SAV provides shelter and food to aquatic organisms. It also helps improve water quality, stabilizes sediment, and produces oxygen. SAV is declining due to natural and anthropogenic disturbances. SAV restoration approaches include promoting natural recolonization through habitat quality improvement and proactive methods such as human-facilitated revegetation. Our study examined the potential of *Ruppia maritima* seed germination as a less expensive and less disturbing proactive restoration technique. Seeds were collected from Grand Bay National Estuarine Research Reserve (NERR), MS and Lake Pontchartrain. Freshly collected seeds and dried seeds were tested for viability. Dried seeds and scarred seeds were used in the germination study at varying salinities (0ppt, 5ppt, 10ppt, and 20ppt). Before seed coats became fully formed, seeds were able to germinate, indicating the absence of initial physiological dormancy. Drying appeared to induce physical dormancy; the physical dormancy was broken when the seeds were submerged. Seeds from Lake Pontchartrain germinated significantly slower than ones from Grand Bay NERR. The final germination was not different among the salinity treatments.

Acknowledgements: This research is supported by grants from the NOAA-ECSC (Grant No.NA17AE1626, Subcontract # 27-0629-017), the Science and Technology Access to Research and Graduate Education Program of Jackson State University, and NSF-UBM (Award No. 0531927).

08.09

3:20 SEASONAL AND SPATIAL VARIATIONS IN MACROBENTHIC INVERTEBRATES IN THREE MISSISSIPPI GULF COAST BAYOUS

Jonathan Watkins
Jackson State University

Macrobenthic invertebrates alter the geophysical conditions of sediments, promote decomposition and nutrient cycling, and facilitate energy transfer among food webs. Changes in biological communities may indicate changes in environmental conditions. This study was designed to compare the macrobenthic invertebrate community in Bayous Casotte, Heron, and Cumbeest. Bayous Heron and Cumbeest are located within relatively pristine areas of Grand Bay National Estuarine Research Reserve, whereas Bayou Casotte is located in the vicinity of the Chevron Refinery. Effluents from the industry may have significant impacts on the Bayou Casotte ecosystem. Two replicate samples were collected at four sites in each Bayou, as well as in offshore areas within Mississippi Sound, using a Ponar Grab. Water temperature, salinity, dissolved oxygen, depth, pH & turbidity were measured using an YSI water quality

multiparameter meter. Benthic samples were washed through a 500-micron sieve, sorted and then counted. Analysis indicates that macrobenthos densities were higher in the more offshore areas in Mississippi Sound (811.8 m⁻²) than in Bayous (581.9 - 215.5 m⁻²), and were dominated by annelids, particularly polychaetes (492.2 m⁻²). Average densities of other major invertebrate groups; echinoderms (46.7 m⁻²), molluscs (28.7 m⁻²), arthropods (23.3 m⁻²) and flatworms (1.8 m⁻²) were relatively low. Similar results were observed throughout the year and physiochemical parameters remained consistent throughout the study. Sediment composition rather than water quality parameters seemed to contribute a more significant role in macrobenthic invertebrate variations among bayous and offshore areas.

08.10

3:40 PHYTOPLANKTON PIGMENT DISTRIBUTIONS IN OCEAN MARGINS OF THE NORTHERN GULF OF MEXICO AND WESTERN NORTH ATLANTIC DURING SUMMER 2007

Sumit Chakraborty, Steven Lohrenz
The University of Southern Mississippi

Information about phytoplankton pigment concentration and taxonomic composition is crucial to understanding factors influencing the role of the oceans in exchanging carbon dioxide with the atmosphere. The abundance and distribution of phytoplankton pigments in the northern Gulf of Mexico and eastern margin of North America during summer 2007 were characterized. This study was a part of the GOMECC (Gulf of Mexico and East Coast Cruise), led by NOAA scientists in support of the North American Carbon Program (NACP). Nine transects were conducted in coastal waters of the northern Gulf of Mexico and western North Atlantic Ocean. The sites encompassed regions of complex hydrodynamics, influenced by mixing of fresh and saline water, shelf break fronts, and eddies derived from the Loop Current in Gulf of Mexico and the Gulf Stream in the North Atlantic. These regions play a critical role in carbon dynamics of the North American continent. This work documents distributions in phytoplankton pigment concentrations during strong thermally stratified conditions in summer. Satellite imagery (MODIS-Aqua) during the study period revealed distinct gradients in pigment concentrations. Areas dominated by river input, (i.e., Mississippi plume, Chesapeake Bay, Delaware) showed relatively high chlorophyll concentrations. High-performance liquid chromatography (HPLC) will provide more detailed information about pigment concentrations and composition for samples collected at various depths within the upper 100 m of the water column. Pigment composition can then be examined to provide information about the taxonomic composition of the phytoplankton community in different regions.

08.11

4:00 HIGH RESOLUTION MICROMILL SAMPLING FOR ANALYSIS OF FISH OTOLITHS BY ICP-

MS

Zikri Arslan¹, David H. Secor²¹Jackson State University, ²University of Maryland Center for Environmental Science

Elemental information from an otolith's core corresponding to the first year of fish's life is critical to reliably discriminate the adult fish to their natal habitats. High resolution micromilling approaches offer the capability to isolate the core from a whole otolith. In this study, contamination issues from otolith micromilling protocols to trace metals were examined using blackfin tuna otoliths. A preconcentration procedure was utilized to ICP-MS to accurately determine the trace elements from the small core material. It was found that micromilling procedures introduce significant trace element contamination to otoliths, especially for common elements (Al, Cu, Pb and Zn). The sectioning procedure caused significant contamination for Co and Cu and the embedding procedure resulted in contamination for nearly all the trace elements analyzed (Al, Cd, Co, Cu, Ga, Mn, Ni, Pb, V, and Zn). The combined sectioning, embedding and coring procedure also resulted in contamination for most transition and heavy metals. Despite the contamination across all procedural steps, the rigorous decontamination procedure with H₂O₂ and HNO₃ was effective. The decontamination procedure effectively removed bias with the exception of Pb and Zn. Bias in Pb was small in comparison to overall concentrations of Pb expected in fish otoliths, therefore, its effect may be minor in discriminating individuals. Zn showed larger contamination, at concentrations similar to those that are expected to occur in otoliths, which could limit its application in discriminating individuals.

MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

Co-Chair: Constance Bland, Mississippi Valley State University

Co-Chair: Jason Hale, University of Mississippi

Vice-chair: Joseph Kolibal, University of Southern Mississippi

THURSDAY MORNING

Dogwood

09.01

9:00 IMPLEMENTING VARIOUS CHECKLIST IN ELECTRONIC FORM USING XML AND PYTHON PROGRAMMING LANGUAGES

Marcus Winn*Mississippi Valley State University*

The Electronic Logbook (E-Log) is an information storage and retrieval system that records daily activities of the particle detectors located in the D0 Experimental Hall. The detector records collision of protons and antiprotons at Fermi National Accelerated Laboratory. E-Log was developed using XML, HTML and the Python programming languages. The problem with E-Log was that data had to be retrieved from an external database manually and keyed into a form for the E-Log database. My project was to create scripts that would automatically retrieve data from the external database and web pages and insert the data into the E-Log database. This process eliminated the tedious task of the crewmembers which allowed them to perform their job at a more efficient rate.

09.02

9:30 IMPLEMENTING E-MAIL ALERTS TO THE GCC TEMPERATURE MONITORING PROGRAM

DeMarcus Thomas*Mississippi Valley State University*

This document outlines efforts to determine an efficient means of monitoring a high density computing center remotely and efficiently through the use of a web browser. To accomplish this, a web-based temperature monitoring program was created, and implemented at Fermi National Accelerator Laboratory's Grid Computing Center (GCC). The Python program created was designed to read data from thermocouple heat sensors and to superimpose their values onto a floormap of GCC. The software created a virtual floormap which placed the temperature readings in the proper locations relative to the sensors in the actual room. Additions to the program included the creation of a temperature threshold. When the temperature threshold was exceeded, (temperature >95.0 °F), e-mail is sent to the appropriate personnel with a mailing list.

09.03

10:00 EMWASTE DATABASE TRANSFER AND FUNCTIONALITY ASSESSMENT

Alvin McClerkin*Mississippi Valley State University*

I conducted an assessment of the data transfer from the now inactive Waste Inventory Tracking System (WITS) to the active, operable eMWaste® System. The assessment involved two separate verification phases. The first assessment verification phase entailed a 100% review of the WITS inventory utilized for data port to eMWaste®. This involved a one to one comparison of containers on the WITS inventory list against the operable eMWaste® production database. The second assessment verification phase involved random selection of containers within the eMWaste® inventory system for field comparison that included storage location, container size, type and weight. Waste

containers were also randomly selected at field locations and cross-referenced against the eMWaste® inventory database. In addition, a small subset of the containers selected in the second assessment verification were also cross-referenced against the Facility Acceptance Testing-Container Analysis Tool (FATCAT) system to ensure that critical radiological parameters were accurately and adequately tracked to ensure waste management storage facility categorization levels were maintained.

09.04

10:30 A DEM CONVERSION TOOL

Sufian Ahmad¹, Pamela Lawhead¹

¹University of Mississippi, ²Institute of Advanced Education for Geospacial Sciences

This is a program that converts Digital Elevation Models[DEM] to a 3D polygon file of type PLY. The research done opens possibilities towards creating Binary Spatial Partitioning[BSP] file and using files from Mississippi Auto Resources Information System[MARIS] of type E00.

09.05

11:00 RESEARCH ON HYBRID ARIMA AND SUPPORT VECTOR MACHINE MODEL IN FORECASTING ENVIRONMENTAL SUSTAINABILITY

Benjamin Harvey, Joshua Fu

Mississippi Valley State University

Due to the complexity of environmental sustainability and the historical forecast data and the randomness of a lot of uncertain influence factors, the observed historical data showed linear and nonlinear characteristics. Currently, the autoregressive integrated moving average (ARIMA) is one of the popular linear models in time series forecasting, and the SVM, which is closely related to the neural networks model, is the model recent researchers have successfully used in solving nonlinear regression and time series problems. This research presents a hybrid methodology that combines both ARIMA and SVM model to take advantage of the unique strength of ARIMA and SVM models in linear and nonlinear modeling to help forecast environmental sustainability. The ARIMA model is used to deal with the linear pattern of the sustainability and the SVM model is used address the nonlinear association. The effectiveness of the model has been tested using nonlinear patterns in several research studies to forecast environmental pollutants which play a major role in forecasting environmental sustainability. The test results of the models vary according to the changes in each of the variables. The experimental results showed that the hybrid model can effectively improve the forecasting of environmental sustainability, which was accurately achieved by either of the models used separately.

09.06

11:30 CREATING AN INTER-PLATFORM COMMUNI-

CATION BETWEEN LEGO'S RCX AND NXT AND THE IR TOWER FOR A NETWORKING SYSTEM.

Aik Min Choong, Pamela Lawhead

University of Mississippi

This paper will present the results of a study that explored multi-platform communication; between LEGO Mindstorm's RCX, NXT and a computer. The primary purpose of the study was to develop a method to allow the two microcontrollers (RCX and NXT) to communicate with each other and a single controlling computer. The RCX can communicate with other RCX controllers and with a computer using infrared technologies, while the NXT communicates with other NXT controllers and a computer using either Bluetooth or USB. As we can already see, the two microcontrollers do not have a common communication device and there is a need to choose either of the two communication methods and develop a device for that technology for the controller. As an emerging technology, there are complications with Bluetooth. For this reason, infrared was chosen as the communication method for this study. Our goal was to equip the NXT with an infrared transceiver, and provide the necessary API (Java source code) for the NXT, so it can communicate with the RCX and the computer using infrared. This will allow for a networked environment using all three platforms. Once infrared was available for the NXT, a universal remote control was also programmed to control both the RCX and NXT. This allowed the sending of commands via the remote control both to the RCX and NXT.

THURSDAY AFTERNOON

Dogwood

09.07

1:30 CHARACTERIZING ELECTROMAGNETIC DATA SPECTRA USING TRANSFORMS AND WAVELETS

Andrew Harrell

Geotechnical Laboratory, Engineer Research and Development Center

This talk will describe an application of mathematical wavelet theory for target detection by analyzing geophysical underground electromagnetic induction data. It uses wavelet analysis for the spatial series analysis of a sampling instrument where the sample rate/target scale is changing. Analysis of the data is considered by using spectrograms (short-distance Fast Fourier Transforms (FFTs) in preference to periodograms and continuous wavelet transforms (CWTs) if possible. Both the inphase and quadrature data of the instrument are considered. Tables of percent of spectral power in the data are computed using several different approaches to thresholding the first n Fourier coefficients. This is proposed as a measure of effectiveness which compares the wavelet and Fourier transform ap-

proaches to analyzing the data.

09.08

2:00 A SOFTWARE TOOL DEVELOPED FOR PATTERN RECOGNITION AND DATA MINING APPLICATIONS

Abdullah Faruque

Southern Polytechnic State University

This paper describes the development and implementation of PRT (Pattern Recognition Tool), a software tool for various pattern recognition and data mining applications. This software tool can be used by researchers to select the best pattern recognition techniques for a particular data set. This tool can also be used by educators in teaching pattern recognition and neural networks courses. The development of this software tool takes advantage of the high performance computational and visualization routines of the MATLAB programming environment. PRT provides an integrated environment for various data analysis, data visualization and pattern recognition techniques. Data analysis component of PRT includes: principal component analysis, fisher and variance weight calculations and feature selection. Data visualization tool permits visual assessment of the data patterns and their relationships and allows the user to identify outliers in the data set. Several classification methods have been implemented in PRT using both neural network and statistical pattern recognition techniques. Neural network methods include the Back Propagation Neural network (BPN) and Radial Basis Function (RBF) neural network. Statistical pattern recognition component of PRT includes Linear Discriminant Analysis (LDA), Quadratic Discriminant Analysis (QDA), Regularized Discriminant Analysis (RDA), Soft Independent Modeling of Class Analogy (SIMCA) and Discriminant Analysis with Shrunken Covariance (DASCO). PRT provides two ways to estimate the relative performance of different pattern recognition techniques applied to a particular data set by calculating the classification error rate. PRT software tool has been used successfully to classify the different classes of remote sensing and gas chromatographic spectral data.

09.09

2:30 A COMPLETE DATA ANALYSIS USING MINITAB STATISTICAL SOFTWARE

Elgenaid Hamadain

School of Health Related Professions, University of Mississippi Medical Center

Minitab was originally developed in 1972 at Pennsylvania State University. It is now very commonly used in colleges worldwide. It is an easy-to-use package, used interactively to provide organization, manipulation, analysis, and reporting of statistical data. Minitab accepts data in many file formats and keeps work tidy in a single organized project file. This presentation begins with illustrating how to import data from Excel or SPSS to Minitab. Then, an explanation of how to use Minitab for

power and sample Size analysis to calculate the sample size needed to achieve a given power value will be displayed. Use of power curves in MINITAB to visualize the relationship between power and sample size will be shown. Additionally, an explanation will be made to show how to use Minitab to obtain random samples, generate random data, and calculate probabilities for a variety of distributions. Finally, the use of Minitab to generate descriptive statistics, run a two independent samples t-test, perform paired t-test, run one-way ANOVA, perform factorial experiments, and conduct regression analysis will be elucidated.

6:00 Dodgen Reception and Poster Session (Please set up between 4:00 and 4:30p) Location: Grand Ballroom

P9.01

Parallel Compression on the Cell Broadband Engine with CZIP

David Thigpen, Andy Anderson

University of Mississippi

The goal of the study was to parallelize the ZLIB compression library for the cell broadband engine. The basis for the parallel algorithm came from PIGZ, which was a parallel version of the compression algorithm written by Mark Adler for use on a Symmetric Multiprocessor. Using Adler's code as a basis, Andy Anderson and myself were able to successfully make a parallel version of ZLIB, which we called CZIP, that would compress files in GZIP format for the Cell Broadband Engine. CZIP still stands as the only parallel compression tool built solely for the Cell Broadband Engine. During the course of the work on CZIP, we were able to find out the smallest size that would be able to be parallelized using the cell's SPE's without seeing performance that was worse than before parallelizing the algorithm. We were also able to compare the speedup on the cell to the serial versions across all of the SDK's that have come out for the Cell, measuring any gains received from optimizations on the compilers for the Cell architecture.

All of this work was not without its problems, which were many and varied. These problems included errors in documentation and problems with the compiler among other things. These will be discussed in detail at the meeting, giving the solutions that we found to get around these troubling problems and advice on how to avoid them on future projects.

P9.02

A MULTI-RESOLUTION MODEL FOR RENDERING TERRAIN DATA USING JAVA AND OPENGL

J. Sam Testa

University of Mississippi

The goal of this study is to implement a multi-resolution model for rendering terrain data using Java and the OpenGL Java extension JOGL. The terrain data consists of an elevation map and an optional texture map. The terrain data is compiled into a

3-dimensional mesh and then a multi-resolution technique is applied to the mesh. The result is rendered on-screen using Java and tries to provide high rendering rates regardless of the complexity of the mesh.

P9.03

PERFORMANCE ANALYSIS OF OPENMP PROGRAMMING

Liang Huang, Dawn Wilkins

University Of Mississippi

The OpenMP (Open Multi-Processing) is an application programming interface (API) which supports shared memory multiprocessing programming. It can also run on multi-platform including Unix and Windows by using C, C++ or Fortran. In this article, we analyzed the benefits of the OpenMP as a parallel programming language such as, incremental parallelism, the message passing elimination and simpler programming and compiling. Furthermore, we considered a series of programming factors which influence the performance of OpenMP programs, such as the number of fork/join step, threads synchronization, the choice between the private variable and shared variable, the consideration of the cache hit rate etc. Extensive tests of various programs using OpenMP were conducted to see how and in what degree the factors influence the performance of parallel programs. Finally, a general OpenMP programming style was suggested to build more efficient, high quality OpenMP program.

P9.04

ASSESSMENT OF A NON-LINEAR OPTIMIZATION ALGORITHM FOR IMAGERY CLASSIFICATION

Henrique Momm, Greg Easson

The University of Mississippi

The necessity for information extraction from remotely sensed data has experienced significant growth in recent decades. Automated and semi-automated techniques have been developed as an alternative to minimize human interaction and thus save time and cost. However, custom information extraction techniques rely on one's ability to design procedures from scratch either by using tools available in commercial software packages or by developing new computer programs. In both ways there is a steep learning curve involved. Evolutionary computation provides an alternative solution to reduce the overhead necessary to develop tailored solutions because they can solve (or partially solve) the problem without being explicitly programmed to do so but rather to derive the solution from experience. Genetic programming was integrated with standard unsupervised clustering algorithms to develop custom-tailored solution in the form of non-linear functions to spectrally separate the target spectral feature from the remaining image background. By using a Monte Carlo simulation procedure, two distinct aspects of the proposed framework were investigated: [1] – uncertainty involved in the random creation of the initial set of candidate solutions from which the algorithm begins and [2] – its sensitiv-

ity to the number of variables. Results suggested that the overall variability increased with the introduction of additional variables despite the higher accuracy values. Conversely, the use of techniques such as population restarting significantly reduced the variability caused by the initial randomness process and therefore it is recommended to be incorporated into the framework.

P9.05

AN EXPERIMENT WITH CONSTANT MIGRATION OF VIRTUAL MACHINES

Anthony Nocentino, Paul Ruth

University of Mississippi

This study explores the feasibility of constantly migrating a virtual machine between nodes. A constantly migrating virtual machine is one that is almost always ready to be committed to the destination node, allowing the administrator to commit the VM almost instantaneously. This technique shows great promise for high availability systems allowing administrators to provision redundant systems without special hardware. We have modified the virtual machine migration process, conducted experiments and produced results regarding the performance of this solution. Our current results indicate that we need to further explore the source code of the migration and make modifications that allow control of the resources dedicated to the migration.

P9.06

GAME PROGRAMING UNDER MICROSOFT XNA GAME STUDIO EXPRESS

Jianqing Sun, Lawhead Pamela

Department of Computer and Information Science, University of Mississippi

XNA Game Studio Express is an integrated development environment (IDE) developed by Microsoft to make hobbyist, independent game developer and professional companies to develop various games. It is based on .NET framework and provides a number of class libraries, such as some about 2D&3D space, time control, first-person shooters and matrix transformation, to design game program. With this platform, Microsoft Visual C# 2005 and XBOX360 are used as programming language and hardware environment separately. A 2D plane game is designed and 2D BMP gray terrain images in 3D world are displayed on TV. Firstly, in the 2D game programming, I designed elements with different classes to stand for objects in game, and controlled their distant behaviors and response to the key press of the player on the game time line successfully. Then in the 3D terrain display, basic terrain algorithm was used to create triangle view with height data value. In order to give the various projections, I used the program to turn the camera position with some matrix transformation. Users can feel being in a three-dimensional world. As a result, XNA is a good game programming tool.

P9.07

A NEW METRIC FOR DISTRIBUTED ALGORITHMS: ACCUMULATED FAILURE LOCALITY

Sungbum Hong

Jackson State University

One of major roles of distributed algorithms is to reduce the impact of crash. If an algorithm can make the area impacted smaller than that of others, then it could maintain robust distributed systems. To examine the robustness of distributed systems, Failure Locality that is a distance between a crashed process and a farthest process starved has been being used as an important metric. A graph $G(V, E)$ can represent a distributed system, where V is a set of vertexes and E is a set of edges. Each vertex v represents a process and also a edge e represents a communication channel between two processes. A graph $G'(V', E')$ where V' is a set of vertexes crashed or starved and E' is a set of edges associated with the vertexes. Therefore, $G' \subseteq G$. Some of the processes in G can be crashed within a distance d but some of them within the distance d may be still working. Failure Locality can not describe how many processes are starved or working on the distance. To describe the details of Failure Locality within a distance, we proposed a new metric, Accumulate Failure Locality (AFL). AFL can show that how many of the processes on a distance are alive or crashed. With other metrics, AFL was used to evaluate three recent distributed algorithms for the dynamic channel allocation problem. The theoretical analysis was verified through the extensive simulation processes.

P9.08

Mathematica as a Supplement for Teaching Beginning Calculus at Mississippi Valley State University

Raymond Williams, Lee Redmond, Sandra Course

Mississippi Valley State University

Beginning calculus at MVSU has a very high attrition rate and is considered a gatekeeper's course for all STEM majors. Mathematica is a primer computer algebra system (CAS) that is in wide spread use in reformation of mathematics and engineering courses aimed to reduce the high failure rates of students in these departments. The CAS has a variety of capabilities ranging from simple to complex calculations and from graphing elementary functions to displaying regions in 3-space. The purpose of this presentation is to show how MVSU is using Mathematica to supplement lectures in Cal.I and Cal. II The software is used at MVSU mainly for showing complex limits involving indeterminate forms and isotopes and to show relationships and patterns especially with functions and their associated derivatives. The software is also used to verify complex integrals especially those involving transcendental functions. Students expressed better understanding of concepts when graphics are used as opposed to just plain text. Statistical test of student improvement is yet to be determined.

FRIDAY MORNING

Dogwood

8:00-9:00

Poster Session: The Math/CIS/Stats posters from the Thursday evening poster session will be displayed again this morning in the Grand Ballroom

Oral Presentations

O9.10

9:00 AN ARRURATE IMAGE MOSAICING APPROACH USING AFFINE INVARIANT CORNERS

Qiang He, Benjamin Harvey

Mississippi Valley State University

The image mosaicing is to construct a single panoramic image by merging a collection of overlapping images from different viewpoints through a series of coordinate transformations. The image mosaicing provides an efficient way to video detection and analysis. The image mosaicing process consists of two major steps: (1) Image registration to transform images into one coordinate system and (2) Seam removal to eliminate seams in the image mosaic. In reality, accurate image registration on a subpixel grid is the single most critically important step for the accuracy of image mosaicing. The traditional image registration is based on classic features such as the Harris corner and the scaled-invariant feature transform (SIFT) corner, which are both weak to affine transformations. In our research, we introduce affine invariant features to improve subpixel image registration, which considerably reduces the number of mismatched points and hence makes traditional image registration more efficient and more accurate. Affine invariant interest points include those corners that are invariant to affine transformations, including scale, rotation, and translation. They are extracted from the second moment matrix through the integration and differentiation covariance matrices. Our tests are based on two sets of real video. The experimental results from two set of real data show that affine invariant interest points are more robust to perspective distortion and present more accurate matching than traditional Harris/SIFT corners. In addition, for the same image mosaicing problem, we can use much fewer affine invariant points than Harris/SIFT corners to obtain good mosaicing results.

O9.11

9:30 IMPLEMENTATION OF CHINESE SLIDING BLOCK PUZZLE USING BALANCED BINARY SEARCH TREE

Xiaofei Nan

University of Mississippi

Chinese Sliding Block Puzzle is a traditional game, and has long fascinated mathematician aficionados. It is similar to 8-

tile puzzle except the number of blocks and different shapes of blocks. A Chinese Sliding Block Puzzle project was designed and can solve all the opening states of this game. It gives the simplest solution if an answer exists or tells of the nonexistence of a solution. First, an effective indexing method is designed to present the blocks and further the states of the board. Second, move generation is made by shifting the blank block instead of finding out the potential movable blocks. Then, the Breath-First searching strategy is used to traverse the whole game tree in consideration of the limited computational complexity of this game. To eliminate repetition nodes, an AVL tree, a balanced binary tree, is introduced. Use of AVL tree shrinks the time complexity from $O(n)$ to $O(\log n)$ for lookup and insertion operations. In addition, a fully operational User Interface is built by creating a graphic user interface on Win32 and could implement user's commands, such as selecting opening states, changing background, and dynamical demonstrating the searched results. This implementation is a good example in Artificial Intelligence.

09.12

10:00 Toward Automatic Parallelization of Spatial Computation for Computing Clusters

Baoqiang Yan, Philip Rhodes
University of Mississippi

In recent years, cluster computing resources have become freely available to a wide variety of scientific researchers. However, scientists are not necessarily skilled in writing efficient parallel code. The processing of spatial datasets is one area in which this problem is particularly acute. To address this issue, we are developing an API that helps the scientific user to easily write code that performs I/O efficiently and either performs efficient intercompute node communication, or avoids it entirely. In previous work we devised a method of distributing data amongst compute nodes that takes into account the manner in which the data is stored on disk, and also aggregates cluster I/O. This work was done in the context of ray casting, but the view direction was constrained to one of the major axes. This poster or presentation will describe how we have extended our previous work to allow arbitrary rotation of the view direction around a major axis, meaning that spatial dependencies are present along two axes for a given view direction, making the problem much harder.

09.13

10:30 SIMULATION-BASED ANALYSIS OF THE BANDWIDTH USAGE AND NUMBER OF HOPS PER RECEIVER FOR MOBILE AD HOC NETWORK MULTICAST ROUTING PROTOCOLS

Natarajan Meghanathan, Kasi Mudunuri
Jackson State University

The objective of this work is to explore the tradeoff between the efficiency of bandwidth usage and the number of hops per receiver for multicast trees in mobile ad hoc networks.

In this context, we implement and compare the performance of the bandwidth-efficient multicast routing protocol (BEMRP) and the Multicast ad hoc on-demand distance vector (MAODV) routing protocol through extensive simulations. The simulations were conducted for diverse conditions of network density (50 and 100 nodes in a 760m x 760m network), multicast group size (2 to 24), node mobility (5 to 50 m/s) and offered traffic load (512 bytes per packet and 4 packets/ second). The performance metrics studied include the hop count per path, the number of links in the multicast tree, the number of multicast tree transitions, the energy consumed per data packet and the energy consumed per node. Simulation results indicate that the average number of hops per receiver and the energy consumed per packet incurred with MAODV is less than that incurred with BEMRP. On the other hand, the average number of edges per tree and the energy consumed per node is less for BEMRP when compared with that of MAODV. We also observed that BEMRP trees, which have fewer edges, are relatively more stable than MAODV trees, which have more edges. All of these above results indicate that efficiency in bandwidth usage and number of hops per receiver in a multicast tree cannot be optimized simultaneously.

11:00 Presentation of awards for Best Student and Faculty Oral Presentations, Best Posters, and best HPC presentation

11:30-12:30 All Math/CS/Stats division participants are welcome to attend the following open session:

09.14

MISSISSIPPI CENTER FOR SUPERCOMPUTING RESEARCH (MCSR) USER ADVISORY GROUP MEETING, POSTER SESSION, AND SPECIAL SUBSESSION ON SUPERCOMPUTING

David Roach
University of Mississippi

The Mississippi Center for Supercomputing Research was established in 1987 by the Mississippi Legislature and the Institutions of Higher Learning (IHL) in order to provide high performance supercomputing (HPC) support for research and instruction at all state universities. The Mississippi Supercomputer User Advisory Committee (MSUAG) was established by the IHL Research Consortium to provide user input and advice to MCSR management and technical staff on policies and procedures for the Center's operations. It includes member representatives from all IHL institutions. The Advisory Group will meet at this MAS conference. Mr. David G. Roach, Director of the MCSR, will conduct the meeting. The agenda includes an update on MCSR HPC facilities and services, introduction of new MCSR staff members, and site reports and ongoing research updates by MSUAG representatives. A poster session, showcas-

ing research projects that utilize MCSR facilities and services, will follow the Advisory Group Meeting.

A Special HPC Subsession of the Mathematics, Computer Science, and Statistics Division, sponsored by the MCSR, will also be held to serve as a forum on supercomputing in which faculty and graduate student researchers will have the opportunity to describe their research projects that involve HPC, Internet2, Grid Computing, Visualization, Network Security, Computer Systems Administration, and the use of MCSR resources. IHL faculty and graduate students, with an interest in HPC and/or MCSR facilities and services, are also invited to attend and participate.

PHYSICS AND ENGINEERING

Chair: Erdem Topsakal, Mississippi State University
Vice-chair: Alina Gearbe, University of Southern Mississippi

THURSDAY MORNING

Amphitheater

O10.01

8:30 MICRO-MANUFACTURING

Kant Vajpayee

The University of Southern Mississippi

Evolution in electronics during the last two decades and the needs of the medical equipment market are leading us into the micro-world. Minimally invasive surgical (MIS) procedures involving dime-size incisions, robots that assist surgeons, desktop machine tools, and similar developments rely on micro-manufacturing. Our progress toward the micro-world depends to a large extent on our being able to manufacture parts/products of small dimensions. Many a times, the tools and techniques of conventional manufacturing are insufficient at these dimensions. For example, being able to physically hold micro-parts is a challenging task. Micro-machining involves tools that are under 0.3 mm in diameter. Holes of such diameters may be required to be as deep as 2 cm. Spindles can run at speeds as high as 40,000 rpm. Robots are increasingly being used in micro-manufacturing. Major challenges exist in micro-molding and its systems, such as lack of fundamental physics at the micro scale, thermal effects, problems with static electricity, higher precision, and many others. Smaller parts can become airborne if not properly grounded. Very limited measuring instruments capable of measuring to submicron tolerances are available. Some recent milestones covered have been: achieving tolerances as tight as

0.001 mm, drilling 19 mm deep holes of 0.5 mm diameter, and using 0.13 mm diameter end-mills.

O10.02

8:45 THE BIGGEST MYSTERY OF THE UNIVERSE - DARK ENERGY.

Amin Haque

Alcorn State University

The surprise findings of the researchers in 1998 that the supernovas were dimmer, and that meant they were farther away than they should have been, gave birth to the concept of Dark Energy. This mysterious invisible repulsive force is assumed to cause the accelerated expansion of the Universe. Riess' team analyzed 42 of the most distant supernovae received by Hubble Space Telescope. Allen and his colleagues used Chandra X-Ray Observatory to study 26 clusters of galaxies at distances corresponding to between one and eight billion light years. Better limits on the amount of dark energy and how it varies with time were obtained by combining the X-ray results with data from NASA's Wilkinson Microwave Anisotropy Probe (WMAP), which used observations of the cosmic microwave background radiation to discover evidence for dark energy in the very early Universe. Using the combined data, astronomers have found that dark energy makes up about 75% of the Universe, dark matter about 21%, and visible matter about 4%. Thus we do not understand 96% of the universe. Dark energy has profound implications on the fate of the universe. If acceleration were to continue indefinitely, the universe could expand so incredibly that it would end in a Big Rip. All matter — galaxies, stars, planets, and even an atom — would be torn apart. If dark energy becomes attractive with time, the universe would start contracting, ending in the Big Crunch.

O10.03

9:00 Understanding Mysterious Dark Energy.

Amin Haque

Alcorn State University

Einstein introduced Cosmological Constant to balance the attractive gravitational force. Edwin Hubble discovered that the farther away the galaxy, the greater its recessional velocity. Dark Energy entered the astronomical scene after several groups of astronomers discovered independently the expansion of the universe at an accelerating rate, and the repulsive force responsible for the expansion is called Dark Energy. Using the combined data, astronomers have found that dark energy makes up about 75% of the Universe, dark matter about 21%, and visible matter about 4%. Our understanding of Dark Energy currently is vague. The simplest model for dark energy is the Lambda – Cold Dark Matter. CDM could be made up of Axions or WIMPs. Axions are non-thermal particles, and massless at high temperature and they undergo no energy loss. WIMPs are Supersymmetry (SUSY) particles associated to every standard model particle. The spins of these two particles differ by one-half. The R-parity

number is 1 for ordinary particles and -1 for SUSY particles. Neutralino were created at the time of the Big-bang when temperatures were extremely high. Although neutralino are stable, they can annihilate each other. Quintessence theory proposes a low-mass (light) dynamical field that varies with time and could effectively act as dark energy. Chaplyin Gas is a negative pressure gas and can be a form of dark energy. Our very understanding of gravity might be flawed, and may involve more dimensions than the ordinary four. Superstring theory may solve the greatest mystery.

O10.04

9:15 FORMATION OF BLACK HOLES.

Amin Haque

Alcorn State University

A star is made up of hydrogen plasma. Nuclear fusion reactions continuously take place which convert hydrogen nuclei (protons) to helium nuclei. New nuclear fusion reactions convert the helium to carbon nuclei, then to oxygen to silicon to iron. The tremendous amount of energy released from the fusion reactions balances the force of gravity, and the star is stable. However, fusion reactions stop at iron because not enough energy is available to maintain the nuclear reaction. Thus, the original star ends up with layers of different heavy elements. The outer layers of hydrogen, helium, carbon, and silicon are still burning around the iron core, building it up. The remaining material eventually collapses in upon itself due to strong gravity. A star with mass greater than 3 times the Sun's gets collapsed into a single mathematical point with virtually zero volume, where it is said to have an infinite density, called a Singularity or black hole. Within a certain distance of the singularity, called event horizon, the gravitational pull is so strong that nothing--not even light--can escape. Since light ordinarily travels on a straight-line path, light follows a curved path if it passes through a strong gravitational field; and this is why light becomes trapped in a black hole. Escape of anything from the event horizon of a black hole would require a velocity greater than the speed of light. According to Einstein's theory of relativity, no object can have a speed greater than light.

O10.05

9:30 DETECTION OF BLACK HOLES

Amin Haque

Alcorn State University

Black holes do not emit light or radiation, and so are detected indirectly by observing their gravitational effects on other nearby objects. Their intense gravity pulls in dust particles from a surrounding cloud of dust or a nearby star. The accelerated particles heat up and emit x-rays which are detected. Also, a star circling around something that cannot be seen, indicate the presence of a black hole or a neutron star. Light from a nearby star will bend due to strong gravity of a black hole before reaching an observer. The stronger the gravitational field of a

black hole, the more the curving. The discovery of a black hole is based on velocity measurements of a whirlpool of hot gas orbiting the black hole. The Space Telescope Imaging Spectrograph aboard the Hubble Space Telescope can take a spectrum of many places at once across the center of a galaxy. Each spectrum tells scientists how fast the stars and gas are swirling at that location. With that information, the central mass that the stars are orbiting can be calculated. The faster the stars go, the more massive the central object must be. Supermassive black holes about 3 billion times the mass of our Sun which appear to be concentrated into a space smaller than our solar system have been found. The Advanced Camera for Surveys, installed in March 2002, aboard the Hubble Space Telescope, is expected to outperform all previous instruments flown.

9:45 Break

O10.06

10:00 METHODOLOGY IN THE CONCENTRATION AND TEMPERATURE DEPENDENT SEPARATION OF COMPLEMENTARY AND NON-COMPLEMENTARY DNA TO ENABLE LIQUID CRYSTAL OBSERVATION AND EXTRACTION

Taiquitha T. Robins¹, Francis Tuluri¹, Dacia McPherson², Chenhui Zhu², Joseph MacLennan², Noel A. Clark²

¹Jackson State University, ²University of Colorado Boulder

Liquid Crystals (LCs) are a state of matter between liquids and crystalline solids. Deoxyribonucleic acid is known to be the very basic genetic descriptor of the molecular structure of an organism. It is believed that the behavior of DNA and liquid crystals are intertwined to such an extent that, if liquid crystal phases are separated, then a visual representation of complementary and non-complementary DNA segregation should be present. The purpose of this experiment is to segregate and extract the LC-forming, complementary DNA. This goal is achieved using several processes. The first used sonication to fragment long DNA strands. The second entailed sample measurement via gel electrophoresis. The third allowed for visual observation and evaporation through capillary tubes. Finally, the sample was centrifuged to provide separation of DNA components. The results of this experiment after centrifugation provided for the viewing of two areas utilizing polar microscopy. There existed a birefringent area, which theoretically consisted only of double stranded DNA. Also present was a non-birefringent area which consisted of single stranded DNA. In conclusion, this project was successful to the point of separation of the two possible DNA types. Complete extraction of the liquid crystals from the sample is imperative to future studies of DNA liquid crystal formation. This research was supported by grants from the Minority Access to Research Careers/Undergraduate Student Training in Academic Research (MARC/*USTAR) Program (NIH-MARC 5 T34 GM007672-27) and by the National Science Foundation,

Division of Materials Research award (DMR0213918).

O10.07

10:15 MEASURING ACCELERATIONS OF HORIZONTALLY LAUNCHED SMALL SPHERICAL OBJECTS WITH A HIGH-SPEED CAMERA

William Lancaster

University of Mississippi

The objective of this study is to determine correct setup alignment in order to evaluate the differing accelerations of spinning seeds. A high-speed video camera was used to record one-half inch ball bearings being launched in a plane perpendicular to the camera. The camera was aligned with the desired frame, by mounting a grid with ten by ten centimeter grid lines and using a laser level to match the camera with the grid lines. The recorded videos were analyzed using Logger Pro software to determine their average y-acceleration and average x-acceleration. The average accelerations were then compared to that of the standard accelerations for gravity at that particular latitude, and the drag acceleration for a one-half inch ball bearing traveling between 2.5 m/s and 3.5 m/s. The average y-acceleration after twelve trials was $-9.8182 \text{ m/s}^2 \pm .0411$ which includes that of gravity which is 9.796 m/s^2 for this latitude and elevation. The average x-acceleration for twelve trials was $-.216 \text{ m/s}^2 \pm .46$ which is in the range of the predicted value of $-.327 \text{ m/s}^2$ to $-.190 \text{ m/s}^2$ for velocities between 2.5 m/s and 3.5 m/s. The results indicate that there are limitations for how accurate the measurements can be and give a range of accelerations to which can be compared the accelerations of the spinning seeds.

O10.08

10:30 THE CURRENT DENSITY IN A MIRROR

Henk Arnoldus

Mississippi State University

When light is incident upon the surface of a mirror, it induces a surface current density in the conducting metal layer. This current generates an electromagnetic field, which is the reflected light seen in front of the mirror, and behind the mirror the generated field cancels exactly the incident field. Any light is emitted by a current source. We show that the induced current density in the mirror can be expressed in a simple way in terms of the given current density of the source emitting the light, without considering explicitly the electromagnetic radiation field which carries the information from the source to the mirror. As examples we present typical current distributions in the surface of a mirror, which are induced by nearby electric and magnetic dipoles. It turns out that these current densities can have very intriguing field line patterns, which include the appearance of singular points, singular circles, and spiraling behavior. We also predict the existence of two counter-rotating vortices in the flow of electric current on the mirror surface.

O10.09

10:45 VORTICES IN THE OPTICAL NEAR FIELD OF AN ELECTRIC DIPOLE

Jie Shu

Mississippi State University

When light travels from a source to an observer, it appears to be propagating along a straight line, commonly referred to as an optical ray. However, when light is observed on a scale of an optical wavelength in close vicinity of the source, the direction of energy flow is not necessarily along a straight line. The field lines of energy flow are determined by the electromagnetic Poynting vector. We have considered the light emitted by an electric point dipole, and it appeared that very close to the dipole the field lines of the energy flow pattern may exhibit a vortex structure, depending on the mode of oscillation of the dipole moment. We have studied numerically the intricate field line patterns that may be present in this optical near field, and we shall discuss possible generalizations of this phenomenon. Particularly promising seems to be the configuration of a dipole near a mirror, which will lead to interference between the dipole radiation and its own reflection. Since the energy flow lines of the emitted radiation are not straight, we anticipate that the common picture of rays reflecting off the surface may have to be reconsidered.

O10.10

11:00 DESIGN AND ANALYSIS OF HOMOGENIZED HIGH IMPEDANCE SURFACES

Yashwanth Reddy Padooru, Alexander Yakovlev

University of Mississippi

The present day need for high frequency designs urges an increase in operating frequency and decrease in overall circuit dimensions. The goal of this work is to design Artificial Magnetic conductors (AMC's) at X-band, which are very small or electrically dense (having a periodicity less than $0.2\lambda_{\text{effective}}$), so that antenna over this surface sees the AMC as a homogenized magnetic surface. AMC's are designed using Frequency selective surfaces (FSS) on a grounded dielectric slab. AMC's have a forbidden frequency band, over which they have very high surface impedance. In this region the reflected wave is in-phase with the incident and increases the radiation in the forward direction when compared to ordinary metal ground planes. This property makes them favorites to be used as ground planes in low-profile applications. An analytical approach is used for both normal incidence and oblique incidence to support the simulated results done by EMPiCASSO. In the analytical model used, expression for surface impedance is calculated from the expressions of impedances of FSS elements and grounded dielectric substrate. From the surface impedance, reflection phase is extracted. These new AMC's are the novel structures for low-profile applications.

THURSDAY AFTERNOON

Amphitheater

O10.11
1:30 ANALYTICAL MODELING OF HIGH IMPEDANCE SURFACES

Yashwanth Reddy Padooru, Alexander Yakovlev
University of Mississippi

This work deals with modeling of high impedance surfaces using an analytical approach. New structures like split ring, split cross with horizontal and vertical arms, which behave as wide band high impedance structures in the X-band and have a stable resonance behavior with respect to different angles of plane wave incidences, are analyzed for normal and oblique incidences for both polarizations (horizontal and vertical) using the formulas that were present in literature. The approach in the literature is based on analytical models for strip grids combined with Babinet principle for planar grids located at a dielectric interface. The emphasis is to see how these surfaces are stable for different angles of incidences and different polarizations and behave as wide band structures. The bandwidth here is considered for the phase varying between +90 degrees and -90 degrees. Analytical expressions of surface impedance and reflection phase applied to these structures are verified using numerical solutions obtained from EMPiCASSO.

O10.12
1:45 CHARACTERIZATION OF SKIN MIMICKING GELS FOR MICS (402-405 MHz) AND ISM (2.4 – 2.48 GHz) BANDS

Tuba Yilmaz, Tutku Karacolak, Erdem Topsakal
Mississippi State University

Characterizations of skin mimicking materials are important for in vitro testing of implantable or wearable radio frequency (RF) systems. Several tissue mimicking materials have been proposed in the literature for different applications such as, test of implantable antennas and specific absorption rate (SAR) measurements. In this study, tissue mimicking gels of both human and rat skin tissues have been developed for implantable antennas operating at MICS (402-405 MHz) and ISM (2.4 – 2.48 GHz) bands. Since the design of the implantable antenna depends on the electrical properties of the tissue environment (skin), in vitro antenna measurements require the skin-mimicking gel characterization. The electrical properties (ϵ_r and σ) of the human and rat skin are obtained from the literature (C.Gabriel, S.Gabriel and E.Corthout: "The dielectric properties of biological tissues: I. Literature survey", Phys. Med. Biol. 41 (1996), 2231-2249). The skin mimicking gels are formulated and characterized by using scintillation grade (triton X114), Diethylene Glycol Butly Ether (DGBE), agarose, sucrose, sodium chloride, and de-ionized water. The electrical properties of the skin-mimicking gels are measured using Aligent's dielectric

probe kit and good agreements are obtained between the electrical properties of the gels and human and rat skin at MICS and ISM bands. The recipes of each human and rat skin mimicking gels for ISM and MICS bands will be presented.

O10.13
2:00 PLANE WAVE DIFFRACTION BY MULTIPLE SLOTTED COAXIAL LINE

Santosh Seran, J. Patrick Donohoe, Erdem Topsakal
Mississippi State University

Diffraction of a plane wave by a coaxial line with two circumferentially symmetric dielectric regions and multiple longitudinal slots in the outer conductor is investigated in this paper. The motivation behind this analysis is to determine the power coupled through cracks in this transmission line. Given r as the cylindrical coordinate radial variable, the configuration consists of a coaxial line with a center conductor of radius a , a dielectric coating around the center conductor ($a < r_c$). The field in each region is represented in terms of cylindrical eigenfunctions. Application of the appropriate boundary conditions at the dielectric interfaces and the combined boundary condition on the outermost interface yields a linear system of equations with an infinite number of unknowns. Truncation of the system yields a finite set of simultaneous equations, which can be easily solved. Numerical results illustrating the effects of surface magnetic field with frequency are presented.

O10.14
2:15 LIGHT PROPAGATION NEAR A MIRROR

Xin Li
Mississippi State University

The direction of propagation of light is defined as the direction of motion of the energy density associated with the electromagnetic wave representing the light. Light emitted by a source appears to propagate along a straight line from the source to the observer, when detected in the far field. The optical near field is a region around the source with a dimension of several optical wavelengths. In this area, the concept of light propagating as straight-line rays is not necessarily valid anymore. The energy can flow along curved paths, which approach asymptotically the rays in the far field. The direction of motion of the energy flow at any point in space is determined by the electromagnetic Poynting vector. These vectors form a vector field, and its field lines present a visualization of the flow of energy. We have studied the field line pattern in the optical near field of an electric dipole, and it appeared that the field lines may exhibit a vortex structure. Under investigation is the modification of such field line patterns for the case where the light is emitted in close vicinity of a mirror. Since the light can not penetrate the mirror the energy flow near its surface has to be parallel to the surface, in seeming contradiction with the common picture of rays reflecting off a surface.

O10.15**2:30 A HILS SYSTEM FOR UAV ATTITUDE DATA SYNCHRONIZATION**Lamarious Carter, Kamal Ali*Jackson State University*

Unmanned Aerial Vehicles (UAV), particularly the smaller ones (Miniature Aerial Vehicles, MAV) are being used to extend the visual field of the user. To extract geolocation coordinates from such MAV images, exact attitude information of the MAV are necessary. Since most UAV/MAV are equipped with autopilots and hence IMUs, attitude information is transmitted to the user's ground station periodically. To be able to utilize this information correctly, it should be synchronized with the imagery received from the UAV/MAV.

In this paper we describe a Hardware In the Loop Simulator (HILS) System that is used to achieve this synchronization. The HILS system is a gimbaled platform equipped with optical shaft encoders. The Autopilot is placed on this platform to simulate flight while exact attitude information is collected from the Optical Shaft encoders. By comparing the signals from the shaft encoders with those transmitted by the autopilot, the delay in attitude data can be quantified. The HILS system is also used to fine tune the IMU making for more accurate attitude data, and hence more accurate target geolocation extraction from MAV/UAV imagery.

The paper goes on to discuss the use of such a HILS system as a flight simulator for autopilots rendering the testing of different airframes under different weather conditions easier and more efficient.

2:45 Break**O10.16****3:00 INTRODUCTION OF SPECIAL WASTE MANAGEMENT IN USA**Pao-Chiang Yuan¹, Elgenaid Hamadain²¹*College of Science, engineering and technology, Jackson State University,* ²*School of Health related Professions, University of Mississippi Medical Center*

Man converts raw materials into products, eventually waste can be transformed into one of three mediums include air, water or land. Waste that has not been recycled, can end up in one of those three states. It can be incinerated, dumped into the ocean or landfilled. Nationwide, 14,000 of solid waste landfill operation in 1978 now has a little less than 6,000 landfills due to increased regulations at the state and federal level. EPA estimates that about 96% of all hazardous waste generated are handled on the site where it is produced. Manufacturing companies put efforts to reduce the volume of waste, recycle, incinerate, or detoxify waste. However, there is sometimes a residual product left that the generator is unable to handle. This waste must be reported to state and federal authorities and sent to an off-site facility for treatment and/or disposal. This presentation uses one

of the largest and oldest hazardous waste treatment facilities in United States as an illustration. The facility has been operating since the mid 70s. The treatment plant includes a laboratory, physical treatment, a chemical treatment plant, bioremediation, a tank farm, a solidification/stabilization plant and a secure landfill. The facility does not have an incineration process. The routine operating process and monitoring will be introduced in this presentation. Plant treats all kinds of hazardous waste from asbestos, wastewater sludge, PCB landfill, Electrical Arc Furnace, dust from Scrap Steel Manufacturing plants, and etc; however, it does not treat radioactive waste.

O10.17**3:15 GAS TRANSPORT CAPABILITIES OF VORTEX RINGS**Barnabas Kipapa*University of Mississippi*

Vortex rings are a fairly common phenomenon, potentially seen everyday in the form of a smoke ring. Nonetheless, the VR's behavior is not entirely well known. The technology needed to properly observe the phenomenon has just recently become available and, within the past decade, studies have found that the VR's phase transition corresponds to the maximum value of circulation. Formation number is used to refer to the point in the formation of maximum circulation just before transition into the trailing jet form. We claim the VR, is capable of retaining a measurable amount of what is approximated as ideal gas. We are interested in the parameters governing this retention as well as what governs efficiency of retention. An ultrasonic anemometer uses a series of acoustic pulses to measure the speed of sound locally. The speed of sound for an ideal gas depends on the ratio between specific heats, temperature, and molar mass. A suitable gas can be chosen so that the speed of sound measurement from the anemometer will tell us the concentration of gas passing through the region between the device's transducers. By designing an appropriate VR-generator, we can experimentally observe the formation number and determine the gas transport parameters.

O10.18**3:30 INVESTIGATION OF THE ELECTROMECHANICAL PROPERTIES OF ASTHMA MEDICINAL DRUGS USING LASER DOPPLER VELOCIMETRY**Mohammed Ali¹, James Ejiwale¹, Malay K. Mazumder²¹*Jackson State University,* ²*University of Arkansas at Little Rock*

A novel method for analyzing electromechanical properties (e.g., aerodynamic diameter, electrostatic charge, polarity) of asthma medicinal drug aerosols produced by four different commercially available pressurized metered dose inhalers (pMDIs), including Albuterol?, Atrovent?, Qvar?, and, Ventolin? is presented. In recent, influence of electrostatic

charge on particle deposition in the lung airways has attracted much attention, which requires precise quantification for analytical perspective. In this study we report the application of an Electronic Single Particle Aerodynamic Relaxation Time (ESPART) analyzer, which operates on the principle of laser doppler velocimetry to measure simultaneously d_a and q (magnitude and polarity) on a single particle basis and in real time. Its draws aerosols from an aerosol sampling chamber (ASC). The chamber's inside walls were lined with a grounded wire mesh. The pMDI devices were actuated at the inlet of valve holding chamber, which had the other end connected to the ASC. Prior to each run ASC was cleaned and evacuated (50 mb) to simulate the inhalation of an aerosol bolus @ 30 L/m for 8 s. Aerosol particles from all drug delivery devices were found to not only have different size distributions but also varied in their polarities. The drug aerosols cloud emitted by Albuterol and Ventolin were determined to be electropositive while Atrovent and Qvar were electronegative. These findings can be explained by variation in the drug propellant surfactants, metal surfaces of delivery devices, and drug/carrier homogeneities. In conclusion, the ESPART provided more detailed charge information about the pMDI aerosol particles.

3:45 Divisional Business Meeting

6:00 Dodgen Reception and Poster Session
(Please set up between 4:00 and 4:30p)
Location: Grand Ballroom

P10.01 SYSTEMATIC CHARACTERIZATION OF A RUBIDIUM MAGNETO-OPTICAL TRAP

Alina Gearba, Gregory Carson, Brad Crochet
University of Southern Mississippi

At the University of Southern Mississippi, rubidium atoms are cooled and trapped in a standard magneto-optical trap to temperatures $1/10,000$ of a degree above absolute zero. The presentation includes a description of the basic operating principles of a magneto-optical trap, an overview of the experimental apparatus, and a systematic characterization of the rubidium magneto-optical trap. The purpose of such characterization was to identify the best experimental conditions in which the number of trapped atoms is the highest. High atomic numbers are crucial in a series of novel applications such as Bose-Einstein condensation, cold molecules, atomic lithography, quantum computing and others. The total number of trapped rubidium atoms was measured versus several laser intensities and detunings, magnetic field gradients, and background pressure. Other measurements characterizing the behavior of the cold atoms in the magneto-optical trap such as size, atomic density and lifetime were also performed. The total amount of fluorescence emitted by the cold atoms was measured with a calibrated photodetector

subtending a known solid angle, while a high-speed video camera connected to a computer via an image acquisition board was used to monitor the size and the shape of the atomic cloud. A two-level atom model was used to relate the fluorescence collected by the photodetector with the total number of trapped atoms. We identified the optimum experimental conditions and we trapped a maximum of 80 million atoms.

P10.02 HYDROTHERMAL SYNTHESIS OF V2O5 NANOBELTS USING POLY(ETHYLENE)OXIDE AS A TEMPLATE

Venkata Subba Reddy Channu¹, Sun-il Mho¹, Rajamohan Kalluru², Quinton Williams²

¹*Ajou University, Korea, Republic of*, ²*Jackson State University*

With the aim of obtaining nanodevices as batteries, sensors and fuel cells, we prepared V2O5 nanobelts by a simple hydrothermal process using poly(ethylene oxide) (PEO) as a template. The interlayer distance of the V2O5 lattice of the nanobelts expands from 11.5 to 13.98 Å with the polymer insertion. Strong interaction between the vanadyl group and the polymer was confirmed by the shift in FTIR vanadyl vibrational peaks.

PSYCHOLOGY AND SOCIAL SCIENCE

Chair: David Swanson, University of California,
Riverside

Vice-chair: Carolyn Adams-Price, Mississippi State
University

THURSDAY AFTERNOON

Holly

O11.01 1:15 THE LETTER SPAN AND WORD SPAN TESTS OF SHORT TERM MEMORY

Tiffany Smith, Heidi Smith, Reid Jones

Delta State University

The Digit Span Test is widely used on IQ tests of intelligence as a measure of short term memory (STM). The task involves listening to a series of digits and then repeating them back. A more difficult variation occurs when the subject required to repeat the digits in reverse order. The researchers constructed analogous tasks using letters of the alphabet and one syllable words that began with the same letters. Participants warmed-up with a game of 'Simon', also based on STM. Then participants

completed the Digit Span, Letter Span, and Word Span Tests. The last two tasks were counterbalanced. Participant responses to the three STM tasks were related.

O11.02

1:30 SHORT TERM MEMORY IN A PSYCHOMOTOR TASK

Heidi Smith, Tiffany Smith, Reid Jones
Delta State University

Using the popular 'Simon' game, participants listened to and watched a random pattern of sounds, colors, and locations. They were then required to replicate the patterns by pressing light panels on the game. Next, participants were presented with the Digit Span subtest from the Wechsler Adult Intelligence Scale and analogous memory tasks using letters of the alphabet and one syllable words. The 'Simon' task was always presented first. The other three tasks were presented in counterbalanced order. Finally, participants filled out a brief demographic survey. Participants were also asked to describe any strategies they used to complete the memory tasks. High levels of performance on 'Simon' (the psychomotor task) were related to the other short term memory tasks and demographics.

O11.03

1:45 GENDER DIFFERENCES IN THE INFLUENCE OF PARENTAL AND TEACHER ACCEPTANCE ON STUDENT ACHIEVEMENT IN THE MISSISSIPPI DELTA

Shaila Khan, Linden Haynes, Alfredlene Armstrong
Tougaloo College

This study explored gender differences in the influence of perceived parental and teacher acceptance/rejection on students' achievement in Mathematics, Science and English subjects in the Mississippi Delta. Parental (PARQ), Teacher (TARQ) Acceptance/Rejection Questionnaires, and Personal Information Form (PIF) were administered to 7th grade students of level 3, 4 and 5 schools ($n=358$, male=173, female=185). Teacher Evaluation of Student Conduct Questionnaire (TESQ) and students' achievement scores were obtained from teachers and school authorities. For males, results suggested that average grade was negatively correlated with teacher acceptance ($r=-.241$, $p<.01$) and teacher evaluation of student conduct ($r=-.200$, $p<.05$); and they had higher perceived feelings of teacher rejection ($t=1.99$, $p<.05$), and paternal rejection ($t=1.82$, $p<.07$). For females, average grade was only negatively correlated with teacher's evaluation of student conduct ($r=-.208$, $p<.01$). Teacher acceptance and teacher evaluation of student conduct were positively correlated ($r=.231$, $p<.01$). Females' performances in Mathematics ($t=4.20$, $p<.001$), Science ($t=3.14$, $p<.01$), English ($t=4.79$, $p<.001$) subjects and average performance ($t=4.64$, $p<.001$) were significantly higher than males. Compared to Level 5 schools, students in level 3 schools had significantly lower Mathematics, Science and average scores, perceived less

acceptances from their teachers, and teachers rated their students more negatively. Relationship between teachers and students positively influence academic achievement of students and hence, a better environment for healthy teacher-student relationship should be promoted.

O11.04

2:00 ROLE IDENTITY AND SERVICE-LEARNING

Ann Marie Kinnell, Richard Conville, Mark Hamrick
University of Southern Mississippi

Practitioners of service-learning often notice that community partners, students and faculty members often seem unaware of each other's expectations and needs. When this happens the quality of student learning is damaged, university-community relations are damaged, and the community is not served. To understand the expectations of the parties involved, the investigators engaged in semi-structured interviews with 10 community partners, 10 students, and 10 faculty members involved in service-learning. Transcripts of the interviews were analyzed using standard procedures of analytic induction. Four themes emerged from the analysis: Control, Preparation, Oversight, and Involvement. Results show that: (1) Instructors indicated moderate levels of control in that they set the parameters of their projects within the context of the course but tended to leave up to the students the specific details of their work with the community partners. Many had low levels of site-based involvement and relied on the community partner for site-based oversight of the students; (2) Community Partners indicated that they would like to have more communication with instructors in setting up the projects and more involvement by the instructor during the project; and (3) Students who indicated that they were highly involved in their projects tended to be more satisfied with their experience. Using research on roles identities, the authors analyze how the roles identities of the involved parties affect the interactions between them in the areas of control, preparation oversight, and involvement.

2:15 Break

O11.05

2:30 PERCEIVED OBSTACLES TO MENTAL HEALTH TREATMENT FOR AFRICAN AMERICANS

Pamela G. Banks
Jackson State University

Contradictory findings exist regarding the overrepresentation of African Americans in the mental health system and underutilization of mental health services. Underutilization can best be explained by a constellation of barriers that deter African Americans from seeking mental health services. A few studies have been conducted that identify these barriers, e.g., societal stigma, cost, fragmentation of services, lack of availability of services, mistrust, fear, racism and

discrimination, etc. The present study, conducted in a university setting, assessed obstacles to seeking mental health treatment. One hundred, eighty-six African American college students (females=136; males=50) completed a survey evaluating preferences and attitudes about mental health services. The participants' ages ranged from 18-54 with a mean age of 23.9 years. Each participant listed their perceived obstacles. Three hundred and twenty-three responses were recorded and analyzed for the sample. The findings show that the most commonly identified obstacles (in rank order) were personal responsibilities/time(24%), social stigma (20%), personality characteristics (18%) and financial constraints (16%). Flaws in the mental health delivery system accounted for 9% of the responses while 10% of the responses indicated that no obstacles were believed to interfere with their seeking mental health treatment. As expected, stigma and cost were deemed obstacles. However, the study provides the unique examination of personal attributes such as pride, denial, fear, stress, motivation and depression as perceived obstacles to help seeking behavior. These findings provide evidence that strategies are needed to reduce these barriers.

O11.06

2:45 THE DEMOGRAPHIC IMPACTS OF HURRICANE KATRINA ON THE MISSISSIPPI GULF COAST: AN ANALYSIS OF SEX AND AGE GROUPS BY ZIPCODE

David Swanson

University of California Riverside

This paper provides an estimate of the effects of Hurricane Katrina on the populations of 20 selected zipcode areas in Hancock, Harrison and Jackson counties, Mississippi that were at or near the epicenter. The examination of effects on the population proceeds by using 1990 and 2000 census data to develop "Cohort Change Ratios" (Smith, Tayman, and Swanson, 2001: 127-128), which are then adjusted to develop 2007 population estimates that account for the effects of Hurricane Katrina using data collected under the auspices of a study funded by the National Science Foundation and special "Katrina estimates" done by the US Census Bureau for 2006. These estimates represent the only ones available for these zipcodes that utilize "on-the-ground" data.

O11.07

3:00 EXTRAVERSION AND CELL PHONE USE

Jerry Scott, Johnny Hunsucker, Megan Jackson, Reid Jones

Delta State University

Persons who heavily use cell phones for social calls might be considered extraverts (who have high needs for social conversations) or possibly introverts (persons who avoid non-phone social interactions but may spend large amounts of time on the cell phone with only one or two persons). Surveys were developed for extraversion/introversion and cell phone usage.

The surveys showed acceptable reliability and validity data. A ratio was constructed for the amount of time using a cell phone divided by the number of different persons usually called. That ratio was correlated to the extraversion score of the participating subjects.

O11.08

3:15 CONSERVATIVE POLITICAL VIEWPOINTS AND PERSONALITY

Johnny Hunsucker, Megan Jackson, Jerry Scott, Reid Jones

Delta State University

A survey was developed to measure the degree to which a person's political viewpoints could be classified along a dimension from low conservatism to high conservatism. Some items were modified from the widely used "F Scale" for authoritarianism. Satisfactory measures of internal consistency and validity were obtained for the survey. Participants were asked to complete the survey as well as a nationally validated measure of the 'Big Five' personality traits. Profiles of likely personality traits for low and high conservative persons were compared.

O11.09

3:30 NARCISSISM AND PERSONALITY TRAITS

Megan Jackson, Jerry Scott, Johnny Hunsucker, Reid Jones

Delta State University

Narcissistic Personality Disorder is defined by the Diagnostic and Statistical manual (DSM-IV-TR) as an exaggerated sense of self importance, abilities, or characteristics. Additionally, the person has strong needs to be admired. The DSM-IV-TR views this as a 'life-long' problem, and not as one that may occur because of important successes as an adult. For example, many professional musicians, athletes, and even medical doctors are believed to be narcissistic, although this differs from the personality disorder in that it was acquired later in life. By studying college students, it might be possible to detect early tendencies toward narcissism before the person has had many important successes as an adult. A self-report survey of narcissistic tendencies was constructed and showed preliminary evidence of reliability and validity. The survey was administered to college students along with a widely used survey of the 'Big Five' personality traits. Narcissism was interpreted in terms of each of these traits.

3:45 Division Business Meeting

6:00 Dodgen Reception and Poster Session (Please set up between 4:00 and 4:30p) Location: Grand Ballroom

P11.01

THE INFLUENCE OF GENDER ROLE ORIENTATION ON CHILDHOOD FRIENDSHIP PATTERNS

Ashley Durkee, Karen Christoff
University of Mississippi

Gender role orientation (GRO) is an area of increasing interest with regard to social relationships. Some researchers posit that differences in GRO may more accurately describe phenomena that were previously thought to be sex differences, while others suggest androgynous individuals tend to be healthier psychologically. However, much of this research has focused on adults. Perhaps if we are able to learn more about the impact of GRO on social relationships in children, interventions can be developed in order to promote androgyny, and thus greater psychological health, from a young age. The purpose of this project was to investigate the ways in which GRO, and androgyny in particular, influences childhood friendship patterns. 103 children, age 7-8, participated in individual interviews, consisting of the Children's Sex Role Inventory (CSRI; Boldizar, 1991) and sociometric peer nominations. Children showed significant preference for androgynous friends, regardless of their own GRO. Furthermore, the children who were consistently rated as "most popular" among their classmates were significantly more likely to be androgynous. Roughly half of participants preferred friends who adhere to the same GRO as themselves. Of those who preferred friends of a different GRO, a significant proportion preferred androgynous friends. It appears that childhood androgyny may be associated with being liked. Perhaps this is due to the fact that androgynous individuals possess both masculine and feminine personality traits and therefore tend to have more in common with greater numbers of people.

P11.02

TO HEAR, OR NOT TO ADHERE: A FOLLOW-UP STUDY ON SISTERTALK ADHERE PARTICIPANTS

Keita Rouser¹, Thomas Lasater²

¹Tougaloo College, ²Brown University

Black women in the U.S. have obesity problems with a dramatically increased rate in the prevalence of overweight Black women. The SisterTalk ADHERE program was developed to help Black women decrease their weight and blood pressure by promoting healthy nutrition and physical activity. This study explores the adherence of the SisterTalk ADHERE participants to the nutritional suggestions and the overall effectiveness of the program among the participants of a clinical delivery group. A survey of 25 questions was asked to participants in the clinic group (the clinic group consisted of weekly meetings with a facilitator and other participants to watch SisterTalk videos and receive supplementary materials). Results from this study showed that participation in the SisterTalk ADHERE program helped participants develop ways to promote long-term healthy eating habits. The SisterTalk ADHERE program worked for the majority of these women in a way that they were able to take what they learned in their weekly sessions and remember to apply it to long-term dietary changes. Many of the participants still kept in contact with other participants and frequently exercised and

shared healthy eating tips with each other.

P11.03

GENDER DIFFERENCES IN CHILDREN'S AGGRESSION AND POPULARITY PATTERNS

Kristen Tyson

University of Mississippi

Children labeled by their peers as popular have shown an increase in aggressive acts, which can be used to obtain and maintain their status. Aggression is also most associated with males, whose masculine identity demands strength, power, and physical prowess, but girls have developed their own socially acceptable means of asserting their power through relational aggression (Rose et al., 2004). This study sought to measure and compare the amount and types of aggression exhibited by male and female 2nd graders through peer nominations in a sociometric questionnaire. Boys and girls were found to participate in equal amounts of gender-specific aggressive behavior. Girls, who according to their scores on the BSRI were classified as traditionally feminine, were more likely to use relational aggression. Acts such as excluding peers from participating in an activity, spreading rumors about a classmate, and getting even by keeping a classmate from being in their group of friends were all significantly correlated with popularity in girls, while overtly aggressive acts of hitting, pushing, and beating up another classmate were not significantly correlated with popularity in girls or boys. These findings illustrate that the covert mechanisms of relational aggression can be powerful tools of obtaining popularity in girls and can be detrimental to the psyches of all girls who utilize relational aggression and are abused by its use.

Rose, Amanda J., Swenson, Lance P., & Waller, Erika M. (2004). Overt and relational aggression and perceived popularity: Developmental differences in concurrent and prospective relations. *Developmental Psychology*, 40, 378-387.

P11.04

EFFECTS OF BILINGUALISM ON MEMORY ENHANCEMENT

Preeti Kumar

Mississippi College

Bilingualism is a growing necessity for today's society. Much research has been conducted on the benefits of being bilingual. The purpose of the current study is to test the memory of monolingual and bilingual college-age students at a private college using digit span, picture-naming, and listening comprehension. It is hypothesized that bilingual participants will score better than their monolingual counter-parts in all three areas.

P11.05

PERCEIVED SOCIAL SUPPORT, MENTAL HEALTH AND WELL-BEING IN AFRICAN-AMERICAN NURSING HOME RESIDENTS

Bouchra Koussih, Bryman Willimas

Jackson State University

This study aimed to investigate the relationship between perceived social support, depression and life satisfaction in elderly African-American residents of nursing homes. A survey design was used to study a convenience sample of elderly African-American adults (n=9) selected from two nursing homes in the state of Mississippi. The participants completed a socio-demographic questionnaire, The LSI-Z, The SSAS and the GDS. It was found that life satisfaction was significantly negatively related to perceived social support and to availability of close friends. Perceived social support and life satisfaction were not significantly related to depression and neither was involvement in church related activities. Regression analyses indicated that availability of friends and perceived social support from friends add to the prediction of depression while perceived social support from family does not. Non parametric analyses uncovered that females experienced a higher level of life satisfaction than males. Male residents perceived a higher level of perceived social support than females and unmarried residents (divorced, widowed or single) had a higher perception of social support than married residents. These results have implications for the development of interventions designed to improve the quality of life and psychological well-being of elderly African-American nursing home residents by increasing social activities and enhancing interpersonal relationships and interactions for the purpose of building a large network of friendships.

P11.06

RACE AND ITS EFFECT IN SEEKING MENTAL HEALTH SERVICES

Pamela G. Banks, Joseph Hayes

Jackson State University

There is contradictory evidence about the utilization of mental health services by African Americans. Some researchers have reported that African Americans are overrepresented in the mental health care system while others report that African Americans tend to underutilize these services. The 2001 Surgeon General Report highlighted barriers that include race, poverty, stigma and cultural mistrust. A descriptive study based on preliminary data was conducted to assess the specific role that race may play in perceptions about seeking mental health services. A group of college students (N= 186, females=136; males=50) was asked the following question: "Do you think that your race (e.g. being an African American) would affect your seeking professional mental health services?" The participants' ages ranged from 18-54 with a mean age of 23.9 years. The results show that 80% of the participants did not think that race would affect their seeking mental health services, while 20% perceived that that race does have an effect. A look at the breakdown by gender showed that 82% of the females reported that race does not influence their help seeking behaviors. Similar to the overall sample, 18 % of the females perceived race to be a mediating factor. The male participants appear to have placed

more emphasis on race; 28% believed that race was a determinant while 72% did not believe that race influenced their seeking mental health services. In this preliminary analysis, for a sizable proportion of the sample, race is still an influencing factor.

P11.07

EFFECTIVENESS OF A BRIEF ANXIETY AND DEPRESSION QUESTIONNAIRE FOR COMMUNITY SCREENING

Preeti Kumar, Shambhavi Chandraiah

University of Mississippi Medical Center

The purpose of this pilot study was to analyze existing data obtained from voluntary female participants at a community health screening for depression and anxiety and to evaluate its effectiveness. It was hypothesized that both the depression and anxiety screening questionnaires would be an effective tool for community-wide screening. The screening was conducted in May 2004 for women in Jackson, MS at the National Women's Health Checkup Day Health Fair. Both NIMH questionnaires were intended for patient self-evaluation for possible depression (15 items) and anxiety(37 items). 28 women chose to be screened for depression and 40 women chose to be screened for anxiety. The questionnaires were evaluated by matching the items on the questionnaire with the criteria given for the respective disorders in the DSM IV TR. Analysis of results showed that 14% of the women screened positive for potential major depressive disorder, 11% for dysthymia, 31.7% for generalized anxiety disorder, 35% for panic disorder/attack, 4.9% for obsessive compulsive disorder, and 0% for post traumatic stress disorder. In the depression sample, Caucasians were the majority, and in the anxiety sample, African Americans were the majority. While some of the current study's results do support the results of similar studies done previously, it is likely the small sample size of this study causes differences with other existing results. Further suggestions on modifying this questionnaire for screening or ongoing progress of treatment, along with comparison with other available questionnaires will be discussed.

P11.08

RELATIONSHIP BETWEEN SUBSTANCE ABUSE AND ANXIETY AND DEPRESSION AMONG CLINICALLY ADMITTED SAMPLE AND COLLEGE STUDENTS

Ashley Wilson, Shaila Khan

Tougaloo College

Substance abuse involves the excessive or repeated use of legal or illegal drugs to produce pleasure or escape reality. Growing evidence indicates that substance use disorders and mood and anxiety disorders are far more widespread among the general population than previously assumed. Past history of a mental disorder was associated with more than twice the risk of having an alcohol disorder and four times the risk of having another drug disorder. Research done by Grant, Stinson, Dawson, Chou, Dufour, Compton, et al., (2006) show that there are extremely high numbers of substance abuse disorders and mood

and anxiety disorders in the United States population and confirm the strength of association between them. The purpose of the present study was to investigate whether there is a relationship between substance abuse disorders and mood and anxiety disorders among clinically admitted sample and college students. Using a convenient sample, data were collected from 40 clinically admitted participants and 40 college students. Three Questionnaires were administered which included Substance Abuse Questionnaire, Depression Questionnaire, and Anxiety Questionnaires along with a Demographic survey. Anxiety and depression was the independent variables and substance abuse was the dependent variable. First it was hypothesized that if anxiety level and depression was found to be high participants will abuse substance more. Second, it was hypothesized that clinically admitted participants will have more anxiety, depression and history of substance abuse compared with college students. Correlation and t tests will be performed to test the hypothesis. The study is still on going.

P11.09

RELATIONSHIP BETWEEN PSYCHOLOGICAL WELL-BEING AND INTERPERSONAL RELATIONSHIP AMONG COLLEGE STUDENTS

Chaquina Griffin, Shaila Khan

Tougaloo College

Our psychological well-being plays a very important role in our everyday lives. It may also be related with how we react with others, such as our partner, lover, spouse, or whatever term one may prefer to use to describe that significant other. It is important to understand what the psychological basic needs are. There has been research showing that autonomy, competence, and relatedness all relate to emotional well-being (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). Emotional dependence is also connected with one's well-being (Reiss et al., 2000). The purpose of the study was to find whether there was a positive correlation between better psychological well being and better interpersonal relationship. A convenient sample of 80 undergraduate college participants, (40 males, 40 females) were given a Demographical Informational Sheet, a Psychological Well-being survey and an Interpersonal Relationship survey (Snell, 1997). The independent variable was psychological well-being and the dependent variable was interpersonal relationship. The Psychological Well-being survey had 51 items. The response type was on a 7-point scale. Higher score revealed better psychological well-being. The Interpersonal Relationship survey had 31 items. The response type was on a 5 point Likert type. Higher score revealed better interpersonal relationship. It was hypothesized that participants who have better psychological adjustment will also demonstrate better interpersonal relationship. It was also hypothesized that the relationship between psychological well-being and interpersonal relationship will vary according to gender. Correlations and t tests will be performed to test the hypothesis.

P11.10

EFFECTS OF PHYSICAL ACTIVITY ON STRESS AMONG AFRICAN AMERICAN COLLEGE STUDENTS

Iman Abdelrahman, Shaila Khan

Tougaloo College

Physical activity or inactivity has been found as one of the most dominant precursors to stress related symptom in the United States. The U.S. Department of Health and Human Services shows that rates of physical inactivity are more rampant in minority groups such as women, adults with lower income, African Americans, Hispanics, and American Indians (Castro & Wilcox, 2000). However, little research has been done on these groups to understand the personal and environmental obstacles that make these groups such large targets. This study examined the attitudes and the occurrences of physical activity among college students and how this correlates with their level of stress, or anxiety. Eighty African American college students (45 female and 35 male) were asked to complete two questionnaires. These included the Physical Activity Questionnaire which measured things such as how much the individual was involved in vigorous intensity activities during the day to how much time they spend doing moderate intensity activities as part of their work or schooling and the Anxiety Rating Scale Questionnaire which measured things such as how tense or restless one feels throughout the day. It was hypothesized that those reporting a higher level of physical activity level will have a lower level of stress or anxiety. It was also hypothesized that men are involved in more physical activities compared to females. Correlation and t-tests will be performed to test the hypothesis. The study is still on going.

P11.11

RELATIONSHIP BETWEEN ROAD RAGE AND ANGER AMONG AFRICAN AMERICAN COLLEGE STUDENTS

Jessica Lee, Shaila Khan

Tougaloo College

Road rage is when a driver or passenger attempts to kill, injure or intimidate a pedestrian, another driver, another passenger, or to damage their cars in a traffic incident (Smart, Mann & Goldbloom, 2005). Angry drivers are hostile in thinking; take more risks while driving; get angry easier; behave more aggressively; more likely to have more accidents; as well as have more anger, anxiety and impulsive traits (Dittman, 2005). The present study investigated the relationship between road rage and anger among African American college students. It was hypothesized that a positive correlation will be found among road rage and anger; (b) fresh-persons will demonstrate more road rage and anger compared to sophomores, juniors, and seniors; and (c) males will have a higher level of road rage and anger compared to females. Eighty African American college students (40 men, 40 women) selected conveniently were given a questionnaire entitled: Road Rage Questionnaire and a Demographical information sheet. A significant positive correlation between

road rage and anger ($r=.609$, $p<.01$) was found. ANOVA showed that road rage significantly varied according to classification [$F(3,40)=4.62$, $p<.007$]. Post hoc Tukey's tests showed that road rage for fresh-persons was significantly higher compared to juniors, and that for juniors was significantly higher compared to seniors. Males also showed significantly higher road rage compared to females [$t(42)=1.77$, $p<.08$]. Males also scored higher on anger scale compared to females [$t(42)=3.16$, $p<.003$].

P11.12

EFFECTS OF PARENTAL INVOLVEMENT, SUPPORT, AND WARMTH ON STUDENTS' SELF-ESTEEM

Stephanie McGee, Shaila Khan

Tougaloo College

Parent-child interaction is substantial to child development. According to recent research, supportive parenting is linked to adolescent self-esteem (Dekovic & Meeus, 1997; Spoth, Redmond, Hockaday, & Yoo, 1996; Rice, 1990; Hoetler & Harper, 1987). Adolescents who receive positive parental support generally have higher self-esteem. They tend to be cheerful and social and do well in school while those with low self-esteem tend to be depressed and shy (Plotnik, 1999). Lack of parental support is cited as a strong correlate of adolescent substance problems and delinquent behavior (Barnes, Farrell, & Cairns, 1986; Hundleby & Mercer, 1987; Simmons, Lin, & Gordon, 1998). The present study investigated to see if parental involvement, support, and warmth have an influence on college and high school students' self-esteem. The participants were of both African American and Caucasian descent. There were a total of 80 participants (20 high school males and 20 high school females; 20 male college students and 20 female college students) who were given two questionnaires Rosenberg Self-Esteem Scale and another questionnaire which measured students perception of their parent/guardians which is composed of 42 questions and is rated on a 7-point scale. It was hypothesized that (a) students whose parents are more involved with their lives and give them emotional support and warmth have higher self-esteem; and (b) there will be gender and age differences in such relationships. T-tests will be performed to test the hypotheses. The study is still ongoing.

P11.13

RACIAL DIFFERENCES IN PHYSICAL ACTIVITY AND DIETARY HABITS AMONG OVERWEIGHT AND OBESE COLLEGE STUDENTS

Danielle Bogan, Madhu Singh

Tougaloo College

In the United States, obesity is increasingly considered an epidemic affecting the nation. Among the fifty states, Mississippi has the highest obesity rate with 30.6 percent of adults considered obese (Trust for America's Health, 2007). Obesity can be managed by both exercise and diet however, only 26 percent of adults engage in vigorous leisure-time and about 59

percents of adults do no vigorous physical activity at all in their leisure-time. (Weight-control Information Network, (WIN) 2007) and their eating habits are poor. This study was conducted to determine racial differences in physical activity and dietary habits among overweight and obese college students. It was hypothesized that there would be no difference in the amount of physical activity undertaken by African- American and Caucasian overweight and obese college students, but there would be a difference in their eating habits. Further, males would be less physically active than females, and females more careful about their dietary habits. Data was collected on 80 college students recruited from both an African- American and Caucasian liberal arts institution, using convenient sampling. Surveys included Personal Information Questionnaire (PIQ), Physical Activity Survey, which assessed the physical activity level, and a Fat-Related Diet Habits Questionnaire assessed the history of food choices in the past month. Participants were classified according to the body mass index (BMI) as normal weight, overweight, or obese. The data will be analyzed using the Statistically Package of Social Science (SPSS) software. Outcomes of this study are still being reviewed.

P11.14

REFINED ASSESSMENT OF MALE SEXUAL BEHAVIOR IN RATS AFTER EARLY LIFE EXPOSURE TO SELECTIVE SEROTONIN REUPTAKE INHIBITOR ANTIDEPRESSANTS (SSRIS)

Christopher Campbell¹, Spencer Bowley¹, Ian A. Paul³

¹Base-Pair Program, Jackson Public School, ²Program in Neuroscience, University of Mississippi Medical Center, ³Department of Psychiatry & Human Behavior

Early life exposure of male rats to tricyclic antidepressants as well as SSRIs results in lasting changes in behavior, including significant impairment of sexual behavior. Moreover, this is accompanied by sustained reductions in the expression of neuronal serotonin markers. This indicates that early maternal SSRI exposure may produce lasting neurobiological effects in infants. However, we have noted instability in this behavior in rats, particularly among controls, which has hindered our ability to relate the behavioral changes to the changes in neurochemical expression in serotonergic neurons. One possible source of instability may be the imprecision of the 4 behavior rating system initially employed in these experiments. To determine whether a more detailed system will result in a shift in the stability of the ratings, we began analyzing male sexual behavior using an 8 behavior rating system as well as evaluating the behavior of stimulus females. We noted both a reduced variability in data from males as well as that females were not uniformly sexually proceptive/ receptive. Failure of the stimulus females to emit appropriate sexual behaviors appeared to disrupt the male's sexual activity, particularly among control animals which increased experimental variability. IAP Supported by funds from RR-17701 to the Center for Psychiatric Neuroscience.

P11.15**THE EFFECTS OF ROMANTIC RELATIONSHIPS ON BODY IMAGE AND SELF-ESTEEM AMONG COLLEGE WOMEN**

Portia Bobbitt, Ena Knott-Scott

Tougaloo College

A romantic relationship is about finding companionship, commitment, emotional security, communication, happiness and it can play a role in one's identity. A friendship, which is often the first stage of a relationship, starts by wanting to know a person and involves happiness, companionship and emotional security, just as in romantic relationships. This study looks at issues women go through when in a romantic relationship regarding self-esteem, body image and value of one's self. A partner's self esteem can be the foundation of a relationship; it holds a good relationship together and can tear a relationship apart. This study is being conducted to explore the effects of romantic relationships on African American women's body image and self-esteem. It was predicted that women within a romantic relationship would have higher self-esteem levels and value their appearance more than women not in a relationship. Data collection is ongoing with an expected participant total of 80 female students enrolled in a southern historically black college. Participants will complete the Rosenberg self-esteem scale (Rosenberg, 1965) to determine low and high self esteem, The Body Image scale by Licazoli and Brannon-Quam (2000) and will be asked about their relationship status. Analysis will be done using t-tests to compare women in a relationship to those not in a relationship in regards to their self esteem and body image.

SCIENCE EDUCATION

Chair: Michael Carley, USM Gulf Coast Research Laboratory

Vice-chair: Samuel Clardy, USM Gulf Coast Research Laboratory

THURSDAY MORNING

Ash

O12.01**8:00 USE OF THE INTEGRATED SYSTEM APPROACH TO CONNECTING TECHNOLOGY OF THE 21ST CENTURY FOR INDUSTRIAL TECHNOLOGY CURRICULUM.**

Prince Showi, James Ejiwale

Jackson State University

Never before have men been so close together, yet so far apart, in so many ways. This is particularly frustrating period in the history of our nation. Technology, as it affects everyone in this age of science, is a powerful force upon the pattern of our society. The unique aspect of this era is the rapidity with which knowledge becomes outdated. Our changing society and power pressures are constantly moving us to new thresholds. Our nation is faced with problems growing out of a rapidly increasing population, an increased and expanded industrial economy, and accelerated job changes. To provide education and training for all who need it, who seek it, and who can profit from it. To improve, as necessary, ongoing programs and develop new programs to meet the needs of people in a changing economy. To meet the challenge of projected and rapidly increasing enrollments in Technology Education.

As we complete the twentieth century and prepare for the twenty-first century, it is important to realize that our world is far different from one which existed a hundred year ago. We must try to understand how changes will originate, their probable future direction, and how to cushion our self against the shocks that might come. Since have no heritage of the future. Therefore we must, by re-examining past programs, project such a heritage and relate it to current thinking and Technological innovations.

O12.02**8:20 A VISUAL APPROACH TO REMINDING NON-TRADITIONAL STUDENTS ABOUT EXPONENTS**

Harold A. Simmons, Randall Warren

Northwest Community College

Non-traditional students who have not been associated with mathematics nor science for a period of time are more likely to exhibit the most prevalent academic condition in the United States – that being “mathophobia”. This is usually expressed during the math or science supposed review of how to deal with exponents and scientific notation. The following visual approach has been developed to attempt to guide these students; since, slides and/or the board may be covered, crowded, and filled with symbols and rules.

In addition and subtraction, a ‘change’ symbol is used to remind the student which entry was altered:

$$2 \times 10^2 \rightarrow 2 \times 10^2$$

$$3 \times 10^3 \rightarrow 30 \times 10^2$$

In multiplication and division, a ‘to the whatever’ platform is utilized. This is an extended line on which the exponents are assembled. For example, $(-3) + (+4)$

$$(2 \times 10^{-3})(3 \times 10^4) = 6 \times 10 \text{-----} < \text{‘to the whatever’ platform and } (+4) - (-2)$$

$$(4 \times 10^4) / (2 \times 10^{-2}) = 8 \times 10 \text{-----}$$

These seemingly simple devices help clarify exponents for students who need a reminder about some of the ‘ghosts of math’s past’. Student response to these visual setups has been positive. The more formal rules and guides can then be intro-

duced without as much initial apprehension.

O12.03

8:40 THE USE OF ASM "MICROBLIBRARY" RESOURCES IN TEACHING MICROBIOLOGY

Mary Lux¹, Rebecca Buxton²

¹University of Southern Mississippi, ²University of Utah

Because of the high expectations in the technology-enhanced classroom, instructors are challenged to obtain high-quality images for use in "PowerPoint" and other visual teaching and testing formats. Because of ubiquitous access to the Internet, many instructors have been eager to exchange and share classroom resources with their colleagues around the globe. MicrobeLibrary (ML) was established by the American Society for Microbiology (ASM) to "...be an electronic journal of peer-reviewed educational resources for the teaching community." Materials include over 1400 learning objectives; still and animated visual resources; science and education feature articles and journal papers; review of books, videos, software and websites; and curriculum resources. We will highlight how instructors have used the ML curriculum and visual resource area in their classrooms. Increased concern and regulation for use of highly infectious organisms in teaching have limited the use of many organism and ML resources have filled the gaps for continued effective presentations of a broad diversity of organisms. Although no outcomes assessments have been performed on these specific additions to our curricula, course evaluations have improved with the addition of enhanced visual technology in classrooms. The accessibility of high-quality, legally-available images has contributed to our successes. Most academic institutions recognize the peer-reviewed status of ML, which offers an opportunity for communication and publication within the microbiology education community.

O12.04

9:00 ENHANCEMENT OF ATTITUDE IN COLLEGE BIOLOGY STUDENTS THROUGH INCREASED USE OF VISUAL INSTRUCTION

Johnny Mattox

Blue Mountain College

Today's traditional college freshmen have been reared in the modern information age, having been exposed to computers, the Internet, online communities, text messaging, and video games from an early age. It has been estimated that eighty percent of these students are mostly visual learners. Two classes of general biology students were taught using both traditional lecture and lecture incorporating PowerPoint presentations. Students were then administered a questionnaire that included questions concerning their preferred method of instruction. Eighty-one percent of the forty-two students that responded to the questionnaire indicated that they preferred instruction that included PowerPoint presentations. Ninety percent of the students responded that the use of PowerPoint had enhanced their

understanding of biology and eighty-three percent responded that they felt their attitude toward biology had improved through the use of PowerPoint instruction. The results obtained from this survey seem to indicate that the use of PowerPoint instruction does have a positive effect on student attitude toward biology.

O12.05

9:20 TECHNOLOGY ASSIMILATION IN SCIENCE CLASSROOM (TASC): A NEW STANDARD FOR ENHANCED STUDENT LEARNING

Babu Patlolla¹, Josephine Posey¹, Jan Duncan¹, Leroy Johnson¹, Joyce White², Gayla Banks³

¹Alcorn State University, ²Jefferson School District, ³Claiborne County School District

The Department of Biological Sciences and the Department of Education at Alcorn State University conducted a four-week (July 2–30, 2007) workshop for local middle school and high school science teachers. Eighteen in-service teachers from the local school districts participated in this program. Activities included computer applications, hands on contemporary molecular biology techniques and incorporation of varied learning styles into teaching methods. Participants also took three field trips in the state and attended seminars. As a part of program evaluation pre and post surveys were conducted by an internal and external evaluator. Two follow-up sessions are planned for the 2007–2008 academic year to discuss the incorporation of the new knowledge in their class. Participants enjoyed the field trips and were eager to share their experiences with their colleagues at their school district. (This project was funded by Mississippi Institutions of Higher Learning through No Child Left Behind Summer Institute for Teachers Title II Program # 2007- 073E.)

9:40 Break

O12.06

10:00 ENHANCING WEBSITE ACCESSIBILITY OF DATA GENERATED BY THE CENTRAL GULF OF MEXICO OCEAN OBSERVATION SYSTEM

Jessica A. Kastler¹, Sharon H. Walker¹, Stephan D. Howden²

¹The University of Southern Mississippi-Gulf Coast Research Laboratory-J.L. Scott Marine Education Center, ²The University of Southern Mississippi-Department of Marine Sciences

Ocean Observation Systems (OOS) are networks of data collecting stations spread throughout the world's ocean. Each station provides information concerning local oceanographic and atmospheric conditions. Used together the data can help people understand the coastal environment, improve weather forecasts, notify boaters of unsafe navigation conditions, or assist emergency responders in locating people needing help. The Central Gulf of Mexico Ocean Observation System (CenGOOS) maintains a buoy on the coast of Mississippi that transmits data onshore at 30-minute intervals. This buoy has operated since

2004, except during a two-year hiatus resulting from hurricane damage in 2005.

The CenGOOS website broadcasts data from this buoy as it becomes available. This website was examined to determine how easily it could be used by individuals with varying degrees of awareness about OOS. Modifications to improve the accessibility of these data to various stakeholders were listed. High school science teachers were selected as the user group to be targeted with the first modifications. The following modifications were implemented to enhance the website for use by teachers. Directions were written for downloading data and graphing in Microsoft Excel. Descriptions were written and posted to describe parameters measured, their significance, and the instruments that measure them on the USM buoy. Lesson plans were designed to explore the manner in which common weather events appear in time series of key parameters.

O12.07

10:20 **The Center for Ocean Sciences Education Excellence: Central Gulf of Mexico: Catalyzing Relationships Among Scientists and Teachers to Enrich Classroom Ocean Sciences Learning**

Sharon H. Walker¹, Jessica A. Kastler¹, John Dindo², Mike S. Spranger³, Dan Brooks⁴

¹The University of Southern Mississippi, ²the Dauphin Island Sea Lab, ³the University of Florida, ⁴Mississippi State University, United Kingdom

The Center for Ocean Sciences Education Excellence: Central Gulf of Mexico (COSEE:CGOM) is funded by a grant from the National Science Foundation to The University of Southern Mississippi, Gulf Coast Research Laboratory, J.L. Scott Marine Education Center (MEC). Through this grant, the MEC participates in the nationwide COSEE network to improve ocean sciences education by providing opportunities for scientists and teachers to learn from and teach each other during field experiences. Teachers share their expertise in pedagogy, communication with diverse audiences, and classroom culture. Scientists share marine science content knowledge and the process of conducting research. These experiences occur during Weekend Workshops and Summer Institutes, which are held annually in two Gulf of Mexico states. Teachers who have participated in a Summer Institute, or similar experience elsewhere in the U.S., may embark on a Sea Scholars cruise, an advanced professional development program during which they work with surveyors aboard U.S. Navy oceanographic survey vessels focusing on physical, chemical, geological and biological oceanic processes. These processes include areas such as acoustics, bathymetry, meteorology, water quality parameters, bioluminescence, navigation, various sediment types, and Naval applications of these data. Participants work collaboratively to develop content-rich or inquiry-based lesson plans, the best of which are posted to the COSEE:CGOM website www.cosee-central-gom. This presentation will share results of COSEE:CGOM activities

to date and provide information for researchers or teachers who would like to participate in future activities.

O12.08

10:40 **CREATING A STATIC SHELL EXHIBIT FOR PATRONS OF THE J. L. SCOTT MARINE EDUCATION CENTER THROUGH THE CLASSIFICATION AND CATALOGING OF SPECIMENS**

Diane Stopher¹, Shelia Brown²

¹Cooperative Intern Program with the Mississippi Gulf Coast Community College – Jackson County Campus Honors Biology Students, ²Gulf Coast Research Laboratory-J.L. Scott Marine Education Center, ³The national Aeronautics and Space Administration

The purpose of the project was to increase the number of static displays for the J. L. Scott Marine Education (MEC) of the Gulf Coast Research Laboratory (GCRL) post-Hurricane Katrina. Shells donated to the J. L. Scott Marine Education Center (MEC) were identified, classified, and grouped based on worldwide distribution. After the shells were cataloged, they were labeled with appropriate descriptors and placed into a display case. The new exhibit will be used for viewing by visitors and as an educational teaching resource by the Research Associates of the MEC as they implement educational programs.

O12.09

11:00 **SAFETY IN THE CHEMISTRY LAB: AN OUNCE OF CAREFUL PLANNING IS WORTH A POUND OF RUSHING INTO CHAOS**

Vicdaly Williams¹, Steve Manis¹

¹Cooperative Internship Program with the Mississippi Gulf Coast Community College- Jackson County Campus Honors Biology Students, ²The National Aeronautics and Space Administration

It is very important for students participating in activities to know the safety procedures before performing any work. The intent of the Chemistry laboratory video was to educate the students on how to react to different situations that could occur in the Laboratory. Topics included in the safety video were appropriate student behavior, handling of chemicals, eye protection, proper use of Bunsen burners, and clean up procedures.

O12.10

11:20 **CREATING A SAFETY VIDEO FOR MICROBIOLOGY**

Mallory Hoerner¹, Janice Cooley¹

¹Cooperative Intern Program with the Mississippi Gulf Coast Community College—Jackson County Campus Honors Biology Students, ²The National Aeronautics and Space Administration

The purpose of this project was to create a video that focused on the importance of laboratory safety in Microbiology. The intern, with the mentor's assistance, demonstrated correct

and incorrect laboratory procedures in the video. There are two volunteers that demonstrated the procedures in the video combined with complementary narration. The intern met weekly with the mentor, created an outline for the film, and received approval for all components of the video.

11:40 Business Meeting

THURSDAY AFTERNOON

Ash

O12.12

1:40 THE DEVELOPMENT OF A HUMAN BODY LEARNING CENTER FOR THIRD AND FOURTH GRADE GIFTED STUDENTS

Alicia Bowman¹, Bobbie Morgan¹, Anja Comerford¹

¹*Cooperative Intern Program with the Mississippi Gulf Coast Community College—Jackson County Campus Honors Biology Students, ²Ocean Springs School District, Magnolia Park Elementary School, ³the National Aeronautics and Space Administration*

The gifted students at Magnolia Park Elementary School participate in various self-paced learning centers. The centers require the students to research and learn more in-depth material about a specific subject. Learning centers were created to assist students in exploring the various systems of the human body. The students used hands-on, interactive activities to gain information about the human body to which they would not have access in an average third or fourth grade class. Students routinely understand and gain knowledge concerning the levels of Bloom's Taxonomy. These centers provided the students the opportunity to learn on the synthesis and evaluation levels, ultimately resulting in a more detailed knowledge of the human body and its major systems.

O12.13

2:00 THE EFFICACY OF ELECTRONIC TECHNOLOGIES AND THEIR THERAPEUTIC APPLICATIONS FOR AMPUTEES

Demarco Pendarvis, Kelvin Reed, Nicholas Haynes, Susan A. Bender
Jim Hill High School

The objectives of this project are to design and build and electronic alternative to the human forearm and hand and the therapeutic applications for amputees. We will accomplish this task by designing an original electronic arm and hand that will be connected to the pressure points and neuromuscular junctions in existing human tissues. We will discuss the results of the trials of our invention and our success in developing our novel technologies. This research is sponsored by a grant given to the University of Mississippi Medical Center awarded to the Base Pair Program from the Howard Hughes Medical Institute, Project

Director Dr. Rob Rockhold.

2:20 Break

O12.14

2:40 THE EFFECTS OF HOMEOPATHIC REMEDIES ON THE METABOLISM OF GLUCOSE IN *Gryllus assimilis* AND ITS IMPLICATIONS TO THE TREATMENT OF HUMAN DIABETES

Brandon E. Hodges, Susan A. Bender

Jim Hill High School

This research project will discuss the metabolism of glucose in field crickets, *Gryllus assimilis*. The methods include the use of a metabolism chamber to measure the oxygen consumption of both ale and female crickets at controlled temperatures. These will serve as the control group while a second set of crickets will receive over the counter homeopathic remedies for the treatment of Diabetes mellitus. We will then measure the rates of glucose metabolism in the experimental group to determine the effectiveness of these remedies in mediating the metabolic process. We will then attempt to connect the use of glucose in invertebrates to the potential benefits of homeopathic medicines on human Diabetes mellitus. This research is sponsored by the University of Mississippi Medical Center and the Base Pair/SOAR grant funded by the Howard Hughes Medical Institute. Dr. Rob Rockhold project director.

O12.15

3:00 RURAL BIOMEDICAL INITIATIVE: TRANSFORMING RURAL STUDENTS INTO SCIENTIFIC SCHOLARS

Cindy Cook¹, Jeff Stokes¹, Susan A. Bender¹, R. W. Rockhold¹

¹*Puckett Attendance Center, ²Murrah High School, ³Jim Hill High School, ⁴University of Mississippi Medical Center*

The Rural Biomedical Initiative (RBI) is an undertaking to inculcate components of Jackson Public School's programs, Base Pair and SOAR, into an emblematic rural high school science curriculum with the intent of establishing a student awareness of the infinite array of opportunities available in both medical and scientific regimes. Puckett Attendance Center in the Rankin County School District was selected as the first rural Mississippi school to implement RBI. The 2007-2008 biomedical research students chose the course from the class selection choice card based not only on interest generated from the comments of first year students, but also the course overview. During the first week of school, students were polled regarding career interests. Of the students polled, 50 % declared interest in a medical-related career, 30% in a science-related career, and 20% undecided. The students were exposed to a series of unit lectures and an array of laboratory investigations extending through four areas of focus which included Medicine and Health, Biotechnology, Forensics, and Environmental Science. Throughout each unit, student progress was recorded providing evidence that 82% of

the students performed above average while only 18% performed average. Currently, 70% of the students surveyed declare interest in a medical-related career, 20 % scientific-related field, and 10% undecided. RBI provides rural students an opportunity not only to experience their career interests, but also explore incalculable opportunities available in medical and scientific prefectures. (Supported by the Pre-college Science Education program of the Howard Hughes Medical Institute and UMMC)

O12.16

3:20 CURRENT SCIENCE NEWS AND EPIDEMIOLOGICAL CASE STUDIES TO INSPIRE STUDENT SUCCESS

Susan A. Bender

Jim Hill High School

High school and college students are becoming increasingly concerned about the emergence of new bacterial and viral threats to public health. Although many of these pathogens have been around for many years, the advent of an increasingly active media has generated a sense of panic and fear over the perceived threats associated with community acquired infections. These original case studies help student's master new skills and assimilate new content while developing a sense of self confidence. The students are able to intelligently discuss the current threats to public health without experiencing the panic associated with those that are ignorant of science. This research is sponsored by the University of Mississippi Medical Center and the Base Pair/SOAR grant funded by the Howard Hughes Medical Institute. Dr. Rob Rockhold, Project Director.

O12.17

3:40 MARINE SCIENCES CAREERS EXPOSITION

Michael Carley, Shelia Brown

J.L. Scott Marine Education Center

The University of Southern Mississippi (USM) Gulf Coast Research Laboratory's (GCRL) J.L. Scott Marine Education Center (MEC) hosted a Marine Sciences Careers Exposition Day on January 19, 2008. The Exposition was held on the campus of GCRL in Ocean Springs, Mississippi. Sponsors for this program were the Mississippi Department of Marine Resources (MSDMR), USM, GCRL, MEC, Coastal Conservation Association Mississippi, and Chevron Pascagoula. During the Exposition high school students were provided the opportunity to interact with local scientists, researchers, engineers, and formal and nonformal educators from USM's Department of Coastal Sciences and Department of Marine Sciences-Stennis Space Center, the National Marine Fisheries Service, U.S. Navy, MSDMR, and other marine related agencies in both formal and informal settings. The scientists/researchers presented career testimonials, research presentations, tours of research and work facilities, and field experiences.

6:00 Dodgen Reception and Poster Session

(Please set up between 4:00 and 4:30p)

Location: Grand Ballroom

P12.01

A SURVEY OF THE NATURAL AND BUILT ENVIRONMENT OF THE GULF COAST RESEARCH LABORATORY

Sarah Deutsch¹, Joyce Shaw³

¹*Cooperative Intern Program with the Mississippi Gulf Coast Community College—Jackson County Campus Honors Biology Students,* ²*The National Aeronautics and Space Administration,* ³*Gunter Library, Gulf Coast Research Laboratory, The University of Southern Mississippi*

The Ocean Springs campus of the Gulf Coast Research Laboratory, bound by the Mississippi Sound to the south and Halstead Bayou to the north, consists of approximately 35 acres of marsh, sandy shoreline, lawns, wooded areas, and the built environment. The purpose of this project is to document and review the birds, mammals, and reptiles coexisting among the humans, trees, and buildings on the campus. Activities included interviewing staff members about their knowledge of animals seen on campus, visiting Gulf Islands National Seashore Park to access information about wildlife in the Park which is directly across the bayou from the Gulf Coast Research Laboratory, compiling literature about the animals and trees, and using archival documents to verify information about the built environment. The results of this project included: a listing of commonly found birds, mammals, and reptiles and an inventory of buildings including: the date of construction and architect, a listing of trees, photography documentation of physical and biological entities, and fact sheets concerning common animal species.

P12.02

FIRST STEPS IN CREATING A SEARCHABLE DIGITAL DATABASE FOR CURRENTS, THE JOURNAL OF MARINE EDUCATION

Stevie Smith¹, Sharon H. Walker², Johnette Bosarge²

¹*Cooperative Intern Program with the Mississippi Gulf Coast Community College—Jackson County Campus Honors Biology Students,* ²*The University of Southern Mississippi-Gulf Coast Research Laboratory-J.L. Scott Marine Education Center,* ³*The National Aeronautics and Space Administration*

The mission of the National Marine Educators Association (NMEA) is to make known the world of water, both fresh and salt. The NMEA has approximately 1,100 members, including formal and informal educators, media professionals, research scientists, and social scientists. Most members belong to one of NMEA's 17 regional chapters. The NMEA publishes *Current*, the *Journal of Marine Education* three to four times annually for audiences representing academia, state/federal governmental agencies, non-profit organizations, and businesses/industries. The archive of *Current* includes paper copies of all issues published each year since 1978. Digital copies of these records

were destroyed with the J.L. Scott Marine Education Center and Aquarium facility in Biloxi, Mississippi during Hurricane Katrina, in August 2005. The long term goal of this project is to develop a digital database which can be searched on the basis of author, volume/issue or year of publication, key word, or category. Articles were digitized into "pdf" files, and assigned to categories (e.g., "activity," "exemplary program," or "pedagogy"). All information was entered into a spreadsheet which will serve as the foundation for future work. Statistics describing total number of articles and number of articles per category demonstrate the development of the publication, its membership, and marine education in general through the previous 29 years.

P12.03

EDUCATIONAL CURRICULUM FOR THE BIRD EXHIBIT

Theresa Freshour¹, Makala Brown²

¹Cooperative Internship Program with the Mississippi Gulf Coast Community College- Jackson County Campus Honors Biology Students, ²The Walter Anderson Museum of Art, ³The National Aeronautics and Space Administration

A curriculum was needed to give school tours background resources in both art and science in order to maximize the educational value of the museum. A list of book resources was compiled for teacher and classroom use and a list of online resources was compiled concerning Walter Anderson, art history, and science/nature. A list of art activities for the classroom and for use at the museum was prepared. This curriculum will be provided to all school tours before and during their visits.

P12.04

SCIENCE BEYOND THE BASICS: AN EDUCATIONAL PROGRAM

Lane Havard¹, Julia Platt²

¹Cooperative Intern Program with the Mississippi Gulf Coast Community College—Jackson County Campus Honors Biology Students, ²Oak Park Elementary Fourth Grade Class, ³The National Aeronautics and Space Administration

The primary objective of this project was to introduce elementary-age students to the exploration of the science curriculum in an in-depth creative manner. Required topics were expanded and applied to current events and every-day fundamentals. Hands-on projects enhanced student understanding through participation in experimental experiences. Topics presented included matter, weather and atmospheric, solar systems, and climate.

P12.05

"YOUR BACKYARD" PROJECT ENGAGES COLLEGE STUDENTS IN ONLINE CLASS

Wendy Garrison

The University of Mississippi

The objective of this assignment was to challenge

college students in a freshman level non-majors biology class to come up with original and simple ways to positively affect their personal environment or "backyard." Students in the Spring 2007 online BISC104 class "Inquiry Into Life, The Environment" were given a choice between two projects, with about 65% choosing to work on "Your Backyard." Methods used online for this project were peer review discussion boards, digital photography and computer generated sketches, and graphs. This poster presents six designs reflecting different student ideas and approaches to incorporating wildlife-friendly features in familiar areas. The assignment followed up on earlier class discussions on pesticide safety and exercises on making graphs. Students were required to follow specific guidelines in designing their site, creating time-lines, and documenting sources and cost estimates for materials. The imagined projects were diverse and included backyards recovering from Hurricane Katrina; sorority grounds; small individual apartment grounds; a school courtyard; a Mississippi hunt club. Because of cost and other restrictions students were asked NOT to implement the projects for the class, but many students were enthusiastic about following through at a later date, and found that they had developed a new outlook.

P12.06

SUPERHYDROPHOBIC MATERIAL MIMICS LOTUS LEAVES

Anil Sharma, Kimberly Jefferson

Mississippi Valley State University

The water droplets rest on wood that has been treated with a nanoparticulate surface coating, prepared by the BASF chemical company. The coating has made the surface of the wood highly water-repellent (superhydrophobic) by decreasing the forces of adhesion between the wood and water. As a result, the contact area between water and wood is minimized, making the water droplets assume a globular form instead of wetting the wood. Superhydrophobic surfaces are self-cleaning and stay clean for a long time. The nanostructures in superhydrophobic coatings are also found in natural materials, such as the leaves of the lotus plant. Such a superhydrophobic material could potentially be applied to airplane wings (to keep them from icing up), the hulls of ships (to help them ply waters more easily), and clothing (to keep them dry).

P12.07

DEVELOPING AND IMPLEMENTING SCIENCE LESSONS FOR A FOURTH GRADE GIFTED CLASS

LeAnn Potter¹, Shera Zimmerman¹, Adelle Register²

¹Cooperative Intern Program with the Mississippi Gulf Coast Community College—Jackson County Campus Honors Biology Students, ²Pecan Park Elementary, ³The National Aeronautics and Space Administration

As gifted students, the select fourth grade class was comprised of children whose thinking abilities were above that of their peers. The focus of this study was to research, develop,

and implement science lessons for these students. Each individual study was created to meet the fifth grade Mississippi Science Frameworks by introducing information pertaining to the solar system through participation in hands-on activities. Various methods of learning were utilized to continue increasing the students' knowledge at an advanced pace.

P12.08

USING TRIANGULAR INQUIRY LEARNING TO INCREASE TEST SCORES IN THE MISSISSIPPI DELTA

Abigail S. Newsome, Louis Hall, Mack Felton, Jr., Udai Kudikyala
Mississippi Valley State University

Triangular inquiry learning is designed to increase science test scores of students while enhancing teacher effectiveness. By combining state and national educational standards this project attempted to create a working model that could be used to exploit triangular inquiry learning methods using a hands-on approach. This project provided hands-on infusion of technology into instructional processes for teachers and students while introducing the facts of science and technology as they relate to catfish farming. By providing students and teachers experiences and year-round instructional activity, this project proposed to stimulate interest in STEM disciplines while improving student outcomes. Activities consisted of students and teachers attending a two week residential program. Students received instructions in water quality analysis collection and correlation led by participating teachers with the support of university faculty. Students were paired with teachers to perform field based laboratory experiments. Pre- and post-test results showed a 10.88% percent increase in science knowledge with a standard deviation of 23.84. Students and faculty also developed websites using Netscape Composer 7.1. The websites can be viewed at <http://nsfitest.mvsu.edu>.

P12.09

THE INFLUENCE OF STUDY HABITS ON THE ACADEMIC PERFORMANCE OF BIOLOGY UNDERGRADUATES

Tamilselvi Gopal, Jacob C Blickenstaff, Sherry Herron
The University of Southern Mississippi

In the midst of many sophisticated electronic devices and plenty of resources, students study habits vary vastly from one to another. The study habits and time spent on task also influences the academic achievement of biology major undergraduates. This research was aimed at studying the relationship between the study habits of biology undergraduates and their grades. We defined study habits as time spent on academic activities at home in a day, week, weekend, time preference, resource used, time spent on television & internet, learning method and place of study. The study was conducted among 150 biology undergraduate students at USM. Preliminary results show that more than 87% of the students spend less than 1 hr on reading biology every day and less than 3 hrs during the week

end. Also, 85% of the students use only the class notes, 85% of the students read at their residence and 60% of the students preferred individual learning method. Students were grouped according to the CGPA and their responses were correlated. This study revealed some interesting correlations between study habits and the grades (detailed results will be discussed in the poster). The study results will help the students, teachers and parents to understand the relation between the study habits and the grade. Further, suggestions for the parents and teachers will also be provided in order to motivate the students. Some ideas for future research will also be addressed.

ZOOLOGY AND ENTOMOLOGY

Chair: Julius Ikenga, Mississippi Valley State University

Vice-chair: Alex D. W. Acholonu, Alcorn State University

THURSDAY MORNING

Elm

O13.01

9:00 DISTRIBUTION OF BROWN RECLUSE SPIDERS IN MISSISSIPPI

Gail Stratton¹, Pat Miller², Rick Vetter³

¹University of Mississippi, ²Northwest Mississippi Community College, ³University of CA, Riverside

Early records from the USDA publication, the Cooperative Economic Insect Report suggested that the brown recluse spider, *Loxosceles reclusa*, is found in all 82 counties of Mississippi. However, similar reports and more extensive sampling in Georgia (Vetter et al, MS in prep) and Alabama (Vetter, unpublished data) indicate that the brown recluse is mostly limited to the Piedmont region in the northern third of each of those states. In order to clarify the distribution of brown recluse in Mississippi, we have initiated a project that includes checking museum collections, personal collections and other records as well as doing extensive sampling throughout Mississippi. In addition, we have initiated a standardized sampling protocol of out-buildings to determine the abundance as well as the presence of these spiders in different regions of the state. We have examined specimens from the Mississippi Entomological Museum and the American Museum of Natural History. We currently have specimens from 25 of the 82 counties in Mississippi. Brown recluse spiders are found as far south as Clarke County and they are abundant in the northern third of the state. Requests for brown recluse specimens from the southern portion of the state

resulted in few spiders but many tales of the supposed presence due to alleged envenomations. We welcome contributions of specimens of brown recluse for this study.

O13.02

9:20 WATER QUALITY STUDIES OF NWORIE RIVER IN OWERRI, IMO STATE, NIGERIA

Alex D. W. Acholonu¹, Peter U. Okorie¹

¹Alcorn State University, ²Imo State University, Nigeria

Nworie River is a first order stream that runs about a 5km course across Owerri metropolis, Imo State, Nigeria before emptying into another river, the Otamiri River. Its watershed is subject to intensive human and industrial activities resulting in the discharge of a wide range of pollutants. The river is used for various domestic applications by inhabitants of Owerri. When the public water supply fails, the river further serves as a source of direct drinking water, especially for the poorer segment of the city. Studies of water quality parameters are therefore necessary to determine extent of pollution so as to monitor likely danger, not only to the human population but also to the aquatic life. A total of eleven (11) water quality parameters were investigated in January 2007, which fell within the dry season in Nigeria. The parameters investigated were dissolved oxygen, carbon dioxide, pH, chloride, nitrate-nitrogen, nitrate, ammonia-nitrogen, hardness, orthophosphate, sulfide and silica. With the exception of dissolved oxygen and carbon dioxide, other chemical parameters met the water quality criteria of Mississippi/ EPA and the international drinking water standards. This suggests that the river is relatively low in chemical pollutants. However, the low dissolved oxygen concentrations (1.1 - 3.2 ppm) and high carbon dioxide concentrations (13.0 - 30.3ppm) strongly implicate pollution by organic wastes. Further, the study demonstrated significant longitudinal variations in the water quality parameters along the course of the river, reflecting differences in quality and quantity of pollutants at various locations.

O13.03

9:40 FAUJASIID ECHINOIDS IN THE UPPER CRETACEOUS OF NORTH AMERICA

George Phillips¹, Charles N. Ciampaglio¹

¹Mississippi Museum of Natural Science, ²Wright State University

Irregular echinoids have played an important role in benthic marine communities since the Jurassic Period and are important to paleontologists given their sturdy skeletal structure, sediment-dwelling habits, widespread distribution, and considerable diversity. The cassiduloid family Faujasiidae Lambert 1905 is the most diverse and widely distributed group of non-burrowing, sand-dwelling, "sand dollar"-like irregulars in Gulfian (Turonian – Maastrichtian) deposits of North America (NA). The family is recorded from several regions on the continent but is best known from the southeastern United States. Recent collecting efforts in the Southeast have produced several new faujasiids,

bringing the total to ~20 species regionally. The Upper Cretaceous faujasiid genera recorded from NA deposits are the stygmatoptygines Hardouinia and Petalobrissus and the faujasiines Lefortia, Domechinus, and Faujasia—subfamilies separated on the position of the periproct (anus). Among these genera, Hardouinia exhibits the greatest diversity (14+ spp), whereas Petalobrissus, Domechinus, and Faujasia are currently monotypic in NA. Our recent efforts have uncovered new species and occurrences of Hardouinia Haime 1853 and the incompletely known (in NA) Lefortia Cossman 1901. Hardouinia (spp. nov.) is now known from the early Early Campanian of Mississippi and eastern Alabama and the Middle Campanian of Texas; Lefortia (sp. nov.) from the Late Campanian of Arkansas; and Lefortia trojana Cooke 1953 from the late Late Campanian of Arkansas and middle Maastrichtian of North Carolina. True sand dollars—the clypeasteroids—did not appear until after the end of the Cretaceous Period and eventually replaced cassiduloids as the dominant non-burrowing irregulars.

O13.04

10:00 THE BENEFITS OF PROPHYLACTIC LOCAL ANESTHETIC IN ADDITION TO GENERAL ANESTHESIA

Iesha Jackson¹, Egeen Daniels², Monica Jenschke², Julius Ikenga¹, Rachel Beecham¹

¹Mississippi Valley State University, ²University of North Texas Health Science Center

We investigated the efficacy of a combined long acting local anesthetic and general anesthesia before surgical procedures. These approaches could decrease inflammation and pain and consequently result in decreased hospital stay and cost. Tens of thousands of Americans undergo surgical procedures each year. Postoperative pain is a common complication of surgery. A primary contributor to postoperative pain is inflammation due to tissue injury, which results in swelling, loss of function, redness, and temperature abnormalities. Two groups of Sprague Dawley rats, *Novegicus rattus*, were randomly selected. Bupivacaine was subcutaneously administered to group one rats and saline solution to the other. A dorsal incision right lateral to the spinal cord was made on each rat. Prior to and post-surgery, a graded response using the Von Frey Hairs was conducted to establish a baseline data. The later is based on the reflex of the dorsal cutaneous trunci muscle (CTM) and was used to determine which group displayed lesser responses to pain. Reflexes of CTM were scored as 1, 0.5, and 0. These scores, respectively, represented a single vigorous reflex, a shorter/weaker reflex, and a no response. Rats receiving the combined treatment experienced less pain, less allodynia, and less hyperalgesia. Further studies are suggested using other pet animals and eventually human subjects.

O13.05

10:20 ASSESSING ENDOTHELIAL FUNCTION BETWEEN MEN AND WOMEN DURING SUPINE

REST

Sonya Hentz¹, Q. Barnes², J.S. Raven², W. Eubanks², M. Hawkins², S. Ogoh², P.B. Raven², Rachel Beecham¹

¹Mississippi Valley State University,

There has been an increased correlation between endothelial dysfunction and atherosclerosis. Endothelial dysfunction can serve as an early detection sign for atherosclerosis which typically leads to pathological cardiovascular events. The purpose of the study is to examine whether there are any differences in flow mediated dilation between healthy men and women. We hypothesized that men will have a larger increase in flow mediated dilation. Eight healthy subjects, between the ages of 18 -25 years old, participated in the study. The subjects were informed to fast at least eight hours before their schedule visit. The subjects underwent a plasma glucose test. Each individual was instructed to lay supine for a resting period of five minutes. A blood pressure cuff was placed on the forearm and an ultrasound machine was used to image the brachial artery. Baseline measurements of the brachial arterial diameter were taken using the ultrasound machine for five minutes. The blood pressure cuff was then inflated to 200mmHg for five minutes and measurements of the brachial arterial diameter were obtained. After five minutes the blood pressure cuff was released and measurements of the recovery brachial arterial diameter were measured. Women vasodilated 13.4% + 5.9% and men 8.1% + 2.4% (mean + SD). In conclusion women tend to have a larger increase in vasodilated then men. This finding refutes my hypothesis.

O13.06**10:40 FOSSIL GONIASTERID SEA STARS IN THE SOUTHEAST**

George Phillips

Mississippi Museum of Natural Science

The Goniasteridae (Asteroidea: Valvatida) is a diverse group of sea stars first appearing in the Jurassic Period and consisting today of about forty living genera inhabiting largely deep marine waters. Goniasterids are characterized by proportionally large central disks, arms ranging from stumpy to elongate, and body diameters from 25 to 170 mm. Nineteen goniasterid species have been reported from the modern Gulf of Mexico, and about a dozen of these have been identified in the deep Florida Straits. Goniasterid fossils have been reported from fossiliferous deposits throughout the world, some of the most complete and detailed specimens having been collected in the English Chalk (Upper Cretaceous). Recently, goniasterid remains were recovered from Upper Cretaceous, Paleocene, Eocene, and Oligocene deposits in Mississippi, Alabama, and North Carolina. As goniasterids are most often prone to immediate postmortem disarticulation, their remains typically consist of isolated ossicles, although a few articulated and partial fossil specimens are known from the Southeast. A prominent family trait is the possession of thick, relatively massive marginal ossicles, which are potentially species diagnostic. Marginals constitute the most frequently encountered goniasterid fossil in the sedimentary record and are

large enough to be collected with the naked eye. Fossil goniasterid marginals have been found in calcareous sediments ranging from fine to coarse and are typically accompanied by the stereomate remains of other echinoderms, namely echinoids and crinoids. Although primarily deep-water dwellers today, the fossil record suggests the family was not uncommon in continental seas and embayments through the early Oligocene.

O13.07**11:00 TEACHERS AS FIELD SCIENTISTS: DOES THEIR EXPERIENCE MAKE A DIFFERENCE TO THEIR STUDENTS?**

Sherry Herron, Kathryn Hampton

University of Southern Mississippi

We describe a summer field biology course designed for secondary and postsecondary teachers and its impact on classroom teaching during the following school year. The course consisted of classroom meetings before and after a week-long field trip to sites across Florida. Teachers experienced four distinct ecosystems and biological phenomena not yet understood. Performance-based evaluations demonstrated increased content knowledge. An anonymous survey sent the following summer provided evidence that the field course impacted classroom practice. Thus, this study provides evidence that the field course increased pedagogical knowledge specific to field study methods.

THURSDAY AFTERNOON

Elm

A Symposium on the Prevalence of Trichomoniasis in Africa**O13.08****1:30 PREVALENCE OF TRICHOMONIASIS IN NIGERIA**

Alex D.W. Acholonu

Alcorn State University

Trichomoniasis is a common protozoal infection in Nigeria. Studies on it have been reported by several authors from different parts of the country. It has been reported in both adults and children but with more prevalence in adults. A review of literature shows that more studies have been conducted on this infection than several countries in Africa. It is however, not one of the reportable sexually transmitted infections in the country, even though it is generally more prevalent than the bacterial and viral sexually transmitted diseases. Although a lot of studies have been conducted as compared to several other African countries, not enough work has been done on it with respect to its prevalence in the 36 states of the country and federal capital territory, Abuja. It is recommended that more work be done on

it and that it be included as one of the reportable sexual transmissible diseases in the country.

O13.09

1:50 PREVALENCE OF TRICHOMONIASIS IN ZIMBABWE

Calvin Jones and Alex D.W. Acholonu

Alcorn State University

Review of the Prevalence of *Trichomonas vaginalis* in Zimbabwe (South Africa) and the United States. *Trichomonas vaginalis* (*T. vaginalis*) was originally considered a commensal organism until the 1950s when the awareness of its role as a sexually transmitted infection (STI) began to evolve. Trichomoniasis has been associated with vaginitis, cervicitis, urethritis, and pelvic inflammatory disease (PID), and adverse birth effects. Infection with *T. vaginalis* could have an important role in transmission and the rising rate of HIV. *T. vaginalis* is site specific for the genitourinary tract. The infection is common in both women and men, but asymptomatic in men, *Trichomonas vaginalis* may be emerging as one of the most important cofactors in amplifying HIV transmission, particularly in African communities of Zimbabwe, Africa. Studies from Zimbabwe have suggested that *T. vaginalis* infection may increase the rate of HIV transmission by approximately twofold. Available data indicate that *T. vaginalis* is highly prevalent among Africans in major urban centers especially in Harare, the capital of Zimbabwe and is often the most common sexually transmitted infection in women Zimbabwe. The purpose of this study is to assess the prevalence of Trichomoniasis in Zimbabwe. Available literature indicates that minimal studies have been conducted on this sexually transmitted infection and that it deserves more attention.

O13.10

2:10 PREVALENCE OF TRICHOMONIASIS IN GHANA

Cynthia Addae and Alex D.W. Acholonu

Alcorn State University

Trichomoniasis is a common sexually transmitted protozoa infection caused by *Trichomonas vaginalis* and is associated with several adverse health outcomes, such as preterm birth, delivery of a low-birth weight infants, and facilitation of sexual transmission of human immunodeficiency virus (HIV). A review on the prevalence of trichomoniasis in Ghana was conducted. Available literature shows that not much work has been done on this sexually transmitted disease (STD) in Ghana. The few reports found were in conjunction with other bacterial and viral STDs. One of the studies covering 1997-1999 conducted in urban areas reported the rate of infection to be 31.4%. Another one on the etiology of urethral discharge in West Africa reported the prevalence of *Trichomonas vaginalis* infection in men in Ghana to be 19.0%. Because of the public health importance of trichomoniasis, it is recommended that more studies be conducted on it in Ghana and that effective control

measures be sought.

O13.11

2:30 PREVALENCE OF TRICHOMONIASIS IN KENYA

Margaret Wanyoike and Alex D.W. Acholonu

Alcorn State University

Trichomoniasis is a sexually transmitted infection caused by *Trichomonas vaginalis*, a microscopic motile protozoan parasite that thrives in an alkaline environment. This single-celled parasite is an anaerobe that has the ability to generate hydrogen, which combines with oxygen to create an anaerobic environment. Most infections are acquired through sexual intimacy. This study was conducted to find out the prevalence of trichomoniasis in Kenya. Several studies have shown a relationship between *Trichomonas vaginalis* infection and HIV infection. Of special interest, is a study conducted between 1993 and 2004 involving 1335 female sex workers in Mombasa, Kenya. This study showed that 806 (23.6%) were infected with *Trichomonas vaginalis* and 265 (7.7%) women infected with HIV out of 3422. A review of literature shows that not much studies have been conducted on *Trichomonas vaginalis* infection in Kenya and highlights the need for more research on this infection that causes infertility in both men and women and is of common occurrence in Africa.

2:50 Divisional Meeting

6:00 Dodgen Reception and Poster Session (Please set up between 4:00 and 4:30p)

P13.01

EAVESDROPPING ON COLONIES OF THE BLACK IMPORTED FIRE ANT, *SOLENOPTIS RICHTERI* FOREL

Timothy O. Menzel, Jake R. Marquess, Tom Fink, John Seiner and Douglas Streett

University of Mississippi, USDA-ARS-BCMMUR

Our objectives were to 1) record acoustic signals from colonies of imported fire ants 2) identify significant patterns within those signals, 3) associate ant behaviors with identified patterns, 4) quantify the occurrence of patterns across all recordings, and 5) study the relationship between those patterns and other variables. A metal spike was driven into the center of seven colonies. An accelerometer attached by magnet received and measured vibrations signals from within the colonies, which were then recorded. Single peaks were detected in all recordings, collections of peaks which sounded like grinding were detected in 95% of recordings, and stridulation was detected in 14%. A soil filled chamber with metal screws embedded was used to determine the behaviors associated with these patterns. As ants tunneled through the chamber their signals were detected by an accelerometer attached to the closest screw. The grinding pattern was detected from ants that were excavating. Recordings were

divided into groups by time of day, presence/absence of visible activity and stridulation, and colony, to determine which division(s) accounted for the variation in grinding (excavation) behavior. The only division with noticeable variation between groups was between colonies. On going research will determine the limitations of single spikes in capturing colony wide behavior and the relationship between detected behaviors and colony life stage.

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