MISSISSIPPI
ACADEMY OF SCIENCES

SEVENTY-SEVENTH ANNUAL MEETING

February 21-22, 2013

University of Southern Mississippi Thad Cochran Convention Center
Hattiesburg, MS

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GENERAL SCHEDULE

MISSISSIPPI ACADEMY OF SCIENCE
Seventy-Seventh Annual Meeting
February 21-22, 2013

GENERAL SCHEDULE

WEDNESDAY, FEBRUARY 20, 2013

TIME	EVENT	LOCATION
2:30 PM to 6:00 PM	Registration	Lobby
5:00 PM to 7:00 PM	Board of Directors Meeting	TBA

THURSDAY, FEBRUARY 21, 2013

TIME	EVENT	LOCATION
7:30 AM to 4:30 PM	Registration	Lobby
8:00 AM to 5:00 PM	Exhibits	Second Floor
9:00 AM or 2:30 PM	USM Campus Tours	Info at registration Desk
8:00 AM to 4:30 PM	Divisional Programs	See program for rooms
5:15 PM to 6:00 PM	2013 Dodgen Lecture & Presentation of Awards	Third Floor Ballroom I
6:00 PM to 8:00 PM	Reception and Poster Session	Third Floor

FRIDAY, FEBRUARY 22, 2013

TIME	EVENT	LOCATION
8:00 AM to 9:15 AM	Past-Presidents' Breakfast	To Be Announced
8:00 AM to 8:45AM	MAS Business Meeting	Third Floor Ballroom I
8:00 AM to 2:00 PM	Registration	Lobby
8:00 AM to 2:00 PM	Exhibits	Third Floor Ballroom I
2:00 PM to 3:00 PM	Business Meeting	Third Floor Ballroom I
8:00 AM to 5:00 PM	Divisional Programs	See program for rooms

Driving Directions

Thad Cochran Center
The University of Southern Mississippi
Hattiesburg, Mississippi

Arriving on I-59 from the north or south...

Approaching Hattiesburg from the north or south on I-59, take the Hardy Street exit. Turn east on Hardy Street. Continue on Hardy Street to 38th Avenue. Turn left. Continue to the intersection of 38th Avenue and West 4th Street. Turn right onto West 4th Street. Turn right at the second traffic light onto Golden Eagle Avenue. Take the third left into the Visitor Parking Lot.

Arriving on US Highway 49 from the south...

Approaching Hattiesburg from the south on U.S. Highway 49, turn left onto Hardy Street at the US Highway 49 / Hardy Street intersection. Take an immediate right onto Service Drive. Follow Service Drive (running parallel to Highway 49) to the traffic light at West 4th Street. Turn left onto West 4the Street. Turn left at the first traffic light onto Golden Eagle Avenue. Take the third left into the Visitor Parking Lot.

Arriving on US Highway 49 from the north...

In less than one mile after passing through the I-59 interchange, follow the sign on the right indicating an exit to the Coliseum and 4th Street. Take the West 4th Street exit (green sign on right says Coliseum) and turn left on the service road. Turn right onto West 4th Street. On West 4th Street, turn left at the first traffic light onto Golden Eagle Avenue. Take the third left into the Visitor Parking Lot.

Arriving on US Highway 98 from the west...

Approaching Hattiesburg from the west on U.S. Highway 98, continue straight through the I-59 interchange. This will put you on Hardy Street, the main street which runs in front of the USM campus. Continue on Hardy Street to 38th Avenue. Turn left. Continue to the intersection of 38th Avenue and West 4th Street. Turn right onto W. 4th Street. Turn right at the second red light onto Golden Eagle Avenue. Take the third left into the Visitor Parking Lot.

Meeting will take place on the second and third levels

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The Mississippi Center for Supercomputing Research (MCSR) provides free, high performance computing cycles and consulting in support of research and instruction, for all interested students, faculty, or researchers associated with any of Mississippi's eight publicly funded institutions of higher learning. The MCSR actively supports the Mississippi Academy of Sciences with regular participation in the Mathematics, Computer Science, and Statistics Division. Please visit http://www.mcsr.olemiss.edu, email assist@mcsr.olemiss.edu, or call 662-915-3922 to inquire about how we might support your HPC research or instructional computing projects at your university. Or, simply apply for an account today at http://www.mcsr.olemiss.edu/accounts.

2013 Dodgen Lecture

5:15 pm Thursday
February 21, 2013

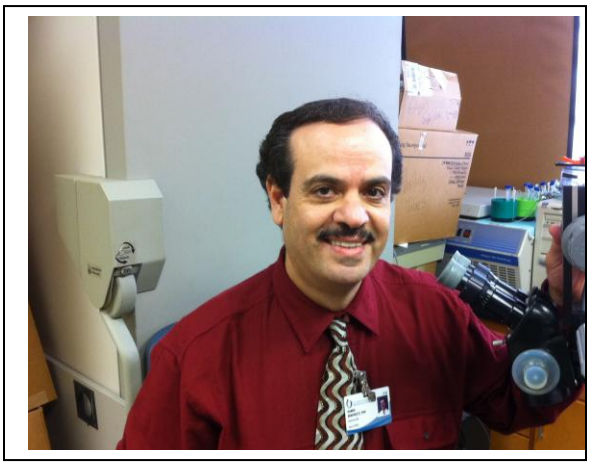
TEAMWORK AND INNOVATION

given by

Lynne Jones, PhD

***Director*; Center for Osteonecrosis Research and Education; and *Director:* Clinical Research Group; Division of Arthritis Surgery;**
The Johns Hopkins University School of Medicine; Baltimore, Maryland

Lynne Jones graduated with a Bachelor of Science Degree from Ursinus College in Collegeville, PA in 1977; a Master's Degree from Towson State University in 1987; and a Doctorate Degree from John Hopkins University in 1997. During her academic career she has been recognized as an Outstanding Young Women of America in 1984 and awarded the William Hathaway Award (Towson (Master's program)) and the Eleanor Bliss Honorary Fellowship (JHU (Ph.D.)); as well as numerous citations in Who's Who. She was elected as a Fellow of the International Union of Societies - Biomaterials Science and Engineering and a Fellow of the American Institute for Medical and Biological Engineering. Currently, Dr. Jones is an Associate Professor in the Department of Orthopaedic Surgery at the Johns Hopkins University School of Medicine, in Baltimore Maryland where she serves on many different posts. At Johns Hopkins she was appointed to the position of Director for the Center for Osteonecrosis Research and Education and Technical Director of the Arthritis Surgery Bone Bank. In addition to the clinical appointments at Johns Hopkins, she also holds the position of Director of Orthopaedic Research at the Good Samaritan Hospital. Dr. Jones has mentored undergraduate, graduate, medical, residents and resident fellows in both basic and clinical orthopaedic research. Dr. Jones has over 35 years of active orthopaedic research, and is a member of numerous prestigious national and international societies. Within the Scientific Community, Dr. Jones is well known and respected for her wisdom, insight and technical abilities. She was elected by her peers to serve as President from 2009 to 2010 for the Society for Biomaterials and is currently President-elect of the Association Osseous Research Circulation (ARCO-International); she also holds the title of Secretary/Treasurer for the National Osteonecrosis Foundation. She is a basic science member of the American Association of Orthopaedic Surgeons and a Board member of the Rocky Mountain Bioengineering Symposium. She is a member of numerous committees for several of these Societies. Dr. Jones has received a total of 33 grants during her career. She has authored and co-authored 93 peer-reviewed manuscripts, 12 book chapters and over 160 abstracts. She has given technical workshops for the Society for Biomaterials on Implant Pathology, Histology, Implant Retrieval, and Tissue Response to Implants. The topics of her workshops at the Orthopaedic Research Society have included Hypersensitivity and Biomaterials; Metal-on-Metal Bearings; Overcoming Obstacles to Innovation and Cell-Based Therapies. In addition, to her academic and research life she is also active with her family, church and the community. She is a gifted and talented woman who works hard, believes in teamwork and will work harder than anyone to complete the process. We are honored to have such an accomplished researcher elaborate on her skills to adapt basic and clinical research.



By
Dr. Ham Benghuzzi

This year marks our 77th Annual Meeting. In preparing for the upcoming meeting I have been watching the activities that have occurred on a daily basis since last February, and I realized that most people take for granted all of the **volunteer** work that goes into making this event happen. The theme definitely is team work. Vince Lombardi once said "*The achievements of an organization are the results of the combined effort of each individual*." I now realize why there is no "I" in team. I believe that our team begins with each member and division. Our organization has thirteen distinct divisions and or membership fluctuates between 400-700 faculty and students. Each of us select and entrust a leader from our divisions to help select abstracts, coordinate the sessions, and communicate the program back to us. Often times it seems that the last man standing or the one who left the room to answer the cell phone is nominated and voted on as the leader. I ask myself, why is happening in our organization? Why don't we care enough about the leaders we select? Is it because we are too busy or is it because we don't want to get involved? Think about the consequences of not having a strong leader. What is a team without leadership? I think we all know the answer to that…."failure". I want to take time to thank all of the Division Chairs and Co-Chairs for all of the efforts that you have done on the front end to reach out to colleagues and students to help put together a great divisional program. I want to especially recognize the Chairs and Co-Chairs of the Chemistry Division for the past two years (Drs. Wolfgang Kramer, Zikri Arslan, and Md Alamgir Hossain). I am so impressed with their "teamwork" from coordination of their sessions to communication with all involved. They have reached out to **"all"** faculty and students in every major university and college within our state. Their meeting will wholeheartedly leave our members filling satisfied at the end of the annual meeting. It is so encouraging to see that level of participation. So the vision for all of our divisions is to work together to select a **strong leader** that you feel has the potential to think about what is needed for your division (workshops, invited speakers, areas that are hot and need debate) and are willing to start early to coordinate the events for next year and to reach out to others across the state to be a part of their team. If you think you want to be a division leader first we thank you, second start thinking about each of the students in your division (and their mostly empty pockets which they use to fund their trip), and recognize that you have the ability to design a divisional program that can help challenge them, stimulate their creativity, and give them a filling that the money they spent was well worth it.

Lastly, I want to recognize the board and work staff that contributes hours of work throughout the year for their dedication and the continued monetary support from our sponsors. Let us all try to work together as one team to further increase the awareness of science and science education in our state. Mississippi is always looked as as the leaders in areas such as obesity, heart disease, and lack of education to name a few. Let us all strive to change the way we are viewed. In order to that we first need to take pride in what we do and want to reach out to the next person to tell them about our discoveries or theories. I always tell my students once you have been bitten by the reach bug you can't escape its infection. Let us go out and essentially infect other with our enthusiasm for what we do!

GENERAL SYMPOSIUMS
Thursday, February 21

7:00 AM **Registration Open**
4:00 PM **Registration Closed**

Thursday Evening
LOCATION: Ballroom Third Floor

5:00 PM **AWARDS**
5:15 PM **THE DODGEN LECTURE**

6:00 PM **Dodgen Reception and Divisional Poster Sessions**
Please set up posters as directed by Dr. Hossain, Poster Coordinator
Hallway Third Floor

GENERAL SYMPOSIUMS
Friday, February 22

7:00 AM **Registration opens**
8:00 AM **President's Breakfast Room TBA**
2:00 PM **Business Meeting Ballroom**

OVERVIEW OF DIVISIONAL PROGRAMS

AGRICULTURE AND PLANT SCIENCE

Thursday, February 21

THURSDAY MORNING
Cochran 210

9:00 **OPENING PRESENTATION**

9:15 **ENHANCING TOMATO (LUCOPERSICON ESCULENTUM), PRODUCTION AND UTILIZATION IN SOUTHWEST MISSISSIPPI**

9:30 **SUSTAINABLE MEDICINAL PLANT (TANACETUM PARTHENUM PRODUCTION AND UTILIZATION IN MISSISSIPPI**

9:45 **COMPARISONS OF ELECTRONIC AND VISUAL RATINGS OF DETACHED STRAWBERRY LEAVES INOCULATED WITH TWO *COLLETOTRICHUM* SPECIES**

10:00 **USE OF CASEIN HYDROLYZATE AND TEA EXTRACTS IN THERMIZED WHEY-BASED EDIBLE COATING SOLUTIONS TO REDUCE OXIDATIVE DEGRADATIONS OF CUBED BEEF STEAK**

10:15 **COMPARATIVE EVALUATION OF THE GROWTH RESPONSE AND HEAVY METAL PHYTOEXTRACTION OF TWO PLANT SPECIES GROWN IN LEAD- AND CADMIUM-CONTAMINATED SOIL**

10:30 **BREAKING *VALLISNERIA* SEED DORMANCY WITH GIBBERELLIC ACID**

10:45 **BREAK**

11:00 **EFFECTS OF PRELAY *MYCOPLASMA GALLISEPTICUM* VACCINES IN CONJUNCTION WITH AN F-STRAIN *M. GALLISEPTICUM*CHALLENGE OVERLAY ON THE REPRODUCTIVE AND DIGESTIVE ORGAN CHARACTERISTICS OF COMMERCIAL LAYERS**

11:15 **DEVELOPING REMOTE SENSING METHODS TO ESTIMATE SHORT VEGETATION BIOPHYSICAL VARIABLES**

11:45 LUNCH

DIVISION POSTER PRESENTATIONS
Authors should be available with their posters to answer questions 1:30-2:30 PM

1. **THE EFFECTS OF ACIDIFICATION AND CHELATING AGENTS ON THE BIOAVAILABILITY, UPTAKE AND TRANSLOCATION OF LEAD BY SESBANIA EXALTATA**
2. **CHELATE-MEDIATED CHANGES IN METAL SOLUBILITY AFFECT THE PHYTOEXTRACTION OF CADMIUM BY TRITICUM AESTIVUM**
3. **ASSESSMENT OF IN-SEASON AGRICULTURAL CROP GROWTH USING FIELD AND AIRBORNE REMOTE SENSING MEASUREMENTS**
4. **PHENOLIC AND ANTHOCYANIN COMPOUND CONCENTRATIONS IN BLUEBERRY (VACCINIUM CORYMBOSUM) CULTIVARS**

3:00-3:45 DIVISIONAL BUSINESS MEETING

CELLULAR, MOLECULAR AND DEVELOPMENTAL BIOLOGY

Thursday, February 21

THURSDAY MORNING
Cochran 218B

8:15 WELCOME AND OPENING REMARKS

8:30 ClONING AND EXPRESSION OF THE *cbbO* GENE FROM *Halothiobacillus neapolitanus*

8:45 ANALYSIS OF TWO MUTATIONS THAT AFFECT THE EXPRESSION OF *ICSA* AND THE SURFACE DISTRIBUTION OF ICSA In*shigella flexneri*.

9:00 GENETIC REGULATION OF VANCOMYCIN RESISTANCE IN *STAPHYLOCOCCUS AUREUS*

9:15 THE *MSA* GENE REGULATES IMMUNE EVASION AND PERSISTENCE IN *STAPHYLOCOCCUS AUREUS*.

9:30 INVESTIGATING TRNA CHANNELING BY AMINOACYL-TRNA SYNTHETASES AND ELONGATION FACTOR TU

9:45 BREAK

10:15 IMPACT OF CALCIUM SIGNALING ON OCCIDIOFUNGIN ACTIVITY

10:30 MSA NEGATIVELY REGULATES AUTOLYSIS IN STAPHYLOCOCCUS AUREUS

10:45 AN INSIGHT INTO THE MICROBIOME OF TICKS INFESTING MIGRATING SONGBIRDS

11:00 TICK CYSTATINS: FRIEND OR FOE OF RICKETTSIA PARKERI

11:15 THE ROLE OF *MSA* IN THE REGULATORY NETWORK OF *STAPHYLOCOCCUS AUREUS* VIRULENCE

11:30 ELECTION OF OFFICERS (Chair and Co-Chair) for serving the Cell, Molecular, and Developmental Biology Division of the MAS in 2014

LUNCH

THURSDAY AFTERNOON
Room 218B

1:15 TICK CORAZONIN: STORY OF A MULTI-FUNCTIONAL NEUROPEPTIDE

1:30 AMSNARES ROLE IN *AMBLYOMMA MACULATUM* FEEDING AND PATHOGEN TRANSMISSION THE PATHOGENIC FUNGUS *HISTOPLASMA CAPSULATUM*

1:45 LARGE FATTY ACID-DERIVED OLIGOMERS (LFAOS): THE NEW SYNTHETIC AB PRIONS

2:00 CHARACTERIZATION OF DELETION MUTANT OF *MSA* IN *STAPHYLOCOCCUS AUREUSi*

BREAK

Visit Vendors and USM Campus

4:45 DODGEN LECTURE AND AWARDS

POSTER SESSION IMMEDIATELY FOLLOWING DODGEN LECTURE
6:00-8:00 PM

1. **MAPPING AND IDENTIFICATION OF A GENETIC MUTATION THAT CAUSES CATARACTS**
2. **EVALUATING THE INTERACTIONS BETWEEN AMINOACYL-tRNA SYNTHETASES AND ELONGATION FACTOR TU IN PROTEIN SYNTHESIS**
3. **MUTATIONS IN THE *NHAB* GENE SIGNIFICANTLY REDUCE THE EXPRESSION OF *ICSA* ON A TRANSCRIPTIONAL LEVEL IN*SHIGELLA FLEXNERI* IN A PH DEPENDANT MANNER, CONSTITUTIVE MUTATIONS IN THE *CPXA/R* GENES ARE EPISTATIC TO THE *NHAB* MUTATION.**
4. **EVOLUTION OF THE MAMMALIAN CSH/GH CLUSTER**
5. **EXPRESSION OF THE GLOBAL REGULATOR MSA PROTEIN FROM *STAPHYLOCOCCUS AUREUS***
6. **STUDY OF THE FUNCTION OF THE MOLD SPECIFIC GENE, MS95, IN THE PATHOGENIC DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM**
7. ***MSA* REGULATES PROCESSING OF MUREIN HYDROLASES IN *STAPHYLOCOCCUS AUREUS***
8. **ALTERED NODE OF RANVIER ORGANIZATION IN INTERHEMISPHERIC AXONS AFTER BRIEF POSTNATAL CITALOPRAM EXPOSURE IN ADULT RATS**
9. **ASSESSING POTENTIAL ANTIMICROBIAL PROPERTIES OF HISTONES AND DNA-BINDING PROTEINS**
10. **MODIFIED INFLUENZA VIRUS FOR USE IN TRANSGENIC THERAPIES**
11. **METHANOL INFLUENCES IMMUNOBLOTTING OF HIGH AND LOW MOLECULAR WEIGHT PROTEINS**
12. **EVALUATION OF THE SUSPECTED ROLE OF HIGH MOBILITY GROUP PROTEIN B (HMGB1) IN APOPTOSIS.**
13. **THE USE FOUR-WAY JUNCTION DNA TO ATTENUATE INFLAMMATION.**

Friday, February 18

FRIDAY MORNING
Cochran 218B

8:30 WELCOME
8:45 DETERMINING THE SIDEDNESS OF PROTEIN INTERACTIONS OF CSOS1A
9:00 DETERMINING THE ROLE OF THE NITROGEN REGULATORY PROTEIN AREA IN THE DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM

9:15 LOW CONCENTRATIONS OF BETULINIC ACID DO NOT AFFECT SPONTANEOUS PRION FORMATION IN BAKER'S YEAST
9:30 COORDINATION IN ATPASE DOMAINS OF ENERGY-DEPENDENT PROTEIN DEGRADATION COMPLEXES

9:45 BREAK

10:15 DECODING THE CEMENT CONE: A SNAPSHOT OF GLYCINE RICH PROTEINS IN SALIVARY GLANDS
10:30 A DETERGENT COMPATIBLE PROTEIN NANO ASSAY FOR DILUTE BIOLOGICAL SAMPLES
10:45 THE USE OF RADIOMETRIC ASSAYS TO INVESTIGATE THE STRINGENCY OF tRNA CHARGING.
11:00 CLONING AND EXPRESSION OF THE *cbbQ* GENE OF *HALOTHIOBACILLUS NEAPOLITANUS*
11:15 DR-HELP - A FOCUS ON RURAL HEALTH TRAINING THROUGH THE PROFESSIONAL PORTAL PROGRAM AT THE UNIVERSITY OF MISSISSIPPI MEDICAL CENTER (UMMC)

11:30 CLOSING REMARKS

CHEMISTRY AND CHEMICAL ENGINEERING

Thursday, February 21

THURSDAY MORNING
Cochran 216
PLENARY SESSION I--- ANALYTICAL CHEMISTRY AND APPLIED SPECTROSCOPY

SESSION CHAIR: Dr. Wolfgang Kramer

8:15 INTRODUCTION AND WELCOME
8:30 DEVELOPMENT OF COUNTY-LEVEL TERRESTRIAL CARBON POOL IN MISSISSIPPI
8:45 CADMIUM VAPOR GENERATION WITH CYANIDE COMPLEXES OF CR(III), TI(III), AND V(III)
9:00 ANALYSES OF BIOMARKERS AND ORGANIC RESIDUES IN POTTERY SHERDS TO IDENTIFY CEREMONIAL USAGE
9:15 IMPORTANCE OF METAL SPECIATION FOR COMPLETE GEOCHEMICAL CHARACTERIZATION OF NATURAL SYSTEMS
9:30 ATMOSPHERIC MERCURY SPECIES (GEM, GOM, PBM) IN NORTHERN MISSISSIPPI DURING 2011-2012

10:00 BREAK
PLENARY SESSION II--- ORGANIC AND BIOCHEMISTRY

SESSION CHAIR: Dr. Paige Buchanan

10:15 POLYMERIC MIMICS OF NATURALLY OCCURRING ANTIMICROBIAL PEPTIDES
10:30 *YFDW* FUNCTION IN *ESCHERICHIA COLI*
10:45 PROGRESS TOWARDS THE CHEMOENZYMATIC SYNTHESIS OF ETHAMBUTOL ANALOGUES CONTAINING 3-AMINOALCOHOLS
11:00 B-DNA AND BEYOND: ALTERNATIVE DNA STRUCTURES IN GENETICS AND NANOMATERIALS
11:15 SYTHETICS STUDIES TOWARD THE SYNTHESIS OF 11-DEOXYFISTULARIN-3
11:30 NEW INSIGHTS INTO FLAVONOL CHEMISTRY: SYNTHESIS, STRUCTURE, SPECTROSCOPY, AND METAL CHELATION

11:45 LUNCH BREAK

THURSDAY AFTERNOON
PLENARY SESSION III--- PHYSICAL CHEMISTRY AND MATERIAL SCIENCE

SESSION CHAIR: Dr. Ashton Hamme

1:00 CURE-ON-DEMAND POLYMERIZATION VIA FRONTAL POLYMERIZATION
1:15 AN NMR-DERIVED MODEL FOR PROTEIN-NANOPARTICLE ADSORPTION
1:30 INTERFACIAL CURVATURE EFFECTS IN THE SELF-ASSEMBLY AND RESPONSIVENESS OF POLYPEPTIDE-BASED BLOCK AND START COPOLYMERS
1:45 SYNTHESIS, CHARACTERIZATION AND CRYSTAL STRUCTURE OF TETRA-M-LEVULINATO-K^8 O:O'-BIS[(1,3-BENZOTHIAZOLE-KN)COPPER(II)] AND TETRA-M-LEVULINATO- K^8 O:O'-BIS[(2-AMINO-1,3-BENZOTHIAZOLE-KN)COPPER(II)]

2:00 KEEPING TOXICOLOGY ABREAST OF TECHNOLOGY OF ENGINEERED METALLIC NANOPARTICLES
2:15 MANUFACTURED NANOPARTICLES IN ENVIRONMENT: EXAMPLES OF NEW PROPERTIES AND UNUSUAL BEHAVIOR
2:30 BREAK
PLENARY SESSION IV-- COMPUTATIONAL CHEMISTRY AND NANOTECHNOLOGY

SESSION CHAIR: Dr. Daniel Savin

3:00 COMPUTATIONAL NANOTOXICOLOGY: QUANTUM CHEMISTRY, NANO-QSARS AND PROTEIN-LIGAND DOCKING METHODS FOR ASSESSING THE TOXICITY OF NANOPARTICLES
3:15 ORIGIN OF THE LIFE: FEW IDEAS FROM THE COMPUTATIONAL CHEMISTRY STUDIES
3:30 REACTIVITY PREDICTION FOR CHLORINE RADICAL ADDITION ON CHLORINATED (5,5) ARMCHAIR SWCNT
3:45 POINTWISE BASIS SETS IN VIBRATIONAL CALCULATIONS FOR MULTIDIMENSIONAL PROBLEMS
4:00 WHEN IS THE AROMATIC ISOMER NOT THE MOST STABLE?
4:15 IN SILICO PROTEIN TARGET IDENTIFICATION: CHEMOMETRIC ANALYSIS OF ANTITRYPANOSOMAL NATURAL PRODUCTS

4:30 ELECTIONS: Nomination and selection of new divisional head(s)

THURSDAY EVENING
POSTER SESSION (6:30-8:00)

1. **DNA TEMPLATED SILVER NANO CLUSTER**
2. **DIFFERENTIAL BINDING OF FISETIN AND DAIDZEIN IN Y-CYCLODEXTRIN NANOCAVITYY**
3. **RAPID SYNTHESIS OF POLYMER BRUSH SURFACES VIA MICROWAVE-ASSISTED SURFACE-INITIATED RADICAL POLYMERIZATION**
4. **SPRAY-DEPOSITED SUPERHYDROPHOBIC COATINGS VIA PHOTOPOLYMERIZATION OF HYBRID THIOL-ENE POLYMER NETWORKS**
5. **BINDING OF FISETIN AND ITS CHROMOPHORES 3-HYDROXYFLAVONE AND 7-HYDROXY FLAVONE IN DUPLEX AND TETRAPLEX DNA**
6. **FORMATION OF FOUR-WAY DNA JUNCTION FACILITATED BY A SMALL MOLECULE**

7. **EVALUATION OF SMALL MOLECULES AS A METHOD TO STABILIZE THE FORMATION OF A STABLE FOUR WAY JUNCTION (4WJ)**
8. **EFFECTS OF MORPHOLOGICAL DIFFERENCES ON TOXICITY OF NANOPARTICLES: A STUDY OF NANO TiO_2WITH *ARTEMIA SALINA***
9. **MULTIELEMENT VAPOR/HYDRIDE GENERATION WITH TRANSITION METAL CYANIDES**
10. **Au30(SC4H9)18 & Au23(SC4H9)16 'MAGIC SIZE' NANOPARTICLES**
11. **OXALIC ACID AND *ESCHERICHIA COLI***
12. **YFDW AND YFDU ARE REQUIRED FOR OXALATE-INDUCED ACID TOLERANCE IN *ESCHERICHIA COLI***
13. **OXALATE-DEPENDENT ACID TOELRANCE RESPONSE IN *ESCHERICHIA COLI***
14. **THE INTERACTIONS OF MWCNTs WITH HYDROGEN PEROXIDE IN AQUEOUS MEDIA**
15. **A NOVEL C3-SYMMETRIC THIOUREA-BASED RECEPTOR FOR FLUORIDE AND SULFATE ANIONS**
16. **BIFUNCTIONAL 1,8-NAPHTHALIMIDES AS FLUORESCENCE SENSORS**
17. **OPTIMIZING THE SYNTHESIS OF BIFUNCTIONAL NITROGEN ONIUM SALTS USED FOR DNA-CLEAVAGE**
18. **ANALYSIS OF THE DNA-CLEAVING EFFICIENCIES OF BIFUNCTIONAL DNA-CLEAVING REAGENTS**
19. **PHOTOCHEMISTRY OF N-ALKOXY HETEROAROMATIC TETRAFLUOROBORATES: ANALYSIS OF THE REACTION PATHWAYS BY pH MONITORING**
20. **APPLICATION OF THE DECARBOXYLATIVE PHOTOCYCLIZATION: MEMORY OF CHIRALITY EFFECTS IN TRIPLET BIRADICAL REACTIONS**
21. **THIOPHENE BASED MONOCYCLIC RECEPTORS FOR SELECTIVE BINDING OF FLUORIDE IN WATER**
22. **A NEW THIOPHENE BASED TRIPODAL AMINE RECEPTOR FOR ANION BINDING**
23. **BIOLOGICAL EVALUATION AND SYNTHESIS OF SPIRO-ISOXAZOLINES VIA INTRAMOLECULAR CYCLIZATION**
24. **APPLICATION OF 1,3-DIPOLAR CYCLOADDITION TOWARD SWCNT FUNCTIONALIZATION AND SUBSEQUENT ATTACHMENT OF GOLD NANOPARTICLES**
25. **SELECTIVE DETECTION AND PHOTOTHERMAL THERAPY OF CANCER CELLS USING IRON CORE GOLE SHELL NANOPARTICLES: SWCNT HYBRID NANOSCTUCTURES**
26. **EVALUATION OF THE SUSPECTED ROLE OF HIGH MOBILITY GROUP PROTEIN B (HMGB1) IN APOPTOSIS.**
27. **POTENTIAL OXIDATIVE REACTIVITY OF *P*-NITROPHENYL POLYSULFIDES**
28. **CALCULATING ENTHALPIES OF FORMATION FOR THE OXADIAZOLES AND THEIR CYANO DERIVATIVES VIA ISODESMIC AND HOMODESMOTIC REACTIONS**
29. **RAFT POLYMERIZATION AND PH-RESPONSIVE STUDIES OF A LIBRARY OF SULFONAMIDE-BASED POLYMERS**
30. **A PRELIMINARY STUDY: BIOGEOCHEMISTRY OF THE GRAND BAY RESERVE AND ITS EFFECT ON ENVIRONMENTAL QUALITY**
31. **DFT STUDY OF CATION-π INTERACTIONS FOR 1,3,5-TRIS(NAPHTHYL)BENZENE WITH Li^+, Na^+, K^+ : THE EFFECT OF NAPHTHYL RING SUBSTITUTION**

Friday, February 22

FRIDAY MORNING
Cochran 216
PLENARY SESSION V---CONCURRENT SESSIONS

SESSION CHAIR: Dr. Wolfgang Kramer

8:15 WELCOME-OPENING REMARKS
8:30 ENANTIODIVERGENT SYNTHESIS OF DIVERSE ORTHOGONALLY PROTECTED A-METHYL-LYSINE AND PROLINE ANALOGUES
8:45 INVESTIGATION OF CO-SOLVENT EFFECTS ON THE SELECTIVITIES OF PLE ISOENZYMES
9:00 SYNTHESIS OF PYRIDINYL PHENYLALANINE ANALOGS
9:15 A STEREODIVERGENT STRATEGY FOR THE PREPARATION OF Δ-LACTAMS AND THEIR USE IN THE SYNTHESIS OF A NIPECOTIC ACID ANALOGUE 9:30
9:30 SELF-ASSEMBLED GOLD NANOPLEXES FOR CANCER-TARGETED SIRNA DELIVERY
9:45 A NEW SYNTHETIC METHOD FOR PREPARING A,A-DISUBSTITUTED Γ-UNNATURAL AMINO ACIDS THROUGH A LACTAM INTERMEDIATE

10:00 Break

PLENARY SESSION VI---CONCURRENT SESSION
Cochran 214

SESSION CHAIR: Dr. Zikri Arslan

8:15 WELCOME-OPENING REMARKS
8:30 PLUTONIUM CONCENTRATION AND 240PU/239PU ATOM RATIO IN BIOTA COLLECTED FROM AMCHITKA ISLAND, ALASKA: RECENT MEASUREMENTS BY ICP-SFMS
8:45 SYNTHESIS AND EXAMINATION OF METABOLIC DISTRIBUTION OF SILICA COATED LEAD SELENIDE QUANTUM DOTS
9:00 SYNTHESIS, ISOLATION AND CHARACTERIZATION OF GOLD NANOCLUSTERS (<2NM) CAPPED BY AROMATIC LIGANDS
9:15 SYNTHETIC RECEPTORS FOR INORGANIC ANIONS
9:30 LIGAND EXCHANGE REACTIONS ON ULTRASMALL GOLD NANOCLUSTERS
9:45 THERANOSTIC STAR SHAPE CORE-SHELL NANOPARTICLE FOR THE ISOLATION, FLUORESCENCE IMAGING AND PHOTOTHERMAL DESTRUCTION OF TARGETED RARE TUMOR CELLS FROM WHOLE BLOOD

10:00 Break

Cochran 216
PLENARY SESSION VII---CONCURRENT SESSION

SESSION CHAIR: Dr. James Cizdziel

10:10 TAILORABILITY OF BISPHENOL-BASED POLYBENZOXAZINES
10:25 REVERSIBLE POST-POLYMERIZTION MODIFICATION OF BRUSH SURFACES VIA DYNAMIC COVALENT HYDRAZONE LINKAGES
10:40 ASSESSMENT OF TOXICITY OF SUSPENSIONS OF ZINC AND ZINC OXIDE NANOPOWDERS ON ARTEMIA – FREE ZINC IONS OR PARTICLES?
10:55 NOVEL MOLECULES SYNTHESIZED FROM NATURAL PRODUCTS USED WITH LANTHANIDE METALS IN AN INDICATOR DISPLACEMENT ASSAY FOR DETECTION OF OCEANIC IRON

11:10 SYNTHESIS OF COMPLEX HETEROCYCLES VIA NOVEL TRANSITION METAL-CATALYZED REACTIONS

11:25 BIOGEOCHEMISTRY OF CARBON, HEAVY METALS AND TRACE ELEMENTS IN THE GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE

11:40 SYNTHESIS AND CHARACTERIZATION OF POLY-FUNCTIONALIZED FULLERENE MONOMERS FOR INCLUSION IN POLYMER NETWORK ACIDS THROUGH A LACTAM INTERMEDIATE

11:55 POTASSIUM MANGANIC CYANIDE – A NEW REAGENT FOR GENERATION LEAD HYDRIDE (PBH_4) FOR SENSITIVE DETERMINATION OF LEAD

12:15 PM ANNOUNCEMENT OF STUDENTS' AWARDS

Cochran 214
PLENARY SESSION VIII---CONCURRENT SESSION

SESSION CHAIR: Dr. Alamgir Hossain

10:10 A RHODAMINE-SUGAR BASED FLUORESCENT CHEMOSENSOR FOR DETECTION OF FE^{3+}

10:25 ANIONS BINDING AND SELECTIVITY WITH TRIPODAL UREAS

10:40 SYNTHESIS AND ANION BINDING STUDIES OF POLYAMINE-BASED MACROMONOCYCLES

10:55 SYNTHESIS AND BINDING STUDIES OF *BIS*-UREA RECEPTORS FOR HALIDES

11:10 META-BISCLICK: ELECTROCHEMISTRY, ELECTROGENERATED CHEMILUMINESENCE, AND ITS INTERACTIONS WITH ZN^{2+} IONS

11:25 A SELF-ASSEMBLY BASED FLUORESCENT RATIOMETRIC SENSOR FOR FE^{3+} ION

11:40 ELECTROGENERATED CHEMILUMINESCENCE OF WATER SOLUBLE SILICON QUANTUM DOTS

11:55 POLYMER MICROSPHERE PRODUCTION AND CHARACTERIZATION: INVESTIGATING THE EFFECTS OF ACOUSTIC WAVE EXCITATION AND MONOMER VISCOSITY ON SIZE DISTRIBUTION

12:15 PM ANNOUNCEMENT OF STUDENTS' AWARDS

ECOLOGY AND EVOLUTIONARY BIOLOGY

Thursday, February 21

THURSDAY MORNING
Room 227 (Gold Leaf Room)

8:45 OPENING REMARKS

9:00 A PLEA FOR INTEGRATIVE TAXONOMY: SPECIES DELIMITATION IN THE NORTH AMERICAN TARANTULA GENUS *APHONOPELMA*

9:15 DNA EVIDENCE FOR THE RECOGNITION OF SEVERAL SPECIES OF CUDWEEDS (*GAMOCHAETA*, ASTERACEAE) IN THE EASTERN UNITED STATES

9:30 MONITORING THE FERAL HOG (*SUS SCROFA*) POPULATION AT DAHOMEY NATIONAL WILDLIFE REFUGE IN NORTHWEST MISSISSIPPI

9:45 TESTOSTERONE AND FEEDING BEHAVIOR IN THE EASTERN BLUEBIRD

10:00 BREAK

10:15 PARTIAL ELUCIDATION OF THE LIFE HISTORY OF TWO PARASITIC FLUKES (DIGENEA:

BUCEPHALIDAE), ONE FROM THE PASCAGOULA RIVER, AND ONE FROM INSHORE WATERS OF COASTAL MISSISSIPPI

10:30 THE UTILITY OF NUCLEAR *GBSSI* AND *EMB2765* DNA SEQUENCES FOR INFERRING PHYLOGENY IN THE TROPICAL ANGIOSPERM FAMILY SAMYDACEAE

10:45 TESTOSTERONE PRODUCTION IN THREE SPECIES OF SONGBIRD THROUGHOUT SPRING MIGRATION

11:00 FLORA OF THE "GOPHER FARM" SANDHILL, WAYNE COUNTY, MISSISSIPPI

11:15 COMPARATIVE OSTEOLOGY OF NEW WORLD SNAKES

11:30 LUNCH BREAK

THURSDAY AFTERNOON
Authors should be available with their posters to answer questions 1:30-2:30 PM

1. **USE OF POPULATION GENETICS TO ASSESS STABILITY OF CONSERVATION EFFORT OF ANDROS ROCK ENDEMIC IGUANIDSfSTONER**

GEOLOGY AND GEOGRAPHY

Friday, February 22

FRIDAY MORNING
Cochran 229

9:00 MISSISSIPPI EARTHQUAKE INVESTIGATIONS

9:15 SITE EFFECTS EVALUATION OF NORTHERN MISSISSIPPI

9:30 ENVIRONMENTAL JUSTICE'S HISTORY AS A SOCIAL MOVEMENT

9:45 CARBON MANAGEMENT IN MISSISSIPPI: THE NEED FOR AN INTEGRATED APPROACH

10:00 TERRAIN ANALYSIS OF A FLAT TERRAIN: THE HIDDEN TOPOGRAPHY IN THE MISSISSIPPI-YAZOO ALLUVIAL PLAIN

10:15 BREAK

10:30 DEPOSITIONAL PATTERNS OF FLOODPLAIN SEDIMENTS DURING THE 2011 LOWER MISSISSIPPI RIVER FLOOD IN WILKINSON COUNTY, MISSISSIPPI, AND WEST FELICIANA PARISH, LOUISIANA

10:45 KAOLIN AND BAUXITE DEPOSITS IN MISSISSIPPI - A POTENTIAL SOURCE FOR CERAMIC PROPPANT

11:00 LUNCH

FRIDAY AFTERNOON
Room 229

1:00 BUILDING ON THE YAZOO CLAY

1:15 THE RACE FOR SPACE: FOULING FOSSIL-FEEDERS FROM THE LATE CRETACEOUS AND PALEOGENE OF MISSISSIPPI

1:30 STROMATOPOROIDS FROM GRAVELS OF THE PRE-LOESS TERRACE DEPOSITS IN MISSISSIPPI

1:45 OSTRACODA FROM BAYOU DESIARD, OUACHITA PARISH, NORTHEAST LOUISIANA

2:00 E. COLI CONTAMINATION AND NUTRIENT LOADING IN URBAN STORMWATER, JACKSON, MISSISSIPPI

2:15 BUSINESS MEETING

HEALTH SCIENCES

Thursday, February 21

THURSDAY MORNING
Cochran 226

8:45 **WELCOME AND OPENING REMARKS**

9:00 **THE EFFECTS OF PRR ON MSC CELLS IN CULTURE**

9:15 **EFFECT OF EXTRACELLULAR ADENOSINE TRIPHOSPHATE ON ACTIVITY OF OSTEOBLAST-LIKE CELLS**

9:30 **BUILDING A TRUSTED HEALTHCARE INFORMATICS PLATFORM: IMPLEMENTATION OF THE ENTERPRISE DATA WAREHOUSE AT THE UNIVERSITY OF MISSISSIPPI MEDICAL CENTER**

9:45 **USE OF CASEIN HYDROLYZATE IN THERMIZED WHEY-BASED EDIBLE COATING SOLUTIONS TO REDUCE COLIFORM GROWTH IN SHOULDER CUT BEEF STEAK**

10:00 **THE EFFECT OF ELECTRONIC EMERGENCY PROVIDER WRITTEN PLAN OF DISCHARGE HANDOFF COMMUNICATION ON OUTPATIENT STRESS-TEST/MYOVIEW AND PRIMARY CARE FOLLOW-UP DAYS AFTER DISCHARGE FROM AN EMERGENCY DEPARTMENT IN MISSISSIPPI**

10:15 BREAK

10:30 **ASSESSING INSTRUMENTAL VERSUS INTUITIVE GRIEF PATTERNS BY KEY CHARACTERISTICS IN RESIDENT PHYSICIANS**

10:45 **HEARING AID USE BY UNILATERALLY IMPAIRED INDIVIDUALS: OUTCOME OF THE TINNITUS HANDICAP INVENTORY**

11:00 **POLYMERIZATION SHRINKAGE AND FILLER LOADING OF FLOWABLE DENTAL COMPOSITES**

11:15 **BUSINESS MEETING**

THURSDAY AFTERNOON
POSTER SESSION 1
Authors should be available with their posters to answer questions 1:30-4:15 PM

1. **THE EFFECTS OF NEUROPEPTIDE Y ON OSTEOBLAST AND OSTEOCLAST CELLS LINES**
2. **THE EFFECTS OF ALENDRONATE ON OSTEOBLAST CELLS IN CULTURE**
3. **SUSTAINED RELEASE OF MANNITOL FROM TRICALCIUM PHOSPHATE DRUG DELIVERY DEVICE**
4. **THE EFFECTS OF MANNOSE 6-PHOSPHATE AND MANNITOL ON MCCOY FIBROBLAST CELLS**
5. **THE EFFECTS OF PLATELET RICH PLASMA ON DEGENERATING INTERVERTEBRAL DISCS**
6. **PLATELET-RICH PLASMA EFFECTS ON HEALING TISSUE INTERFACES: HISTOLOGICAL ANALYSIS IN A SPINAL DECOMPRESSION MODEL**
7. **THE EFFECT OF SUSTAINED DELIVERY OF DEMINERALIZED BONE MATRIX PROTEIN IN THE FEMALE RAT**
8. **THE EFFECT OF NEUROPEPTIDE Y ON MOUSE MSCS CELLS IN CULTURE.**
9. **THE EFFECTS OF NEUROPEPTIDE Y ANTAGONIST ON TWO EWING SARCOMA CELL LINES**
10. **REVERSING THE EFFECTS OF NPY ON BONE CELLS USING NPY ANTAGONIST**
11. **EARLY EFFECTS OF POSS ON TISSUE HEALING USING A PIG MODEL**
12. **DEVELOPMENT OF A LC/MS METHOD TO QUANTIFY PODOCIN, A POTENTIAL BIOMARKER**

FOR CHRONIC KIDNEY DISEASE

13. **SURFACE CHARACTERIZATION OF POLYPEPTIDE-POLYELECTROLYTE CONJUGATE COATINGS FOR CELL CULTURE**
14. **THE GEOGRAPHIC DISTRIBUTION OF MAMMOGRAPHY RESOURCES IN MISSISSIPPI**
15. **DEVELOPMENT OF AN EXERCISE AND PHYSICAL ACTIVITY RESOURCE GUIDE FOR CANCER PATIENTS**
16. **SCREENING DISTRESS AMONG CANCER PATIENTS BY STUDY THE NUTRITIONAL PROBLEMS USING DISTRESS THERMOMETER SCALE AND PROBLEM CHECKLIST**
17. **PROBLEMS RELATED DISTRESS AMONG CANCER PATIENTS PARTICIPATING IN SCREENING PROGRAM**
18. **THE CHARACTERIZATION OF RENAL INJURY IN FEMALE T2DN RATS FED A HIGH FRUCTOSE DIET**
19. **DIGITAL IMAGING TO MEASURE WOUND HEALING**
20. **MODIFIED INFLUENZA VIRUS FOR USE IN TRANSGENIC THERAPIES**
21. **DETERMINING THE INHIBITION AND RESISTANCE OF STAPHYLOCOCCUS AUREUS USING EGCG EXTRACT**
22. **BLAME IT ON THE ALCOHOL**
23. **A STICKY CASE OF MAPLE SYRUPS DISEASE**
24. **THE ANTIMICROBIAL EFFECTS OF GREEN TEA (EGCG) ON ESCHERICHIA COLI**
25. **THE CASE OF THE DIRECT AND INDIRECT DISAGREEMENT**

POSTER SESSION II
6:00-8:00 PM (Following Dodgen Lecture)

26. **PATIENT SATISFACTION THE BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEMS TO IDENTIFY ORAL HEALTH DISPARITIES IN APPALACHIA**
27. **THE EFFECTS OF BLACKSEED OIL, THYMOQUINONE, AND EGCG ON TRYPANOSOMA LEWISI INFECTED RATS**
28. **GENETIC POPULATION STRUCTURE AND DISEASE MANIFESTATION OF TRICHOMONAS VAGINALIS**
29. **ADVANCED CT IMAGE ANALYSIS OF DIFFUSE LIVER DISEASE**
30. **DYNAMIC MODELING FOR PREDICTIONS ON THE MISSISSIPPI PHYSICIAN WORKFORCE**
31. **CHRONIC ETA RECEPTOR BLOCKADE PREVENTS THE PROGRESSION OF RENAL INJURY IN DIABETIC DAHL SALT-SENSITIVE RATS**
32. **CARDIOVASCULAR RESPONSES FOLLOWING DIFFERENT TYPES OF BREATHING EXERCISES**
33. **AN EXPERIMENTAL COMBINED WITH THEORETICAL STUDY OF FORMATION MECHANISM AND CONFORMATION OF TRICLOCARBAN-HUMAN SERUM ALBUMIN COMPLEX**
34. **HEALTH EFFECT FOLLWOING A RADIOLOGICAL EMERGENCY IN FIRST RESPONDERS**
35. **EFFECT OF LONG-TERM PHYSICAL EXERCISE ON BLOOD PRESSURE IN AN AFRICAN AMERICAN SAMPLE**
36. **RADIAL/LOW ENERGY EXTRACORPORAL SHOCK WAVE THERAPY EFFECTS IN THE TREATMENT OF ADULT PATIENTS WITH CHRONIC PLANTER FASCIITIS: A SYSTEMATIC REVIEW**

HISTORY AND PHILOSOPHY OF SCIENCE

Thursday, February 21

THURSDAY MORNING
Room 228

8:30 THE EUSOCIAL TRANSITION: A REPLY TO BIRCH
8:55 MACHINATIONS OVER MACHINES: LEIBNIZ AND SPINOZA ON HUMAN TECHNOLOGY
9:20 PERSONAL IDENTITY AND THE BRAIN
9:45 IMMANUEL KANT AND THE SPECIES PROBLEM

10:10 BREAK

10:25 SPECIES AS NATURAL KINDS
10:50 DARWINIAN EVOLUTION: GENESIS OF THE CONCEPT BETWEEN THE 1830S AND 1870S
11:15 THE FUTURE OF CLASSIFICATION IN SYSTEMATICS
11:40 ONTIC STRUCTURAL REALISM AND INFORMATION

12:00 LUNCH BREAK

THURSDAY AFTERNOON
Room 228

1:15 STRONG ARTIFICIAL INTELLIGENCE: AN ONTOLOGICAL APPROACH TO SEMANTICS FROM SYNTAX
1:40 HAPPINESS AND THE GOOD LIFE: THE INTERSECTION OF SCIENCE AND PHILOSOPHY
2:05 THE ENTOMOLOGICAL ETHICS OF BUG SQUASHING
2:45 SUPERSTRING THEORY: AN EXERCISE IN GENERATING PROGRESS

2:30 BUSINESS MEETING

2:50 ON THE NEUROBIOLOGY OF TRUTH
3:15 IS A SCIENTIFIC IDEA OF HOPE POSSIBLE? HOW DOES IT RELATE TO OUR IDEAS ABOUT THE PHILOSOPHY OF RELIGION?
3:40 NO PHILOSOPHER LEFT BEHIND: CRITICAL THINKING MAKES A COMEBACK IN THE SCIENCE CLASSROOM
4:05 SELF-PLAGIARISM AND TEXTUAL RECYCLING
4:30 BIOLOGICAL INDIVIDUALS, TIME, AND PERSISTENCE: THE PERDURANTIST FOUNDATIONS OF THE SPECIES-AS-INDIVIDUALS THESIS

MARINE AND ATMOSPHERIC SCIENCES

Thursday, February 21

THURSDAY EVENING
Poster Session
Following Dodgen Lecture (6:00-8:00 pm)

1. **ENVIRONMENTAL MODELING AND PREDICTION FOR CLIMATE FLUCTUATIONS OVER GRAND BAY OF GULF OF MEXICO**
2. **APPLICATION OF MICROSATELLITE MARKERS TOPEDIGREES RECONSTRUCTION AND GENETIC STUDIES OF LIFE HISTORY TRAITS IN THE ATLANTIC CROAKER**

Friday, February 22

FRIDAY MORNING
Cochran 231

9:00 DEVELOPMENT OF A DYNAMIC DIGITAL ELEVATION MODEL FOR THE COASTAL SHELF REGIONS
9:15 PRELIMINARY FINDINGS ON THE DEVELOPMENT AND DESTRUCTION OF PHYSICAL STRATIFICATION IN THE MISSISSIPPI SOUND AND BIGHT: A DRIVER OF HYPOXIA
9:30 DETERMINING A CORRELATION BETWEEN SEA LEVEL ANOMALY AND CHLOROPHYLL-A IN THE GULF OF MEXICO
9:45 USING AUTONOMOUS UNDERSEA VEHICLES IN SUPPORT OF OIL SPILL RESEARCH IN THE GULF OF MEXICO
10:00 PARTICLE FLUX AND REDISTRIBUTION NEAR THE MACONDO WELL IN THE GULF OF MEXICO

10:15 BREAK

10:45 SYNERGISTIC INTERACTIONS AMONG SALT MARSH BACTERIA IN THE DEGRADATION OF LIGNOCELLULOSE SYNERGISTIC INTERACTIONS AMONG SALT MARSH BACTERIA IN THE DEGRADATION OF LIGNOCELLULOSE
11:00 PERSISTENCE OF ENTEROCOCCI IN COASTAL WATERS
11:15 ANALYSIS OF NITROGEN SPECIES IN RAIN AND STORMWATER ALONG THE MISSISSIPPI GULF COAST USING A LANDSCAPE APPROACH

11:30 LUNCH

FRIDAY AFTERNOON
Cochran 231

1:00 RAPID DETERMINATION OF METHANE AND CARBON DIOXIDE CONCENTRATIONS IN SEAWATER
1:15 EFFECTS OF SELECTIVE GRAZING BY MICROZOOPLANKTON ON PHYTOPLANKTON COMPOSITION IN THE BAY OF ST. LOUIS

1:30 A SURVEY OF FISH PARASITES COLLECTED FROM LOCATIONS IN THE MISSISSIPPI SOUND

1:45 DIVISIONAL MEETING

MATHEMATICS, COMPUTER SCIENCE AND STATISTICS

Thursday, February 21

THURSDAY EVENING
POSTER SESSION (Following Dodgen Lecture 6:00-8:00 pm)

1. **APPLYING COMMON CORE STANDARDS IN GRADES 4TH-10TH USING LEGO ROBOTICS**
2. **ANALYSIS OF BREAST CANCER CELLS USING PARALLEL PROGRAMMING MODEL**
3. **UTILIZING ARCGIS IN EDUCATION TO MAP A GLACIER AND ITS CHANGES OVER TIME**
4. **ACQUISTION OF RIGHT OF WAY IN MISSISSIPPI: IN-HOUSE VS. CONSULTANTS**

Friday, February 22, 2013

FRIDAY MORNING
Cochran 226

8:30 WELCOME
8:35 BIFURCATION ANALYSIS OF A FINANCIAL SYSTEM WITH DELAYED CONTROL
8:50 IS A SCIENTIFIC IDEA OF HOPE POSSIBLE? HOW DOES IT RELATE TO THE MATHEMATICS OF PROBABILITY?
9:05 OPTIMIZING SATELLITE-BASED MARINE DEBRIS DETECTION
9:20 GRAPHICAL 2D WEBPAGE
9:35 ATTACK TREES FOR THREAT/RISK ANALYSIS OF SOFTWARE SECURITY

10:00 BREAK

10:15 REMOTE LABS: A DISTANCE EDUCATION CHALLENGE
10:30 WORKSHOP: INCORPORATING ASPECTS OF SYSTEMS AND SOFTWARE SECURITY IN SOFTWARE ENGINEERING PROJECTS

11:40 DIVISION BUSINESS MEETING

12:00 LUNCH BREAK

FRIDAY AFTERNOON
Room 226

1:20 ELIMINATING HIDDEN TERMINAL PROBLEM IN COGNITIVE NETWORKS USING CLOUD - A SIMULATION BASED APPROACH
1:35 ROLE OF NANOCOMPUTING IN WIRELESS COMMUNICATIONS
1:50 CALCULUS ANIMATIONS
2:10 USING EXCEL IN HIGHER EDUCATION EFFICIENTLY AND EFFECTIVELY

PHYSICS AND ENGINEERING

Thursday, February 21

THURSDAY MORNING
Cochran 231

9:00 IMPORTANCE OF HIGGS BOSON-GOD PARTICLE DISCOVERY
9:15 FINDING THE PARTIAL WAVE COMPONENTS OF TENSOR INTERACTION IN MOMENTUM SPACE
9:30 GRAVITY WITHIN THE STANDARD MODEL
9:45 FINDING THE LIMITATIONS OF AN EXPANDED EQUIVALENT FLUID APPROXIMATION FOR SIMULATING ACOUSTIC INTERACTIONS WITH THE OCEAN BOTTOM
10:00 MODELING THE HORIZONTAL PROPAGATION OF SOUND FROM AN AIRGUN ARRAY IN THE OCEAN

10:15 BREAK

10:30 LEADING E1 AND M1 CONTRIBUTIONS TO RADIATIVE NEUTRON CAPTURE ON LITHIUM-7
10:45 DIGITAL HOLOGRAPHY OF AEROSOL PARTICLES DUE TO BACKSCATTERED LIGHT

11:00 BUSINESS MEETING

THURSDAY AFTERNOON
Cochran 231

1:00 INVITED TALK: FLIGHT MECHANICS AND PUTATIVE AUDIO RECORDINGS OF THE IVORY-BILLED WOODPECKER (*CAMPEPHILUS PRINCIPALIS*)
2:00 GLUCOSE SENSING BY EVANESCENT FIELD-FIBER LOOP RINGDOWN TECHNIQUE
2:15 WATER MONITORING IN CONCRETE AND GROUT STRUCTURE BY USING FIBER LOOP RINGDOWN TECHNIQUE
2:30 MEASUREMENT OF ATMOSPHERIC WATER VAPOR CONCENTRATION USING NEAR-INFRARED CEAS (CAVITY ENHANCED ABSORPTION SPECTROSCOPY)
2:45 ELECTROCHEMICAL DETERMINATION OF AERODYNAMIC PERFORMANCE OF ASTHMA DRUG PARTICLES GENERATED BY METERED DOSE INHALERS

3:00 BREAK

3:15 RELATION BETWEEN VIBRATIONAL MODES AND BONDING ENVIRONMENT OF HYDROGEN ATOMS IN ANPRPHOUS SILICON:A FIRST-PRINCIPLES STUDY
3:30 BUILDING AND DESIGNING AN ROV; BRIGDING THE ACADEMIC AND CAREER TECHNICAL DIVIDE
3:45 BUILDING AN UNDERWATER ROV FOR INTERNATIONAL COMPETITION
4:00 SIMPLE APPROACH TO THE DYNAMICS OF BUBBLE MOTION

THURSDAY EVENING
Ballroom III (Third Floor)

6:00 Dodgen Reception and Poster Session

1. **PARTICLE ASSISTED SOLAR CONCENTRATION**
2. **QUALITATIVE ANALYSIS OF RADIOISOTOPES IN WATER AND SLUDGE SAMPLES COLLECTED FROM WATER TREATMENT FACILITY**
3. **RADIOACTIVITY STUDIES ON LOCALLY RAISED CHICKEN AND CHICKEN FEED**
4. **RADIOMETRIC ANALYSIS OF MILK SAMPLES COLLECTED FROM DAIRY FARMS LOCATED IN THE VICINITY OF A NUCLEAR POWER PLANT**
5. **RADIOLOGICAL EVALUATION OF WATER, SEDIMENT, AND FISH SAMPLES COLLECTED FROM ALCORN STATE UNIVERSITY RESEARCH POND**
6. **EVALUATION OF NATURAL RADIOACTIVITY LEVELS IN BRICKS COLLECTED FROM A LOCAL BRICK MANUFACTURING FACILITY**

PSYCHOLOGY AND SOCIAL SCIENCES

Thursday, February 21

THURSDAY MORNING
218A
ORAL PRESENTATIONS
9:45 WELCOME
10:00 WHAT IT MEANS TO KNOW: A HISTORICAL LOOK AT EXPECTATIONS FOR LEARNING IN MATHEMATICS EDUCATION
10:15 FROM PREACHING TO PRACTICE: CAN STUDENTS USE INFORMATION FROM CLASSES?
10:30 EFFECTS OF FORAGING ENRICHMENT STRATEGIES ON FOOD INTAKE IN BUSHBABIES
10:45 BREAK

11:00 THE ROLE OF FEEDING STRATEGIES IN DOMINANCE HIERARCHIES
11:15 CONSISTENCY BETWEEN CARETAKER RATINGS AND BEHAVIORAL MEASURES OF PERSONALITY IN BUSHBABIES
11:30 EFFECTS OF SOCIAL REJECTION ON SUBSEQUENT GROUP MEMBERSHIP

11:45 LUNCH

FREE TIME TO VISIST CAMPUS

THURSDAY AFTERNOON

2:45 DIVISIONAL BUSINESS MEETING

THURSDAY EVENING

DIVISION POSTER PRESENTATIONS
Following Dodgen Lecture (6:00-8:00 PM)

1. **UNDERSTANDING THE LINK BETWEEN REWARD AND OBESITY**
2. **THE EFFECTS OF MUSIC ON WORKING MEMORY**
3. **MULTITASKING AND MEMORY: DOES DIVIDED ATTENTION DECREASE A STUDENT'S ABILITY TO REMEMBER MATERIAL?**
4. **THE EFFECTS THAT COLOR AND FREQUENCY IN THE CONTEXT OF A TV ADVERTISEMENT HAVE ON MEASURES OF LIKABILITY AND MEMORY**
5. **CATEGORIZATION AND THE FALSE MEMORY EFFECT: A TEST OF WORD RECOGNITION**
6. **THE RELATIONSHIP OF COLLEGE READINESS AND WORK READINESS IN HIGH SCHOOL STUDENTS**
7. **IMPACT OF MUSIC ON ANXIETY, DEPRESSION, AND BLOOD PRESSURE IN AFRICAN AMERICANS**
8. **MEDITATION DOES AFFECT BLOOD PRESSURE, HEART RATE, AND COGNITION IN A MINORITY SAMPLE**
9. **THE ROLE OF PERSONALITY ON ALCOHOL USE AND RISKY SEXUAL BEHAVIOR AMONG AFRICAN AMERICAN COLLEGE STUDNETS**
10. **THE EFFECTS OF PARENTAL ATTACHMENT ON ADOLESCEBT"S AGGRESSION**

Friday, February 22

FRIDAY MORNING
Room 218A
ORAL PRESENTATIONS

9:00 WELCOME
9:15 RISING CONSCIOUSNESS: TRACING MAN'S JOURNEY THROUGH CAVE ART
9:30 RELATIONSHIP BETWEEN ANXIETY, WORKING MEMORY, AND MATH PERFORMANCE
9:45 EFFECTS OF LOCUS OF CONTROL AND PERCEIVED PARENTAL ACCEPTANCE ON PSYCHOLOGICAL MALADJUSTMENT OF BANGLADESHI STUDENTS
10:00 BREAK
10:15 PERCEIVED PARENTAL ACCEPTANCE, SELF-MONITORING TRAIT, AND PSYCHOLOGICAL MALADJUSTMENT OF BANGLADESHI STUDENTS
10:30 ANALYSIS OF FEMORAL 10:30 HIV SEXUAL RISK BEHAVIORS AND BARRIERS TO HIV TESTING AMONG GAY-IDENTIFIED AND NONGAY-IDENTIFIED AFRICAN AMERICAN MEN WHO HAVE SEX WITH MEN LIVING IN JACKSON, MISSISSIPPI

10:45 BREAK

11:00 NATURAL DISASTER: EMOTIONAL REACTIONS, STRESS, AND AFTER THOUGHTS AMONG VICTIMS
11:15 GENDER SELF-ESTEEM AND GENDER DIFFERENCES IN ATTITUDES TOWARDS GAY MEN AND LESBIANS AMONG AFRICAN AMERICANS

11:30 LUNCH

FRIDAY AFTERNOON
Room 214
ORAL PRESENTATIONS
1:30 PSYCHOLOGICAL BARRIERS TO INTENTIONS TO USE AND USE OF HEALTH CARE SERVICES AMONG AFRICAN AMERICAN COLLEGE STUDENTS AT AN HISTORICALLY BLACK COLLEGE AND UNIVERSITY

1:45 THE EFFECTS OF PARENTAL ATTACHMENT ON ADOLESCENT AGGRESSION
2:00 ASSESSMENT OF HEALTH PATTERNS AT SHADY GROVE (22QU525), AN EARLY MISSISSIPPIAN SITE, USING LONG BONE DIMENSIONS

2:15 BREAK

2:30 AGGRESSION: A COMPARISON OF MALE ATHLETES AND MALE NON-ATHLETES
2:45 THE EFFECTS OF RECENT LIFE EXPERIENCES ON PRECIEVED STRESS AND HEALTH AMONG COLLEGE STUDENTS

SCIENCE EDUCATION

Thursday, February 21

THURSDAY MORNING
Cochran 214

8:15 WELCOME
8:30 ABC'S OF A HEALTHIER YOU BULLETIN BOARD
8:45 PRE/POST - HEALTHIER YOU SURVEY
9:00 THE ABC's OF HEALTHY LIVING ACTIVITY WORKBOOKS
9:15 A COMPARISON OF THE BIOMASS OF LONG LEAF PINE AND MIXED HARDWOOD FORESTS
9:30 A CONTENT ANALYSIS OF SIR DAVID ATTENBOROUGH'S BOTANY TEACHING STRATEGY
9:45 KRAKATOA ERUPTS! USING CURIOUSITY STARTER READINGS AND SENSORY PRIMING ACTIVITIES TO INITIATE STUDENT-LED INQUIRY

10:00 BREAK

10:15 TEACHER ACADEMY IN THE NATURAL SCIENCES (TANS): SUCCESSFUL TEACHER PROFESSIONAL DEVELOPMENT IN CHEMISTRY, GEOSCIENCES, AND PHYSICS
10:30 BACTERIAL *Vibrio* POLYCYCLIC AROMATIC HYDROCARBON DEGRADATION
10:45 GUIDE OF PLANTS FOUND ON SHIP ISLAND
11:00 BEACH COMBING GUIDES
11:15 LOCAL IDENTIFICATION GUIDE OF SHIP ISLAND EXPLORATION
11:30 BOOST PROGRAM-WITHDRAWN

11:30 – 1:00 LUNCH BREAK AND BUSINESS MEETING

THURSDAY AFTERNOON
Cochran 214

1:00 THE USE OF HISTORICAL EVENTS IN THE BIOLOGICAL SCIENCES TO ENHANCE STUDENT INTERESTS
1:15 COMPARISON OF THE TREATMENT OF DISEASES IN THE 1960s AND NOW
1:30 ROBOTICS EDUCATIONAL ACTIVITIES ON PEDAGOGICAL PRINCIPLES AND SYSTEMS
1:45 REVISION OF IMMS EDUCATIONAL PACKET

2:00 BREAK

2:15 THE MARY C. O'KEEFE CENTER PROJECT
2:30 HOW ANIMATION CAN STIMULATE LEARNING ENVIRONMENTS

2:45 DEVELOPMENT OF EDUCATIONAL PROGRAMS, EXHIBITS AND TOOL BOX LOANS ON MARINE LIFE
3:00 TEACHING SECOND GRADERS ABOUT THE ANIMALS OF THE PASCAGOULA RIVER WATERSHED
3:15 A BOX FULL OF TOOLS!
3:30 BREAK
3:45 INCREASING COMMUNITY INPUT AND PARTICIPATION AND LEARNING AT THE WALTER ANDERSON MUSEUM OF ART
4:00 CHEMISTRY PERFORMED BY ELEMENTARY STUDENTS
4:15 UPDATING A TUTORIAL VIDEO CONCERNING THE PARTS AND FUNCTIONS OF A MICROSCOPE
4:30 TEACHING THIRD GRADERS ABOUT THE HUMAN BODY SYSTEMS
4:45 TEACHING THE IMPORTANCE OF HAND WASHING TO CHILDREN AND FOOD PRESERVATION TO HOUSEWIVES

THURSDAY EVENING
Divisional Poster Session
Following Dodgen Lecture

1. **JAMES "JIM" FRANKS AND HIS CONTRIBUTIONS TO GULF OF MEXICO SCIENCE**
2. **PROJECT RESTORATION: REORGANIZING THE NOAA SCIENTIFIC LIBRARY**
3. **ACTIVITY TEACHINGS AND OBSERVATIONS OF UPPER ELEMENTARY CONNECTIONS STUDENTS LEARNING MEDICINE OF THE CIVIL WAR**
4. **RESEARCH OF FIFTH GRADERS' STUDIES ON CIVIL WAR INFECTIONS AND DISEASES**
5. **ESCAPE POLYMER ISLAND: DESIGNING A LEARNING BASED GAME**
6. **AN ASSESSMENT OF 6TH -12TH GRADE CLIMATE AND ENERGY STANDARDS IN THE SOUTHEAST UNITED STATES**
7. **CONSERVATION OF MOMENTUM AT BASSFIELD HIGH SCHOOL**

ZOOLOGY AND ENTOMOLOGY

Thursday, February 21

THURSDAY MORNING
Cochran 229

8:45 WELCOME
9:00 POLYCHEATE WORM TUBES FROM THE UPPER CRETACEOUS AND BASAL PALEOCENE OF THE MISSISSIPPI EMBAYMENT
9:15 PRELIMINARY STUDIES ON HELMINTH PARASIRES OF GASTROINTESTINAL TRACT OF CAT FISH (*ICTALURUS PUNCTATUS*) AND BUFFALO FISH (*ICTIOBUS CYPRINELLUS*) FROM LOWER MISSISSIPPI RIVER
9:30 ROLE OF SEX HORMONES IN THE PROGRESSION OF DIABETES & RENAL INJURY IN FEMALE T2DN RATS
9:45 ANTIOXIDANT, ANTIINFLAMMATORY AND IMMUNE-MODULATING PROPERTIES OF JOBELYN COMPOSED OF A SOUTHWESTERN NIGERIAN SORGHUM BICOLOR LEAF SHEATHS
10:00 QUANTIFICATION OF CYANOBACTERIAL BLOOMS AND CYANO-TOXINS IN FOUR LARGE MISSISSIPPI LAKES

10:15 BREAK

10:30 POLLUTION STUDIES OF THE LOWER PASCAGOULA RIVER

10:45 ANALYZING HETEROTROPHIC MICROBES IN DIRECT ECOLOGICAL COMPETITION WITH HARMFUL ALGAL BLOOMS (HABS) IN MISSISSIPPI WATER WAYS

11:00 BUSINESS MEETING

THURSDAY AFTERNOON
Divisional Poster Session
1:00-3:00

1 THE TOXICITY OF FLUOMETURON ON THE DEVELPOMENT OF THE JAPANESE MEDAKA (*ORYZIAS LATIPES)*
2. DETECTION AND QUANTIFICATION OF HARMFUL CYANOBACTERIAL BLOOMS IN LAKE GRENADA, MISSISSIPPI, USING FIELD AND SATELLITE DATA
3. THE EFFECTS OF A SUBLETHAL DOSE OF BOTULINUM SEROTYPE E ON THE SWIMMING PERFORMANCE OF CHANNEL (*ICTALURUS PUNCTATUS*) FINGERLINGS
4. QUANTIFYING THE CONCENTRATION OF HARMFUL ALGAL BLOOMS (HABs) IN LAKE ENID, MISSISSIPPI, USA
5. DETECTION AND QUANTIFICATION OF HARMFUL ALGAL BLOOMS IN LAKE SARDIS, MISSISSIPPI, USA
6. DETECTION AND QUANTIFICATION OF HARMFUL ALGAL BLOOMS (HABs) IN THE ROSS BARNETT RESERVOIR, JACKSON, MISSISSIPPI, USA.
7. ASSESSMENT OF DNA QUANTIFICATION METHODS: COST, ACCURACY, AND SPEED

Agriculture and Plant Science

Chair: **Dr. William Kingery**, Mississippi State University
Vice Chair: Dr. Bill Evans, Mississippi Agricultural and

February 21, 2013

THURSDAY MORNING
COCHRAN 210

9:00 Welcome

O1.01
9:15 ENHANCING TOMATO (*LUCOPERSICON ESCULENTUM*), PRODUCTION AND UTILIZATION IN SOUTHWEST MISSISSIPPI

Q. Thomas, C. Campbell, J. Jackson, A. Burks, A. Cuadra, and P. Igbokwe, Department of Agriculture, Alcorn State University, Alcorn State, Mississippi 39096

Abstract: A field study was used to determine the effect of four spray frequencies of "Response 9-9-7" liquid fertilizer on "Roma" tomato yield potential and quality. The study was conducted on Memphis silt loam (Typic Hapludalfs fine silty, mixed, thermic) soil at the Alcorn State University Experiment Station, in southwest Mississippi. A randomized complete block (RCB) experiment design, with four replications of each spray frequency (0, 7, 14, 21, or 28 days) was used in this study. Similarly, a laboratory "Taste" test was used to determine the quality (appearance, texture, and flavor) of developed tomato paste from each spray frequency (treatment). All data were analyzed by the analysis of variance (ANOVA) and means separated by the Least significant difference (LSD) test procedure. Plant growth was not influenced by spray frequency except for root dry matter content. Marketable tomatoes generally increased with decrease in spray frequency. The quality of processed tomatoes (Tomato Paste) was similar in appearance and flavor, but better in texture compared to commercially available product.
KEYWORDS: Lycopersicon esculentum, Response 9-9-7, spray frequencies, Tomato Paste.

O1.02
9:30 : SUSTAINABLE MEDICINAL PLANT *(TANACETUM PARTHENUM)* PRODUCTION AND UTILIZATION IN MISSISSIPPI.

R. Williams, lll., C. Campbell, J. Jackson, A. Burks, Z. Cuadra, and P. Igbokwe, Department of Agriculture, Alcorn State University, Alcorn State, MS 39096

Abstract: Two field experiments were used to investigate the impact of organic mulching materials (Pine Bark Nuggets) and two synthetic mulching materials ("Black Plastic" and "Weed Barrier") on purple nutsedge (Cyperus rotundus) control in field-grown feverfew (*Tanacetum parthenum*). The medicinal impact of harvested foliage was also investigated. A randomize complete black (RCB) experiment design, with five replications of each treatment and control was used in this study. All data were analyzed by the analysis of variance (ANOVA) and means were separated by the Least Significant Difference (LSD) test procedure. Purple nutsedge control was perfect (100%) due to "Black Plastic" mulch application during the first study period, but was perfect (100%) for both "Black Plastic" and "Weed Barrier" during the second study period. Values for both soil extractable nutrients and leaf mineral compositions were generally increased after the second study period.
KEYWORDS: Mulching, purple nutsedge, feverfew and medicinal plants.

O1.03
9:45 COMPARISONS OF ELECTRONIC AND VISUAL RATINGS OF DETACHED STRAWBERRY LEAVES INOCULATED WITH TWO *COLLETOTRICHUM* SPECIES

Melinda Miller-Butler[1], Kenneth Curry[1], Brian Kreiser[1], Barbara Smith[2]
[1]University of Southern Mississippi, Department of Biological Sciences, USA, [2]USDA-ARS Thad Cochran Southern Horticultural Laboratory, USA

Inoculation of detached strawberry leaves with *Colletotrichum* species may provide a rapid and accurate method for identifying anthracnose resistant germplasm. The purpose of this study was to compare electronic and visual rating methods of screening for anthracnose resistance. Eight to 17 detached leaves of each of 21 strawberry clones (8 named "Cultivars" and 13 "MSUS" breeding clones)

were inoculated with two *Colletotrichum fragariae*isolates and one *C. gloeosporioides* isolate. Anthracnose disease symptoms were analyzed quantitatively via computer based image analysis and qualitatively by two independent visual raters using a 0-5 rating scale (0=no disease, 5=lesion covering entire leaf). The "Cultivar" group had an average lesion area of 14% and an average disease score of 1.7 which were significantly higher than those of the "MSUS" group, which had an average lesion area of 6% and average disease score of 1.0. The higher values of the "Cultivar" group confirmed that as a group these clones were more susceptible to anthracnose than the "MSUS" group. A strong positive correlation was found between percent lesion area as determined by computer analysis and the visual disease scores of the two raters. Image analysis provided a precise measurement of percent lesion area of infected leaves while visual assessment provided rapid results.

O1.04
10:00 USE OF CASEIN HYDROLYZATE AND TEA EXTRACTS IN THERMIZED WHEY-BASED EDIBLE COATING SOLUTIONS TO REDUCE OXIDATIVE DEGRADATIONS OF CUBED BEEF STEAK

Dipaloke Mukherjee, Zahur Haque, Sam Chang
Mississippi State University, USA

We investigated the antioxidative efficacy of thermized cheddar whey-based edible coatings containing casein hydrolyzate (CH) or tea extracts to reduce oxidative degradation of cubed beef steak. The cubing process increases surface area and markedly escalates intramyocellular lipids oxidation during retail related exposure. Tea extracts were prepared by steeping 1, 2, and 5g of Chinese Oolong tea leaves in 100 mL of McIlvaine's iso-ionic buffer for 3 minutes at 85°C. Cheddar whey powder (5%, w/v), CH (0.25%), calcium chloride (0.125%), sorbitol (2.5%), carboxymethyl cellulose (0.25%) and glucomannan (0.25%) were dissolved in McIlvaine's iso-ionic buffer (pH 7.0) for preparing the coating solution. Cubed beef steak samples (5g each) were coated with, (1) only tea extracts, and with the coating solution, (2) with added CH, or, (3) one of the three tea extracts. Degree of protein oxidation was studied by measuring the carbonyl contents of the samples at 1, 3, 5, 7 and 10 days of storage. Results indicated that treating the samples with both the coating solution and tea extract at the 3g level was most effective in reducing oxidative degradation at higher storage times of 5, 7 and 10 days. The average carbonyl contents of the samples so treated were $8.37X10^{-4}$, $9.38\ X10^{-4}$ and $8.71\ X10^{-4}$ µmol/g, respectively. These were significantly less than for all other treatments. Data indicate potential for use of natural and healthy tea extracts to extend retail shelf-life of beef steaks by protecting against oxidative degradation.

O1.05
10:15 COMPARATIVE EVALUATION OF THE GROWTH RESPONSE AND HEAVY METAL PHYTOEXTRACTION OF TWO PLANT SPECIES GROWN IN LEAD- AND CADMIUM-CONTAMINATED SOIL

Maria Begonia, Natalie Anderson, LeoAlexander Harris, Yasmin Partee, Terry Wilborn, Gloria Miller, Gregorio Begonia
Jackson State University, USA

The toxic heavy metal (HM) contamination of soils poses a major environmental and health risks. These HM-contaminated soils need to be remediated using an economical and environmentally safe technology such as the use of plants (phytoextraction) and microorganisms. It has been reported that microorganisms can mobilize some metals in soil and can enhance the phytoextraction of HM in roots of non accumulator plants. This study was conducted to evaluate the growth response and HM phytoextraction of two plant species (*Festuca arundinacea* (tall fescue) and *Aestivum sativum* (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, dry biomass and metal concentrations in root and shoot tissues were quantified. Our results revealed that the root and shoot dry biomass of both tall 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. 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 soil can enhance the HM accumulation in plants.

O1.06
10:30 BREAKING *VALLISNERIA* SEED DORMANCY WITH GIBBERELLIC ACID

Connor White[1], Kauth Philip[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; The National Aeronautic and Space Administration, , USA, [2]the Gulf Coast Research Laboratory, USA

Many reports indicate that seeds of *Vallisneria sp*. germinate quickly and in high percentages. Troubles occurred while trying to germinate these seeds. Dormancy may have been an issue with these seeds, so the Intern's research involved attempts to break this dormancy. He used Gibberellic acid (GA), which is a phytohormone that influences flower development, fruit development, and shoot elongation, to try and break the dormancy and promote germination. The student soaked the seeds in different concentrations of GA for 48 hours. Then, the seeds were incubated for six weeks. After the six week period, the Intern calculated which concentration of GA promoted seed germination the best if at all.

10:45 BREAK

O1.07
11:00 EFFECTS OF PRELAY *MYCOPLASMA GALLISEPTICUM* VACCINES IN CONJUNCTION WITH AN F-STRAIN *M. GALLISEPTICUM*CHALLENGE OVERLAY ON THE REPRODUCTIVE AND DIGESTIVE ORGAN CHARACTERISTICS OF COMMERCIAL LAYERS

Roy Jacob[1], Scott Branton[2], E. David Peebles[1]
[1]Mississippi State University, USA, [2]2USDA/ARS Poultry Research Unit, USA

The effects of prelay vaccinations of ts-11 strain *Mycoplasma gallisepticum* (**ts11MG**), MG-Bacterin, or their combination, when overlaid with F strain MG (**FMG**) during post-peak production, on the digestive and reproductive organ characteristics of commercial layers were investigated. A total of 160 White Leghorn layer hens were used. In each of 16 isolation units, 10 birds were housed, with 4 replicate units in each of 4 treatments. The following treatments were utilized at 10 wk of age (**woa**): 1) Control (no vaccinations); 2) ts11MG (Mycoplasma Gallisepticum Vaccine®); 3) MG-Bacterin (MG-Bac®); and 4) ts11MG/MG-Bacterin combination. At 45 woa, the birds in 2 replicate units in each of the treatment groups were challenged with FMG, thus increasing the number of the treatments to 8. Necropsies were performed at the end of the trial (58 woa), using 4 birds per replicate pen (8 birds per treatment). Parameters examined included BW; liver, ovary, oviduct and small intestine weights; ovarian follicular hierarchy; and the lengths and weights of the components of the oviduct and small intestine. Results indicated that liver weight relative to body weight was significantly lower in control birds that received an FMG overlay. Small intestine weight, specifically jejunal weight relative to body weight, was also significantly decreased only in control birds irrespective of FMG inoculation. In conclusion, the individual or combinatorial use of ts11MG vaccine and MG-Bacterin, when administered prelay, may be effective in preventing possible adverse effects on the reproductive and digestive organs in layers in response to a FMG infection.

O1.08
11:15 DEVELOPING REMOTE SENSING METHODS TO ESTIMATE SHORT VEGETATION BIOPHYSICAL VARIABLES

Yongqin Zhang[1], Anne Smith[2]
[1]Delta State University, USA, [2]Agriculture and Agri-Food Canada, Canada

Remote sensing provides capability to estimate vegetation variables and spatially extrapolate traditional ground-based measurements. In this study, we investigated remote sensing methods for estimating vegetation ground cover and biomass. The study sites were set up on short vegetation communities composed of mixed grasses, forbs and soil types. Field measurements were conducted at each site to estimate soil background cover, green and senescent vegetation fraction and biomass using traditional ground survey and digital photography methods. Hyperspectral CHRIS/Proba and multispectral Landsat TM5 images were analyzed to derive various spectral indices for estimating faction of ground cover and vegetation biomass. Digital photography covered a larger ground area compared to field-based direct measurements and provided good estimates of soil background (r2 =0.80 and RMSE=8.7%), green vegetation (r2 =0.82 and RMSE=5.4%) and senescent vegetation (r2 =0.59 and RMSE=8.2%). Combining ground measurements and satellite images, ground and vegetation cover can be

estimated at an accuracy of R2 from 0.71 to 0.79, RMSE from 3.34% to 6.08% by the Normalized Difference Vegetation Index (NDVI), Modified Transformed Vegetation Indexes 1 and 2 (MTVI1, MTVI2), and Normalized Difference Senescent Vegetation Index. The green biomass was found closely related to NDVI, MTVI1 and MTVI2 with R2 in a range of 0.68 to 0.79, which offered the capability of estimating biomass of short vegetation at reasonable accuracy.

POSTER SESSION
Authors should be available with their posters to answer questions 1:30-2:30 PM

P1.01
THE EFFECTS OF ACIDIFICATION AND CHELATING AGENTS ON THE BIOAVAILABILITY, UPTAKE AND TRANSLOCATION OF LEAD BY SESBANIA EXALTATA

Natalie Anderson, Terry Wilborn, Yasmin Partee, LeoAlexander Harris, Gloria Miller, Maria Begonia, Gregorio Begonia
Jackson State University, USA

Phytoextraction is a cost-effective and environmentally phytoremediation alternative for reducing toxic metal levels from contaminated soils. We hypothesized that the efficacy of phytoextraction can be increased through chelate amendments. The objective of this experiment was to determine whether the addition of ethylenediaminetetraacetic acid [EDTA] alone or in combination with acetic acid [HAc] can enhance the phytoextraction of lead [Pb] by *Sesbania exaltata Raf.* (coffeeweed). Seeds were planted in plastic tubes containing top soil and peat [2:1, v:v] spiked with various levels [0, 1000, 2000 mg Pb/kg dry soil] of lead nitrate. At seven weeks after emergence, aqueous solutions [0, 1000 mg/kg] of EDTA and HAc were applied to the root zone. Plants were harvested at 6 days after chelate addition to coincide with the duration of maximum metal availability as determined from a corollary chelate-induced Pb solubility study. Results showed that coffeeweed was relatively tolerant to moderate levels of Pb and chelates as shown by very slight reductions in root and no discernible effects on shoot biomass. Root Pb concentrations increased with increasing levels of soil-applied Pb. Increases in root Pb concentrations were attributed to chelate amendments. The partitioning of the metal to the shoots was significantly enhanced with chelate addition especially when both EDTA and HAc were used. This study demonstrated that depending on the Pb-contaminated soil type used, chelates can be added when phytoextractive plants have attained maximum biomass, then harvested less than a week later in order to improve phytoextraction efficacy.

P1.02
CHELATE-MEDIATED CHANGES IN METAL SOLUBILITY AFFECT THE PHYTOEXTRACTION OF CADMIUM BY TRITICUM AESTIVUM

Yasmin Partee, LeoAlexander Harris, Natalie Anderson, Terry Wilborn, Gloria Miller, Maria Begonia, Gregorio Begonia
Jackson State University, USA

The use of plants had been gaining acceptance as a phytoremediation strategy for reducing toxic metal levels from contaminated soils. We hypothesized that the addition of synthetic chelates can increase the amount of bioavailable metal for root uptake, thereby improving the efficacy of phytoextraction. This study was conducted to determine whether the addition of synthetic chelates can enhance the root uptake and subsequent translocation of cadmium (Cd) to the shoots. Wheat (*Triticum aestivum* L. cv TAM-109) seeds were planted in plastic tubes containing topsoil and peat (2:1, v:v) spiked with various levels (0, 250, 500 mg Cd/kg dry soil) of cadmium nitrate. At eight weeks after emergence, aqueous solutions (0, 250, 500 mg/kg dry soil) of [ethylenebis(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 wheat was relatively tolerant to treatment combinations of Cd and chelates as shown by non-significant differences in root and shoot biomass among Cd/chelate-treated plants. Enhancements in root Cd uptake were attributed to chelate amendments especially at the highest Cd treatments. However, partitioning of the metal to the shoots was not significantly enhanced with chelate addition. 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 the growth stage when the plants have attained maximum biomass.

P1.03
ASSESSMENT OF IN-SEASON AGRICULTURAL CROP GROWTH USING FIELD AND AIRBORNE REMOTE SENSING MEASUREMENTS

Jason Weick[1], Yanbo Huang[2], Yongqin Zhang[1]

1 Division of Biological and Physical Sciences, Delta State University, Cleveland, MS, 38766;

2 USDA Agricultural Research Services, Stoneville, MS, 38776;

Monitoring crop growth during growing season is critical to identification of potential stress and yield estimation. In this study we have investigated remote sensing methods to determine crop growth. The study sites were set up in cotton, soybean, and bare soil field plots located in the experimental farms of USDA Agricultural Research Services at Stoneville, Mississippi. Digital photographs and field hyperspectral data were collected at random points in each plot in June and July 2012. Airborne remote sensing images were acquired using a Geospatial Systems' MS-4100 multispectral camera over the study area near the same time window of field measurements. The ground data were analyzed to quantify ground cover and spectral reflectance of crops and soil. The remotely sensed images were processed to derive the vegetation indices, Normalized Difference Vegetation Index (NDVI), Soil-Adjusted Vegetation Index (SAVI) and Perpendicular Vegetation Index (PVI). The capability of the three indices in determining crop growth was assessed by combining the field measurements. It has been found that the PVI was the best in determination of growth for mature crop

P1.04
PHENOLIC AND ANTHOCYANIN COMPOUND CONCENTRATIONS IN BLUEBERRY (VACCINIUM CORYMBOSUM) CULTIVARS

Ashten Rea and Dr. Donna A. Marshall
USDA ARS Thad Cochran Agricultural Center in Poplarville, MS

Phenolic and anthocyanin overall compound concentrations were analyzed in 18 blueberry cultivars and 2 blueberry selections from Poplarville, MS. The selections were to compare with phenolic and anthocyanin concentrations of 2 corresponding blueberry selections from Crystal Springs, MS, in 2008 and 2010. Analysis was carried out on blueberry juice partitions extracted from the blueberry fruit skin, seeds and pulp. The major phenolics in the extracted juice were identified by their characteristic spectra. Quantification was made by calibration curves of external standards for both the phenolics and anthocyanin. Total anthocyanins were observed in all varieties with values up to 37.65 mg/100 g in 'Yadkin' and 35.77 mg/100 g in 'Montgomery'. Total phenolics valued up to 218.8 mg/100 g in 'Yadkin' and 206.5 mg/100 g in 'Maru'. The concentrations of anthocyanin and phenolic compounds presented overall had higher values in the 2008 selections versus the 2010 selections. Blueberries have special interest due to their high antioxidant capacity. Research shows that phenolic components within blueberries may have multiple health benefits, while the anthocyanins may have health benefits that are independent of or in addition to the blueberry's antioxidant effects.

3:00 DIVISIONAL BUSINESS MEETING

CELLULAR, MOLECULAR AND DEVELOPMENTAL BIOLOGY

Chair: Dr. Anthony J. Bell Jr.,
University of Southern Mississippi
Vice-Chair: Dr. Ghanshyam Heda
Mississippi University for Women

THURSDAY MORNING
COCHRAN 218B

Environmental Science, Microbiological Science, and Infectious Disease

O2.01
8:30 CIONING AND EXPRESSION OF THE *cbbO* GENE FROM *Halothiobacillus neapolitanus*

Bustin, Avijit Biswas, Gordon Cannon, Sabine Heinhorst
The University of Southern Mississippi, USA

Ribulose-1,5-bisphosphate Carboxylase/Oxygenase (RubisCO) is the CO_2 fixing enzyme of autotrophic organisms. The enzyme is the most abundant protein on Earth, probably because its catalytic performance is rather poor. Many autotrophic bacteria tightly pack RubisCO molecules within the interior of polyhedral

protein microcompartments, termed carboxysomes. Co-sequestration of the enzyme with a carbonic anhydrase produces large amounts of the RubisCO substrate, CO_2. The surrounding protein shell prevents rapid escape of the gas, thereby enhancing the catalytic efficiency of RubisCO and allowing the bacteria to thrive in ambient CO_2 levels. The carboxysome proteins of the sulfur oxidizing bacterium *Halothiobacillus neapolitanus* are encoded by the *cso*operon; a recently discovered gene in a downstream operon was found to encode an additional shell protein. The *cbbO* gene in that operon is predicted to encode a potential RubisCO activase that may influence the activity of RubisCO in the carboxysome. To determine whether the CbbO protein functions as an activase, its gene was over-expressed in *E. coli* to generate sufficient amounts of soluble recombinant protein for biochemical analyses and for the generation of polyclonal antibodies. Recombinant CbbO protein, which has a hexa-histidine affinity tag that is encoded on the pETDUET-1 expression vector, was purified by affinity chromatography, quantified and analyzed using SDS PAGE. The protein is being used in interaction studies with RubisCO and with CbbQ, another potential RubisCO activase.

O2.02

8: ANALYSIS OF TWO MUTATIONS THAT AFFECT THE EXPRESSION OF *ICSA* AND THE SURFACE DISTRIBUTION OF ICSA IN*SHIGELLA FLEXNERI*.

Cassidy Shadinger, Tamica Patton, Ashley Hayes, Diana Milan, Lauren Brandon
MUW, USA

Shigella spp. are obligate intracellular pathogens and causative agents of shigellosis that causes an estimated 1.1 million deaths worldwide per annum. The pathogenesis of *Shigella* involves the invasion of colonic epithelial cells. The *Shigella* outer membrane protein, IcsA is essential to *Shigella* pathogenesis in that this is the sole bacterial protein required for the recruitment of actin filaments. IcsA is unique in that it is targeted and restricted to the old pole of the bacterium. The asymmetrical distribution of IcsA is directly correlated with directional movement of*Shigella* within colonic epithelial cells and its efficient dissemination to uninfected cells. We have isolated two polar transposon generated mutations that demonstrate a marked reduction in alkaline phosphatase activity suggesting that these mutants are defective in expression, unipolar targeting and/or secretion of IcsA. Two genes *genI* and*genQ* have been displaced with the *natA* gene *in vitro* and introduced into *Shigella flexneri*. The mutant corresponding to *genI* has been subjected to surface labeling experiments using antibodies to IcsA; we demonstrate that IcsA is associated with each bacterium in a circumferential fashion compared to the wild type strain. The mutant corresponding to *genQ* has been subjected to q-RT RT pcr; we demonstrate that the mutation in *genQ* significantly reduces the expression of *icsA* on a transcriptional level compared to the wild type strain.

O2.03

GENETIC REGULATION OF VANCOMYCIN RESISTANCE IN *STAPHYLOCOCCUS AUREUS*

Dhritiman Samanta, Mohamed Elasri
The University of Southern Mississippi, USA

The glycopeptide antibiotic vancomycin has been to treat Methicillin Resistant *Staphylococcus aureus* (MRSA) infections. However vancomycin intermediate *Staphylococcus aureus* (VISA) have been isolated. Vancomycin resistance in Enterococci is regulated by *van* genes. But some strains of Staphylococci show significant resistance to this antibiotic despite the absence of *van* genes. Thicker cell wall and low carboxypeptidase activity have been shown to be correlated with vancomycin resistance. Additionally, penicillin binding protein 4 has been reported to be downregulated in clinical VISA isolates and is linked to the low degree of crosslinking in peptidoglycan. We previously described the gene *msa* as a regulator of virulence and biofilm in *S. aureus*. In this study, we analyze the role of *msa* in regulating vancomycin resistance of hospital-associated *S. aureus* strain Mu50. Deletion of *msa*open reading frame resulted in significant increase in vancomycin susceptibility of Mu50. Transcription profile of*pbp4* in *msa* knock out mutants revealed that *pbp4* is up-regulated in mutants relative to wild type. Furthermore, the cell wall thickness and degree of crosslinking in the peptidoglycan will be analyzed under transmission electron microscopy and Reverse phase HPLC respectively. This study will lead to further insights into the mechanisms of vancomycin resistance and will ultimately allow us to develop novel therapies against recalcitrant staph infections.

O2.04

THE *MSA* GENE REGULATES IMMUNE EVASION AND PERSISTENCE IN *STAPHYLOCOCCUS AUREUS*.

Maria D.S. Basco[1], Lindsay Shaw[2], Mohamed O. Elasri[1]
[1]University of Southern Mississippi, USA, [2]University of Southern Florida, USA

S. aureus is one of the main causes of sepsis usually associated with hospital-associated strains. However, there is growing change in the epidemiology of staphylococcal infections where sepsis is caused by community-associated methicillin resistant (CA-MRSA) strains. Sepsis caused by CA-MRSA shows more resistance to immunological clearance than the hospital acquired ones. In this study, we investigated the role of *msa* in immunological clearance using a sepsis model. The two strains of S. aureus tested were hospital-associated UAMS-1 and the CA-MRSA USA300 LAC strain. Animal model results of the *msa* mutant in the UAMS-1 showed the *msa* mutant to be vulnerable to immunological clearance (LAC is currently being tested). Blood survival assay and phagocytosis assay have shown that *msa* is required to survive in the blood by evasion of the immune system, and possibly lead to dissemination of the infection. We also, investigated the arsenal of immune evading factors (e.g. *clfA*, *sak*, *scin*, and *aur*) employed by *S. aureus* that are under the control of msa to elucidate the regulation of immune evasion in *S. aureus*. Each of these factors play specific roles of evasion at the various stages of phagocytosis namely, chemotaxis, opsonization, and phagocytosis. Thus, *msa* has been observed to play a vital role in regulating immune evasion by *S. aureus*. Additionally, it was also observed that this regulation of evasion is strain dependant.

O2.05

INVESTIGATING TRNA CHANNELING BY AMINOACYL-TRNA SYNTHETASES AND ELONGATION FACTOR TU

Crystal Serrano, Anthony Bell Jr.
University of Southern Mississippi, USA

Translation refers to the cellular events that occur as the genetic information encoded in DNA is "translated" into proteins. Aminoacyl-tRNA synthetase (AARSs) and Elongation Factor Tu (EF-Tu) are enzymes that play critical roles in the early to intermediate stages of translation that ensure proteins are synthesized correctly. AARSs are responsible for *i)* activating and *ii)* charging amino acids onto transfer ribonucleic acids (tRNA). These two steps are the most stringent phases of translation. EF-Tu is responsible for protecting/transporting the aminoacylated tRNAs (aa-tRNA) from AARSs to the ribosome to undergo peptide elongation. The majority of investigations have focused on tRNA charging and aa-tRNA transport (via EF-Tu) as a step-wise process. More specifically, the majority of experimental investigations focus on tRNA charging as an AARS dependent process and aa-tRNA transport as EF-Tu dependent process. There is growing support that these processes (tRNA charging and aa-tRNA transport) occur not in a step-wise manner but as a synergistic interplay among AARS, aa-tRNAs and EF-Tu. This interplay is also referred to as "tRNA-channeling". Our short-term goals focus on investigating the overall trends of tRNA channeling via kinetic and thermodynamic tRNA charging assays. These assays will be used to determine if tRNA channeling is affected by the gross structure of AARSs (i.e. do Class I AARSs "channel" differently than Class II AARS?). Next the finer details of the channeling mechanism will be investigated to determine if this phenomena can be used as means to generate large amounts of nonstandard (i.e. unnatural) aa-tRNAs.

10:00-10:15 Coffee Break

O2.06

10:15 IMPACT OF CALCIUM SIGNALING ON OCCIDIOFUNGIN ACTIVITY

V.A. Graham[1], D.M. Gordon[2]
[1]Mississippi University for Women, USA, [2]Mississippi State University, USA

Occidiofungin is cyclic glycol-lipopeptide isolate from Burkholderia contaminans MS14. Occidiofungin has fungicidal properties and is stable against a variety for extreme conditions. The biological target of this antifungal is unknown. Recent data has shown that occidiofungin triggers activation of the cell wall integrity pathway, suggesting that the antifungal may cause cell membrane stress. In fungi, membrane stressor has been shown to induce an intracellular calcium signaling cascade, upregulating genes involved in various cellular processes. Interestingly, the bioactivity of azole antifungals have been shown to be modulated by extracellular calcium levels. Given that occidiofungin exposure also induces a cell membrane stress response, we investigated the

impact of calcium signaling on occidiofungin bioactivity. To this end, we determined the minimum inhibitory concentration (MIC) of a wild type strain of Saccharomyces cerevisiae grown in YPD, and YPD supplemented with CaCl2 or the Ca2+ chelator, EGTA. After 24 hours, the MIC for cells grown in YPD was 0.125 µg/mL. In the presence of CaCl2, cells had a two-fold higher MIC value while in the presence of EGTA, cells dephosphorylation of the transcription factor Crz1p. To determine whether calcium mediated resistance to occidiofungin was though Crz1p, we performed MIC assays on a Δcrz1 deletion mutant. MIC values were identical to wild type, suggesting that the calcium response to occidiofungin may be though a different cellular pathway. The importance of calcineurin and its componenets in the resistance to occidiofungin are currently under investigation.

O2.07
10:30 MSA NEGATIVELY REGULATES AUTOLYSIS IN STAPHYLOCOCCUS AUREUS

Gyan S. Sahukhal, Mohamed O. Elasri
University of Southern Mississippi, USA

Staphylococcus aureus is an important human pathogen that produces biofilm during infections. A key component of biofim in S. aureus is extracellular DNA, which is produced by autolysis of a subpopulation of cells. S. aureus produces several murein hydrolases that contribute to synthesis, degradation, and maturation of its cell wall. These enzymes also mediate autolysis during biofilm formation. Expression and activity of murein hydrolases are tightly controlled to prevent premature or excessive autolysis. In this study, we show that msa negatively regulates autolysis in a glucose dependent fashion. We also showed that msa uses a mechanism that is independent of cid and lrg pathways. These findings suggest that the role of the msa gene in autolysis regulation may be responsible for the biofilm defect observed in the msa mutant. These findings also provide a novel regulatory mechanism for autolysis in S. aureus.

O2.08
10:45 AN INSIGHT INTO THE MICROBIOME OF TICKS INFESTING MIGRATING SONGBIRDS

Nabanita Mukherjee, Shahid Karim
The University of Southern Mississippi, USA

Birds are capable of carrying ticks and tick-transmitted microorganisms over great distances and geographical barriers such as oceans and deserts. Ticks are hosts for several Spotted Fever Group Rickettsia (SFGR), which can be transmitted to vertebrates during blood meal. In this study, the prevalence of SFGR was examined in ticks infesting migratory songbirds using PCR. Ticks collected from migratory songbirds at Johnson's Bayou, Louisiana were identified by comparing their 12S rDNA gene sequences to homologous sequences in GenBank. This method identified *Amblyomma longirostre*, *A. nodosum*, *A. calcaratum*, *A. maculatum*, and *Haemaphysalis* species, originating from Central or South America. The nucleotide sequence similarity of *ompA* PCR products revealed several exotic SFGR. *R. amblyommii*, a causative agent of rickettsiosis, was quantified by amplifying the *ompB*gene using a qPCR assay. 454-based pyrosequencing method was used to get an insight into the diversity of the bacterial biota associated with distinct life stages of exotic ticks. Taxonomical composition in ticks identified the Proteobacter phyla (which include *Rickettsia*) is found in abundance, followed by Firmicutes, Actinobacteria, and Bacteroidetes phyla with a total of 112 identified genera and 142 species. A total of 67 genera and 103 species were detected in birds. 454-based pyrosequencing revealed the presence of SFGR (*Rickettsia rickettsii*, *R. conorii*,*R. australis*, and *R. sibrica*) in ticks and rickettsial species (*R. montanensis*, and *R. riphicephali*) in birds. Our results indicate that exotic ticks arriving attached to migrating songbirds may play an important epidemiological role in importing previously unknown pathogenic bacteria to North America.

O2.09
11:00 TICK CYSTATINS: FRIEND OR FOE OF RICKETTSIA PARKERI

Khem Raj B.C., Shahid Karim
The University of Southern Mississippi, USA

Amblyomma maculatum, the Gulf coast tick, is a recognized vector of Rickettsia parkeri, the causative agent of a disease similar to, but a milder-form of Rocky Mountain spotted fever in humans. Cystatins have previously been shown to inhibit inflammation, facilitating pathogen transmission. The sialotranscriptome of Amblyomma maculatum identified 25 Cystatins including 15 coding sequencing containing secretory signal peptides. We hypothesized that Cystatins (cysteine protease inhibitors) facilitate the transmission of Rickettsia parkeri, an intracellular rickettsia, vectored by A.

maculatum. In this study, questing A. maculatum ticks were collected from the Sandhill Crane National Wildlife Refuge, Gautier, Mississippi, using the drag-cloth method. The collected ticks were blood fed for three and five day on sheep according to an approved IACUC protocol. A. maculatum salivary glands from unfed, day 2, and day 5 blood-fed ticks were checked for Rickettsia parkeri infection by qPCR. The differential expression of 15 putative secretory cystatin genes was determined by qRT-PCR.

O2.10
11:15 THE ROLE OF *MSA* IN THE REGULATORY NETWORK OF *STAPHYLOCOCCUS AUREUS* VIRULENCE

Matthew Arnold, Maria Basco, Mohamed Elasri
The University of Southern Mississippi, USA

Staphylococcus aureus is the causative agent of numerous nosocomial and community acquired infections. In the expression of its plethora of virulence factors *S. aureus* has developed an intricate regulatory network. Our lab has discovered a global regulator *msa* (modulator of *sarA*) and have characterized its widespread effects on the expression of virulence factors and other important regulators. The goal of this study is to identify what effects*msa* mediates on virulence gene regulation through and independently of *sarA*. Total proteolytic activity between wild-type, Δ*msa*, *sarA*-, and Δ*msa*/*sarA*- was determined using azocasein substrate. Initial comparison of proteolytic activity between strains suggests *msa* might have a *sarA*-independent effect on proteases. Other phenotypic assays such as hemolysis, lipase activity and binding assays for several host proteins are being conducted along with biofilm assays. These assays we hope will help elucidate the complex regulatory network involving *msa*, *sarA* and virulence.

11:30 Business Meeting/Lunch

Thursday Afternoon
COCHRAN 218B

O2.11
1:15 TICK CORAZONIN: STORY OF A MULTI-FUNCTIONAL NEUROPEPTIDE

Deepak Kumar, Shahid Karim
University Of Southern Mississippi, USA

Tick blood feeding is the major link between pathogen transmission and the vector's own saliva secretions. Vital processes directly related to blood feeding are the immune-modulation of host immune system and digested blood bolus. Saliva protein secretion is tightly regulated in ticks and recent work identified Corazonin neuropeptide that may be involved in regulation of protein secretion in Drosophila. The function of Corazonin has not yet been elucidated in ticks. Female tick is an excellent model for understanding the regulation of salivary secretion. We characterized tick Corazonin transcript expression in unfed and blood fed females by qRT-PCR and immunolocalization.

O2.12
1:15 ANALYZING THE FUNCTION OF THE MOLD-SPECIFIC GENE *M46*, IN THE DIMORPHIC FUNGUS *HISTOPLASMA CAPSULATUM*

Davida Crossley, Glen Shearer
The University of Southern Mississippi

Histoplasma capsulatum is the cause of the respiratory disease histoplasmosis. The dimorphic fungus grows in the soil as a multi cellular mold. Once the soil is disturbed, spores are released and are inhaled into the lungs. For pathogenesis it is a requirement that yeast convert to mold. To understand the molecular basis of dimorphism, we have isolated several mold-specific and yeast-specific genes. The subject of this study is the mold –specific *M46* gene. The function of M46 is unknown. According to Genbank, there is an *M46* homolog in three fungi. However the function of M46 in these organisms is also unknown. Northern blot analysis has shown that *M46* is expressed in G186AS and Downs strains, but is transcriptionally silent in G184AS and G217B strains. The reason for lack of transcription in the latter strains may imply that M46 is not involved in dimorphism. Localization analysis in which *M46* was fused to the reporter- Green Fluorescent Protein (GFP) on C- and –N- terminus regions, indicates that M46 is localized to the cytoplasm. Localization to the cytoplasm does not give a clear indication of the function of M46. Recently, an *M46* knockout has been constructed. This obvious knock out has shown to have no effect on the yeast phase morphology or growth rate when compared to the morphology and growth rate of wild type. Future work will consist of analyzing the *M46* knockout morphology and rate of growth in the mold morphotype and compare to wild type.

O2.13

1:30 AMSNARES ROLE IN *AMBLYOMMA MACULATUM* FEEDING AND PATHOGEN TRANSMISSION

Rebecca Browning, Khem Raj B.C., Steven Adamson, Shahid Karim
University of Southern Mississippi, USA

Rickettsia parkeri, one of the causes of Spotted Fever Group Rickettsiosis, is carried by the Gulf Coast Tick (GCT),*Amblyomma maculatum*. Pathogen transmission is thought to occur through a transcytotic mechanism in which the pathogen utilizes the protein machinery involved in vesicle docking. Tick salivary gland exocytosis processes appear to be essential to tick feeding success and may be important for pathogen trafficking. Our work to date has demonstrated the role of highly conserved vesicle and plasma membrane-bound protein receptors (SNAREs) in regulating protein secretions in tick salivary gland cells. NSF participates in the disassembly of the SNARE complex. Gene expression of NSF and SNAP -25 follows a cyclic regulation pattern with up and down regulation of the transcript during each of the three feeding phase. RNA interference demonstrates that NSF and SNAP-25 play an important role in prolonged tick feeding, since engorged tick weight was lower than control ticks. In this study, we used next generation sequencing to investigate differential gene expression of AmSNAREs in *A. maculatum* infected with *R. parkeri*.

O2.14

1:45 LARGE FATTY ACID-DERIVED OLIGOMERS (LFAOS): THE NEW SYNTHETIC AB PRIONS

Amit Kumar, Vijayaraghavan Rangachari
University of Southern Mississippi, USA

Aggregates of amyloid-β (Aβ) peptides have been implicated in the etiology of Alzheimer's disease (AD). Among the different forms of Aβ aggregates, low-molecular weight (LMW) ones ranging between ~2 and 50mers, also called 'soluble oligomers,' have emerged to be the species responsible for early synaptic dysfunction and neuronal loss. Emerging evidence suggests that the neurotoxic oligomers need not be formed along the obligatory nucleation-dependant fibril formation 'on-pathway'. Previously, we have reported the isolation of one such 'off-pathway' 12-18mer species of Aβ42 generated from fatty acids, called LFAOs (large fatty acid-derived oligomers) (Kum*ar et a*l. 2011, *PLoS one*). We have now characterized and studied the physiochemical properties of these LFAOs using biophysical techniques like size exclusion chromatography (SEC), dynamic light scattering (DLS), atomic force microscopy (AFM) & analytical ultracentrifugation (AUC). We have discovered that LFAOs are a propagating strain of oligomers that recruit Aβ42 monomers and quantitatively convert them into LFAO assemblies at the expense of fibrils. This mechanism of LFAOs replication is very similar to 'template-assisted corruptive' replication mechanism of prion protein self-propagation. Recently, we have also observed that these LFAOs are toxic to human SH-SY5Y cells, with their toxicity comparable to ADDLs (well characterized and toxic *in vitro* Aβ oligomer). Together this data presents a novel, *in vitro* 'Aβ Prions', characterization of which may reveal new insight into AD pathogenesis

THURSDAY EVENING

DIVISION POSTER SESSION (6:00-8:00 pm)

P2.01

MAPPING AND IDENTIFICATION OF A GENETIC MUTATION THAT CAUSES CATARACTS

Zaliya Morris[1], Ashley Johnson[1], Johnathan Lee[1], Ashlyn Harmon[1], Xuexiang Wang[1], Elise Gomez-Sanchez[2], Michael Garrett[1]
[1]*Department of Pharmacology, University of Mississippi Medical Center, USA,* [2]*GV(sonny) Montgomery VAMC, USA*

Cataracts are a major cause of blindness. The most common forms of cataracts are age and UV- related and develops mostly in the elderly, while congenital cataracts appear at birth or in early childhood. The Dahl salt-sensitive (SS/Jr) rat is an extensively used model of salt-sensitive hypertension. In the mid 1980's, cataracts appeared in a few animals in the Dahl S colony, presumably the result of a spontaneous mutation. The mutation was fixed and bred to establish the SS/Jrcat substrain. The SS/Jrcat substrain has been exclusively used by a single investigator to study the role of steroids and hypertension. Using a classical genetic analysis approach, we localized the cataract gene with high-resolution to a less than 1 Mbp region on chromosome 9 using an F_1[SS/Jrcat X Spontaneous hypertensive rat (SHR)] X SHR] segregating population. The 1 Mbp region was found to contain only 13 genes, including 4 genes from the γ-crystallin (*Cryg-b,-c,-d,-e)* gene family. Mutations in the many of the γ-crystallins are known to play a role in cataract formation in both humans and rodent

models. All of the γ-crystallins were sequenced and a novel point mutation in the start codon (ATGàGTG) of the *Crygd* gene was identified which led to the complete absence of CRYGD protein and the likely cause of cataracts in the SS/Jrcat strain. In summary, the identification of the genetic cause in this novel cataract model may provide an opportunity to better under the development of cataracts, particularly in the context of hypertension.

P2.02

EVALUATING THE INTERACTIONS BETWEEN AMINOACYL-tRNA SYNTHETASES AND ELONGATION FACTOR TU IN PROTEIN SYNTHESIS

Elizabeth Coker, Anthony Bell
University of Southern Mississippi, USA

The purpose of this research is to establish a binding affinity profile of aminoacyl-tRNA synthetase (AARS) to toward their cognate tRNAs. To date, there is not a complete set of binding data for all 20 AARSs and their cognate tRNAs. This information can provide tremendous details to investigate the aminoacylation (i.e. tRNA charging) characteristics of AARS. Data will be collected using an electrophoretic mobility shift assays (EMSAs) to establish K_D values of AARS toward tRNAs. The binding affinity will be compared with tRNA charging levels of AARS and EF-Tu to determine if AARS binding affinity has a measurable effect on tRNA charging. This information will be used to predict the ability of AARS and EF-Tu to charge unnatural amino acids. The long-term goal of this project is to identify unnatural amino acid substrates that are compatible with recombinant cell-free synthesis.

P2.03

MUTATIONS IN THE *nhaB* GENE SIGNIFICANTLY REDUCE THE EXPRESSION OF *icsA* ON A TRANSCRIPTIONAL LEVEL IN *SHIGELLA FLEXNERI* IN A pH DEPENDANT MANNER, CONSTITUTIVE MUTATIONS IN THE *cpxA/R* GENES ARE EPISTATIC TO THE *nhaB* MUTATION.

Erika Harmon-Pratte, Lauren Brandon
MUW, USA

Produced from the virulence plasmid, IcsA is a virulence protein responsible for directional intracellular swimming and subsequent intercellular dissemination of *Shigella* spp. in colonic epithelial cells. The expression of *icsA*, like many virulence factors, is modulated by chromosome-encoded proteins that sense when environmental conditions are appropriate for the expression of virulence factors. We have shown that mutations in the *nhaB* gene, which encodes a sodium/proton antiporter responsible for pH homeostasis, significantly reduce the expression of *icsA* at the transcriptional level and that the expression of the *virF* gene is significantly reduced in these backgrounds. Constitutive mutations in *cpxA* that cause the CpxA protein to be active under repressing conditions are epistatic to the *nhaB* mutation in that *icsA* and *virF* expression is restored in strains harboring both mutations. We propose that optimum pH homeostasis as mediated by NhaB assumes an important role in the ability of the CpxA sensor kinase to respond to changes in pH and to ultimately activate the expression of the *virF* gene whose gene product ultimately activates the expression of *icsA*. An independent lab has demonstrated that the presence of two chemical agents inhibit the function of the NhaB protein. We were interested in determining whether these same chemical agents would reduce the expression of *icsA* in *Shigella*. To this end we grew *Shigella* in the presence of these agents and have identified via qRT-RT pcr one chemical that significantly reduces *icsA* expression. Such chemical may be employed as a chemotherapeutic agent for the treatment of shigellosis.

P2.04

EVOLUTION OF THE MAMMALIAN CSH/GH CLUSTER

Carole Johnson[2], Federico Hoffmann[1]
[1]Mississippi State University, USA, [2]Northwestern State University of Louisiana, USA

The human Chorionic Somatomammotropin Hormone 1 and 2 (CSH1, CSH2), Chorionic Somatomammotropin Hormone-like 1 (CSHL1), and Growth Hormone 1 and 2 (GH1, GH2) are a group of closely related genes involved with the regulation of metabolic processes associated with growth. CSH1, CSH2 and CSHL1 are preferentially expressed in the placenta, whereas GH1 and GH2 play a key role throughout development. GH1 and GH2 promotes cartilage growth in children, stimulates production of insulin like growth factors, and carries out various metabolic functions in adults including increasing calcium retention, promoting the lysis of fat cells, and reducing the liver uptake of glucose. These genes are located in close proximity to each

other, organized in a cluster known as the CSH/GH cluster. Most mammals possess a single gene in this cluster, whereas this gene family has expanded in primates, particularly in humans, which have 5 genes in the cluster. The purpose of this project is to use the tools of bioinformatics and comparative genomics to better understand this expansion.

P2.05

EXPRESSION OF THE GLOBAL REGULATOR MSA PROTEIN FROM *STAPHYLOCOCCUS AUREUS*

Justin Batte, Dhritiman Samanta, Mohamed Elasri
The University of Southern Mississippi, USA

Staphylococcus aureus is an important human pathogen that causes hospital and community associated infections and has been a challenge to treatment. We have previously characterized the *msa* gene as regulator of virulence and biofilm formation. In this study, we express the Msa protein by fusing it with the *E. coli* Maltose Binding Protein (MBP). We amplified *msa* open reading frame from *S. aureus* USA300LAC and directionally cloned into pMAL-C5X (New England Biolabs). This vector expresses *malE* gene (MBP) without its signal peptide. Possible clones were sequenced with vector specific primers in both directions. *E. coli* colonies with positive clones were cultured and subjected to Western Blotting. Blot was probed with anti-MBP antiserum. Prospective bands for the fusion product will be analyzed by Mass Spectrometry. Crude Cell extract from large scale culture was subjected to purification by affinity chromatography. Expression of Msa will allow us to study its localization in the cell and its interaction with DNA or other proteins.

P2.06

STUDY OF THE FUNCTION OF THE MOLD SPECIFIC GENE, MS95, IN THE PATHOGENIC DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM

Erin Smith, Danielle Williamson, Davida Crossley, Glen Shearer
University of Southern Mississippi, USA

Histoplasma capsulatum (Hc) is a dimorphic multicellular fungus that causes the respiratory infection histoplasmosis. *Hc* exists as a mold at 25°C in the soil, but shifts to the unicellular yeast form when inhaled into the host's lungs at 37°C. This phase shift is required for pathogenesis, which can be simulated in the lab by growing the organism as yeast in an incubator at 37°C and then shifting it to mold at 25°C. Our lab's goal is to isolate genes involved in dimorphism. The *Saccharomyces cerevisiae* gene, *DDR48,* is known to function in DNA repair. According to NCBI genbank, there is a DDR48 homolog in *Hc*. A northern blot of *MS95* in four major *Hc* strains revealed its up-regulation in the mold phase and down-regulation in the yeast phase. Therefore, we hypothesize that this gene may play a role in dimorphism. To test this hypothesis, we have over expressed *MS95* in yeast phase temperature by fusing a constitutive *Tef1* promoter in frame to the *MS95* open reading frame. Over expression of *MS95* was confirmed by northern blot analysis. Cells grown in liquid and solid media at 37°C and observed for any detectable morphological change did not produce any filamentous growth, indicating that *MS95*may not be involved in dimorphism. To further investigate its role in *Hc*, an *MS95* knockout is being grown and monitored in various concentrations of 4NQO and H_2O_2 to stress the organism and determine if either of these stressors hinder the organism's growth or shift to mold.

P2.07

MSA* REGULATES PROCESSING OF MUREIN HYDROLASES IN *STAPHYLOCOCCUS AUREUS

Reem Dawoud, Gyan Sahukhal, Mohamed Elasri
University of Southern Mississippi, USA

Staphylococcus aureus is an important human pathogen that causes a variety of infections. During infection, S. aureus produces biofilm on native tissue surfaces and on implants. Biofilm development is a complex process that includes programmed cell death (autolysis) of a subset of the population within the biofilm. One consequence of autolysis is the production of extracellular DNA which plays a critical role in the structure of biofilm. Autolysis is mediated by murein hydrolases which degrade the cell wall. Regulation of the expression and processing of murein hydrolases is important to develop a mature biofilm. In this study, we show that the msa gene negatively regulates autolysis by controlling the processing but not the expression of murein hydrolases.

P2.08

ALTERED NODE OF RANVIER ORGANIZATION IN INTERHEMISPHERIC AXONS AFTER BRIEF POSTNATAL CITALOPRAM EXPOSURE IN ADULT RATS

Ryan Clark[1], Loai Alzghoul[2], Ryan Darling[2], Nidhi Khatri[2], Melissa Lea[1], Kimberly Simpson[2], Ian Paul[2], Rick C.S. Lin[2]
[1]Millsapss College, USA, [2]University of Mississippi Medical Center, USA

Our laboratory found that early-life disruption of brain serotonin (5HT) levels via postnatal exposure to selective serotonin reuptake inhibitors such as citalopram (CTM) has dramatic effects on neural circuitry when measured in adults. We have noted morphological changes of oligodendrocytes within the anterior commissure (AC) and corpus callosum (CC) and abnormal myelin formation around these interhemispheric axons. Therefore, the aim of this study was to investigate the integrity of the nodes of Ranvier as the functional component of saltatory conduction within myelinated axons. Male Long Evans hooded rats were exposed (IP) to either saline or CTM (20 mg/Kg/day) from PN8-21. Upon reaching adulthood (PN>90), they were sacrificed for histological procedures. Tissues were processed immunohistochemically with anti-contactin associated protein (Caspr) antibody to allow for paranodal visualization and with anti-SCN2A to visualize voltage-gated Na+ channels within nodes. The ultrastructural integrity of the nodes were further evaluated using electron microscopy (EM). Our data highlight a distortion of nodal formation after brief postnatal 5HT dysregulation. Specifically, Caspr and SCN2A staining revealed density changes and abnormal symmetrical spacing of nodes within axons of CTM exposed rats. At the EM level, abnormalities in the dimensions of nodes were also noted. These results demonstrate that early-life manipulation of 5HT levels affects cortical axonal network wiring and proper node of Ranvier formation at the ultrastructure level. These data provide strong support for the hypothesis that early-life 5HT dysregulation may be the underlying pathophysiology of neurodevelopmental disorders that are present with interhemispheric communication deficits such as Autism Spectrum Disorders.

P2.09

ASSESSING POTENTIAL ANTIMICROBIAL PROPERTIES OF HISTONES AND DNA-BINDING PROTEINS

Kimberly Hoang, Anthony J. Bell Jr.
University of Southern Mississippi, USA

Our research goal is to evaluate the antimicrobial properties of histones and other DNA-binding proteins, specifically HMGB-1. In recent studies, histones H1 and H2 were found in mucosal surfaces such as: the tongue, intestines, and trachea of humans. These histones were shown to exhibit antimicrobial properties against bacteria, which could indicate their potential importance in innate antimicrobial defense. From our research, ultimately, we would examine HMGB-1 by using histones H1, H2A, H2B, H3.1, H3.2, H3.3, and H4 as controls. Evaluation of histones and other DNA-binding proteins will be accomplished through trypsin digestion and SDS-PAGE. Trypsin is a serine protease commonly used in digestion assays. Trypsin digestions were used to cleave histones and other DNA-binding proteins into smaller fragments with varying incubation times. The expected fragments are approximately between 0.3 to 25 kD. SDS-PAGE was used to analyze the efficiency of the peptide fragment formation. SYPRO Ruby was used to stain the SDS-PAGE due its high sensitivity. A benefit of SYPRO Ruby is that it does not covalently bond with the proteins. Therefore, the proteins can be removed from the gels and used for later applications. We currently are evaluating different conditions to run electrophoresis, such as: gel percentages and run time. Due to the limitations of electrophoresis when evaluating small fragment sizes, we are looking at other methods to analyze our fragments. Our future research will use MALDI-TOF as another method to evaluate fragment size and sequence, and kill-curve assays will be performed using the fragments to analyze antimicrobial properties.

P2.10

MODIFIED INFLUENZA VIRUS FOR USE IN TRANSGENIC THERAPIES

Graeme Campbell[2], Stephen Stray[1]
[1]University of Mississippi Medical Center, USA, [2]Murrah High School, USA

The object of this study is to create through PCR amplification and mutagenesis expression plasmids containing modified Influenza A hemagglutinin (HA) and Nonstructural Segment (NS) genes. These modified plasmids will be used in the viral rescue of a novel influenza A virus. The HA gene is modified via PCR amplification which should create a segment encoding a "headless" HA protein. Headless HA diminishes influenza's ability to bind and infect normal human cells. The NS gene is modified via

mutagenesis to prevent expression of the NS-1 protein. Lack of NS-1 in influenza viruses has previously shown to reduce influenza infection of normal cells. The plasmids are first modified by either PCR or mutagenesis reactions and then grown up in *E. coli* cultures. Promising cultures are sequenced. Thus far potential candidates have been selected in both modification groups and are currently undergoing off site DNA sequencing to verify that the modifications were successful. (Research Supported by the Howard Hughes Medical Institute)

P2.11

METHANOL INFLUENCES IMMUNOBLOTTING OF HIGH AND LOW MOLECULAR WEIGHT PROTEINS

Ariel Finch, Deanna Watson, Ghanshyam Heda
Mississippi University for Women, USA

The sensitivity of protein detection in immunoblotting in part is dependent on the efficiency of proteins transfer from SDS-PAGE to solid surface membranes. Alcohols and SDS in transfer buffer plays an important role in separating proteins complexed with SDS and allowing them to bind to membrane. We hypothesize that alcohol and SDS concentrations in transfer buffer determines the efficacy of protein transfer and sensitivity of western blots. In this study we aimed to first determine a suitable methanol concentration in transfer buffer and its subsequent impact on improving the sensitivity of western blots. We have used CFTR (MW 170 kDa) as a marker of high molecular weight (HMW) protein and Rab11 (MW 25 kDa) as a marker of low molecular weight (LMW) proteins. Crude cell lysates from pig kidney epithelial cells (LL-CPK_1) were electrophoresed on a SDS-PAGE and transferred to nitrocellulose membrane in the presence of 5% or 20% methanol. Following transfer membrane was excised at ~90 kDa mark. Upper portion consisting of HMW proteins was immunoblotted with anti-CFTFR antibody, whereas the lower portion consisting of LMW proteins was immunoblotted with anti-Rab11 antibody. A relatively stronger CFTR signal was obtained when gel was transferred with 5% methanol. On the other hand Rab11 signal was stronger when 20% methanol was used in the transfer buffer. These findings will be useful in detection of proteins that are expressed at low levels such as endogenous CFTFR expression in CFPAC and Capan-1 cells. A mutated CFTR is responsible for the genetic disease cystic fibrosis.

P2.12

EVALUATION OF THE SUSPECTED ROLE OF HIGH MOBILITY GROUP PROTEIN B (HMGB1) IN APOPTOSIS.

Jalisa Keyes, Anthony J. Bell Jr.
University of Southern Mississippi, USA

High mobility group box one (HMGB1) is an abundant chromatin associated protein that medicates transcription by “loosening” or remodeling chromatin. During remodeling, the DNA regions of chromatin are exposed to facilitate the binding of transcription factors such as nuclear factor-kB (NF-kB) and homeobox gene (HoxD9). More recently, HMGB1 has been confirmed to function extracellularly as well. In its alternate capacity, HMGB1 binds to immune receptors such as RAGE1 and TLR2,4 to promote leukocyte recruitment and amplify cytokine production. These investigations suggest that HMGB1 may be involved with additional cellular reactions. Several new studies indicate that HMGB1 binds to the surface of apoptotic cells to reduce the clearance of dead/dying cells. The proper clearance of apoptotic cells is critical because the presence of residual apoptotic cells may initiate harmful autoimmune responses. More specifically, these new reports indicate that HMGB1 binds the cell surface phospholipid phosphatidylserine (PS) to effectively block the apoptotic clearance signal. As a result, large numbers of apoptotic cells undergo secondary necrosis – a process that triggers autoimmune reactions. The short-term goals of this research project are to use standard biochemical assays such as electrophoretic gel shift assays (EMSAs), circular dichroism (CD) and UV spectroscopy to determine the binding affinity (K_D) of HMGB1 toward PS. The premise of these studies are to provide biophysical characterization of HMGB1:PS interactions that can be used to support cell-based investigations.

P2.13

THE USE OF SMALL MOLECULES TO FORM STABLE FOUR-WAY JUNCTION DNA.

Ann Marie Brahan, Anthony J. Bell Jr.
University of Southern Mississippi, USA

Can a class of small molecules be used *in vitro* to form stable four-way junction DNA structures? The purpose of this research is to investigate the potential of small molecules as a method to induce the stable formation of four-way DNA junction (4WJ). 4WJs are referred to as Holliday junctions. 4WJs are most well known as intermediate structures involved in

DNA recombination and repair. The proposed recombination model is based on genetic transfer between different chromosomes making contact points via Holliday junctions. It is widely suspected that 4WJs facilitate replication. However, there is an emerging view that 4WJs may serve as ideal substrates to stall replication. If the second scenario is plausible, the controlled formation of 4WJs could offer a potential method to inhibit the replication of pre- and cancerous cells. The long term goal of this project is to use small molecules to promote the formation of 4WJs *in vitro.* Our short term research goals are focused on screening commercially available small molecules to determine their efficiency in forming 4WJs. Polyacrylamide gel electrophoresis (PAGE gels) is the method of detection to monitor junction formation. Once a successful compound has been identified, the stability of the resulting 4WJ will be investigated further using circular dichroism.

P2.14

THE USE FOUR-WAY JUNCTION DNA TO ATTENUATE INFLAMMATION.

Arik Shams, Anthony J. Bell Jr.
University of Southern Mississippi, USA

The short-term goal of this research project is to employ small molecules as a means to stabilize 4WJs composed of natural DNA and chimeric nucleic acids. The long-term goal of the project is utilizing the 4WJs as extracellular therapeutic inhibitors of DNA binding proteins [i.e. Histones and High Mobility Group Protein B (HMGB1b)]. A number of studies have shown that classical intracellular DNA-binding proteins have a variety of deleterious side-effects when present in the extracellular milieu. In order to develop a successful 4WJ therapeutic, we are focused on using modified nucleic acids to enhance the stability of the resulting 4WJ. The chimera of interest is PNA (peptide nucleic acid). PNA was selected because it is known to form DNA-PNA duplex/triplex structures with elevated thermo- and nuclease stability. 4WJs are prepared using fluorescently labeled DNA strands and a single PNA strand. Small molecules – derivatives of acridines – are currently being investigated as tools to potentially link the PNA-DNA strands to form 4WJs composed of multiple PNA strands. The junctions were visualized using polyacrylamide gels. Circular dichroism studies will be employed to characterize the structural properties of chimera of interest. Once a stable 4WJ structure is identified, the chimera was used to study binding and inhibition of HMGB1 in cell-based assays.

Friday, February 22

FRIDAY MORNING
Room 218B

O2.15

8:45 DETERMINING THE SIDEDNESS OF PROTEIN INTERACTIONS OF CsoS1A

Nickolas Whitehead, Avijit Biswas, Gordon Cannon, Sabine Heinhorst
University of Southern Mississippi, USA

Carboxysomes are protein organelles found in cyanobacteria and many chemoautotrophic bacteria. Most of the CO_2 fixation in a cell takes place within the carboxysome, which acts as a carbon concentrating device. The small pores located in the center of the protein hexamers and pentamers that make up the carboxysome shell are thought to allow bicarbonate to diffuse into the carboxysome interior, where a carbonic anhydrase rapidly converts the bicarbonate to CO_2. Because CO_2 cannot diffuse easily through the carboxysome shell, it is trapped inside and fixed by ribulose-1,5-biphosphate carboxylase/oxygenase (RuBisCO) onto ribulose 1,5-bisphosphate to yield two molecules of 3-phosphoglycerate. The main goal of the project is to express a CsoS1A protein with a mono-cysteine tag on its C-terminus. According to the crystal structure of the hexamers formed by CsoS1A, this cysteine will be located on the convex side near the center. A previously produced cysteine-tagged recombinant CsoS1A protein carries the tag on the concave side of the hexamer. These two protein variants will be immobilized on gold surfaces to probe the sidedness of their interactions with other carboxysome components by surface plasmon resonance and, ultimately, determine the sidedness of the shell protein hexamers in the carboxysome.

O2.16

9:00 DETERMINING THE ROLE OF THE NITROGEN REGULATORY PROTEIN AREA IN THE DIMORPHIC FUNGUS HISTOPLASMA CAPSULATUM

Logan Blancett, Thomas Buford, Glen Shearer
The University of Southern Mississippi, USA

Histoplasma capsulatum (Hc) is the etiological agent of histoplasmosis, a common cause of respiratory mycoses in humans. Hc is a dimorphic organism existing as a mold (M) at 25°C and once inhaled by host (37°C) undergoes a dimorphic shift to the yeast

(Y) phase. This dimorphic shift is essential for the pathogenesis of the organism within the host. It is most commonly found in the United States along the Mississippi and Ohio River Valley regions where high levels of bird and bat excrements can be found. To begin examining Hc's response under differing nitrogen sources we grew it on minimal media plates with sole nitrogen sources. We utilized phylogenetic data and BLAST analysis to locate nitrogen regulatory proteins in near neighbors and compared them to Hc. Initial findings show homologs of these regulatory proteins in Hc. Preliminary results revealed that Hc is preferentially using different nitrogen sources for the M and Y phases respectively. We hypothesize that Hc nitrogen regulation is under the control of nitrogen catabolite repression (NCR), a feature common in closely related species. AreA, a key player of NCR in closely related species, contains a homolog in Hc. We have isolated AreA from Hc to begin determining its role, if any, in nitrogen metabolism. RT-PCR and northern blot confirm that AreA is up-regulated in the yeast phase in nitrogen sufficient conditions and down-regulated in nitrogen starvation conditions. Current research is underway to look at its possible role as a key player in nitrogen regulation in Hc.

O2.17

9:15 LOW CONCENTRATIONS OF BETULINIC ACID DO NOT AFFECT SPONTANEOUS PRION FORMATION IN BAKER'S YEAST

Samantha Humphrey, Ross Whitwam
Mississippi University for Women, USA

Prions are misfolded cellular proteins that are infectious because they can induce other copies of the same protein to misfold and aggregate into amyloids. In mammals, prions are associated with neurodegenerative diseases. In humans, misfolded, amyloid-forming (but non-infectious) proteins are associated with diseases like Alzheimer's disease and Parkinson's disease. Betulinic acid is a natural product from the bark of birch trees used as a traditional medicine in some cultures. In vitro, betulinic acid speeds up the formation of the type of amyloids seen in the brains of individuals with Alzheimer's disease, which form from the aggregation of the amyloid-β peptide. The [URE3] prion of Saccharomyces cerevisiae aggregates into amyloids after prion proteins induce enough copies of the properly folded protein to misfold. We investigated whether 100 μM betulinic acid would increase the rate at which prion-free cells of S. cerevisiae spontaneously form the [URE3] prion in vivo, a process which involves both initial protein misfolding and amyloid aggregation. Prion free cultures were grown for 24 hours in the presence of 100 μM betulinic acid and plated on selective media on which only prion-containing cells can grow. The rates of spontaneous prion formation in the presence of betulinic acid were not significantly different from the controls done in the absence of betulinic acid. This suggests that either betulinic acid does not affect the rates of [URE3] amyloid formation in vivo at the concentrations used, or that betulinic acid does not enter the yeast cells at sufficient concentrations at the concentration used.

O2.18

9:30 COORDINATION IN ATPASE DOMAINS OF ENERGY-DEPENDENT PROTEIN DEGRADATION COMPLEXES

Tshering Sherpa[1], Adrian Olivares[2], Tania Baker[2]
[1]*Mississippi University for Women, USA,* [2]*Massachusetts Institute of Technology, USA*

Damaged and misfolded proteins are continuously degraded by energy-dependent intracellular-proteases. Most ATP-dependent proteases share a common architecture, being constructed from hexameric ring-shaped ATPase of the AAA+ family and a self-compartmentalized peptidase. *Escherichia coli* ClpA is the ATPase and protein unfoldase that binds and hydrolyzes ATP to power protein degradation, whereas ClpP is the peptidase. AAA+ proteases can have a single ATPase site or two ATPase sites per monomer. However, the functional consequences of the two classes are unknown. In ClpAP protease, ClpA monomers contain two ATPase domains and form a hexameric ring that binds ClpP. We are studying the functions and interaction between the two ATPase domains of ClpA during ATP hydrolysis and substrate degradation using ClpA variants deficient in ATP hydrolysis in one or both ATPase domains. The study suggests that mutation in both domains completely disrupts the ATPase activity of ClpA while mutation only in the top domain of ClpA results in an enzyme with some ATPase activity. We compared degradation of targets using different ATPase-deficient variants of ClpA. Mutation of both ClpA ATPase domains prevents degradation in the presence of ClpP. Importantly, we also found evidence of inter-subunit coordination by observing a decrease in the rate of degradation when mutant and wild type ClpA subunits are mixed in the presence of ATP. This study helps elucidate how ATPase

domains and subunits in multimeric energy-dependent proteases coordinate to properly degrade substrates and the molecular function of the two ATPase rings present in some AAA+ proteases.

9:45 – 10:15 Coffee Break

O2.19
10:15 DECODING THE CEMENT CONE: A SNAPSHOT OF GLYCINE RICH PROTEINS IN SALIVARY GLANDS

Brielle Menegazzi, Shahid Karim
University of Southern Mississippi, USA

Ticks are ectoparasites that transfer a variety of pathogens using their cement cone for prolonged attachment and increased feeding. *Amblyomma americanum* is of particular interest because it has a short mouth part (breviostrata) and an elongated cement cone that is crucial for attachment to a host. If Glycine Rich Proteins (GRPs) are present in the tick salivary glands in the initial part of the blood meal then it is possible they play a role in immunomodulation during the entirety of the blood meal; including, possibly the formation of the cement cone. Cement cones were solubilized and gel chromatography was performed along with a tryptic digestion of protein bands followed by mass spectrometry analysis. Multiple sequence alignments of expressed sequence tags were performed, bioinformatics analysis conducted, and expression was analyzed through the use of qRT-PCR. Dissections and extractions of the salivary glands took place at various points of the blood meal indicating proteins expressed that are crucial to the feeding process and expression of specific proteins. Results from an RNAi experiment will be presented with regard to a specific phenotype that has occurred as a result of the knockdown of GRPs. GRPs are an integral part of the ticks ability to blood feed successfully on a host.

O2.20
10:30 A DETERGENT COMPATIBLE PROTEIN NANO ASSAY FOR DILUTE BIOLOGICAL SAMPLES

Upasana Kunwar[1], Rajiv Heda[2], Ghanshyam Heda[1]
[1]Mississippi University for Women, USA, [2]Rhodes College, USA

There are a variety of protein assays that can measure the protein concentrations in biological samples at microgram levels. However, protein assays measuring the nanogram is a rarity. Our newly developed protein assay is rapid, reproducible, cost-effective and more importantly sensitive. Further the compatibility with a wide range of detergent makes this assay useful in a variety of biochemical applications. Protein samples of various concentrations were applied to the nitrocellulose membrane using a dot-blot apparatus and TCA precipitated. The staining of protein spots with amido black and colloidal gold produced a synergistic effect, allowing us to measure the protein concentrations as low as 10 ng/ml in dilute samples. The linearity of assay was confirmed by salt-elution of protein spots and analyzing with NanoDrop 1000 spectrophotometer at OD630, and/or by photo-scanning the stained protein spots and obtaining the pixel counts using Quantity One® analysis software. The validity of this assay was confirmed with the commonly used Biorad Protein Assay that is based on the principles of Lowry et al (1951). This newly developed protein assay will be useful in measuring protein concentration in minute biological samples prior to their biochemical analysis such as in comparative proteomics. Further, the synergistic effects of amido black and colloidal gold stains were explored in detecting protein samples as low as 12 ng/lane on nitrocellulose membrane transferred from SDS-PAGE. This additional application can be used in analyzing electrophoretic profile of dilute protein samples as well as monitoring efficiency of protein transfers in western blotting procedures.

O2.21
10:45 THE USE OF RADIOMETRIC ASSAYS TO INVESTIGATE THE STRINGENCY OF tRNA CHARGING

Douglass Iverson, Anthony J. Bell Jr.
University of Southern Mississippi, USA

The development of sensitive assays designed to examine the intricacies of protein translation is critical to gaining a more clear understanding of the enzymes and nucleic acids involved. Aminoacyl-tRNA synthetases (AARSs) are the first and most stringent of the bacterial translational machinery, followed by Elongation Factor-Tu and the ribosome. We are currently using an [αP^{32}]ATP-based assay to monitor the two initial stages of translation: amino acid activation and tRNA charging. At present, we are utilizing a radiometric assay to qualitatively examine activation of noncognate amino acids. We are also optimizing a radiometric tRNA charging

assay in order to measure the level and rate of charging of tRNAs with cognate (i.e. L-amino acids) and noncognate (i.e. misacylated or analog) substrates. These assays offer very sensitive, rapid methods to measure amino acid activation and tRNA charging. Classical charging assays do not offer a straightforward and sensitive method to measure the level and rate of aminoacylation. The kinetic data produced in this study will be used to help screen analog (i.e. unnatural) amino acid substrates. In addition, these assays may also provide practical insight toward the evolutionary origins of AARSs.

O2.22
11:10 DR-HELP - A FOCUS ON RURAL HEALTH TRAINING THROUGH THE PROFESSIONAL PORTAL PROGRAM AT THE UNIVERSITY OF MISSISSIPPI MEDICAL CENTER (UMMC)

Rob Rockhold, Steve Watson
University of Mississippi Medical Center, Jackson, MS, USA

The Delta Regional Initiative (DRI), a component of the Mississippi Institute for Improvement of Geographic Minority Health, established the Delta Region – Health Education Leadership Program (DR-HELP). DR-HELP will: (1) coordinate among and develop "best practices" promoting regional training programs to enhance preparation of students from rural and underserved populations for entry into professional health care degree programs, (2) establish a regional network that facilitates interaction among applicants to, students presently enrolled in, and graduates of rural health care training programs in the Mississippi Delta Region, and (3) create the expectation for, and training needed to establish, leadership skills in rural health care delivery. Objectives (1) and (2) have been addressed at past MAS meetings. Objective 3 engages UMMC students in the Professional Portal Program (PPP), that identifies students from rural backgrounds and orients them to rural health practice with curriculum activities and engagement in the Mississippi Rural Health Association. Participation in PPP offers a pathway to direct admission into medical or dental school at UMMC. Two PPP classes (8 female, 7 male; 8 African-American, 6 Caucasian, 1 Asian) have been supported by DR-HELP. Eighty % of prior Professional Portal graduates have been admitted to professional health training programs. DR-HELP supports recruitment of underrepresented students for entry into health training. Funded by DHHS' OMH (Prime Award Number 1 CPIMP091054-01-00). Written by RR at UMMC by a grant with UMMC's DRI. The findings, opinions and recommendations expressed therein are those of the author and not necessarily those of UMMC or DHHS.

CHEMISTRY AND CHEMICAL ENGINEERING

Chair: Wolfgang Kramer, Millsaps College
Vice-Chair: Zikri Arslan, Jackson State University

Thursday, February 21

THURSDAY MORNING
COCHRAN 216

8.15 – 8.30 OPENING REMARKS

8:30 - 10:00 AM
PLENARY SESSION I
ANALYTICAL CHEMISTRY AND APPLIED SPECTROSCOPY

Session Chair: Dr. Wolfgang Kramer

O3.01
8:30 DEVELOPMENT OF COUNTY-LEVEL TERRESTRIAL CARBON POOL IN MISSISSIPPI

Fengxiang Han[1], Jian Chen[3], SURYA DURBHA[2], NICOLAS YOUNAN[2], ROGER King[2], Yi Su[0]
[1]Jackson State University, USA, [2]Mississippi State University, USA, [3]Jiangsu Academy of Agricultural Sciences, China

Atmospheric [CO_2] has significantly increased since the Industrial Revolution, closely following the increase in CO_2emissions from the use of fossil fuels. Global warming caused by increasing greenhouse gases in the atmosphere is the major environmental challenge for the 21st century. Terrestrial ecosystems play an important role in mitigating greenhouse gases. Forest biomass and soil carbon (C) are two major means of terrestrial C storage. Currently, terrestrial C sequestration is the only cost-effective and near-term available means for decreasing greenhouse emissions. This study presents terrestrial C pools in county-level of Mississippi. Total terrestrial carbon storage in each county was strongly dependent upon its soil and forest carbon density and area. Among all counties, Jackson County in the southeast MS had the highest total

terrestrial carbon storage of 70.16 Tg C, while Attata County in middle of MS had the lowest total terrestrial C storage. In general, the county level total terrestrial C storage in the southeast MS was > those in southwest MS> Middle-south > Middle > Delta and North MS. About 28% of counties had 10-15 Tg C and 20% of counties had 15-20 Tg C, while 16% counties had 5-10 Tg C. Counties with 20-25% accounted for 7%. In total terrestrial C, soil organic carbon storage contributed for 65% (standard deviation 13.5), while forest biomass C storage accounted for 35% (standard deviation 14). This indicates the soil organic carbon storage plays very important role in sequestration of C in terrestrial ecosystems of MS.

O3.02
8:45 CADMIUM VAPOR GENERATION WITH CYANIDES COMPLEXES OF Cr(III), Ti(III) AND V(III)

Zikri Arslan, Vedat Yilmaz, LaKeysha Rose, Maria Little
Jackson State University, USA

Determination of cadmium by vapor generation atomic spectroscopy is a difficult task because of the poor efficiency, instability of Cd vapor, and interferences of transition metal ions, such as Cu, Ni and Pb. Various chelating and catalytic agents have been utilized to alleviate the interferences. However, vapor generation is still not a popular approach for determination of Cd. We have investigated the catalytic effects of various complex cyanides of Cr(III), Ti(III) and V(III) to improve generation of volatile species of Cd in acidic sample solutions. Studies were conducted to produce cyanide complexes on-line from hydroxides of the metal ions followed by reacting with acidic solution and alkaline $NaBH_4$. Experimental variables, including sample acidity, concentrations of metal ions and potassium cyanide solution, sodium borohydride solution were examined. The results indicated that cyanide complexes of Ti, V and Cr affect the efficiency of Cd vapor generation significantly. An improvement up to a factor 15-40 was achieved. The interferences from transitions metals ions including, Co, Cu, Fe, Mn, Ni, Pb and Zn were not significant at 0.5 µg/mL levels. No interferences were observed from alkali and alkaline earth elements up to 1000 µg/mL levels. The method was applied to the determination of Cd from seawater and various calcium-rich samples by ICP-MS.

O3.03
9:00 ANALYSES OF BIOMARKERS AND ORGANIC RESIDUES IN POTTERY SHERDS TO IDENTIFY CEREMONIAL USAGE

Timothy Ward, Jiyan Gu, Syed Ali, James Klugh, Laura Kebert
Millsaps College, USA

Organic residues of pottery samples were analyzed for the presence of caffeine, theobromine, and theophylline, the primary methylxanthine markers for cacao. In addition the samples were also analyzed for Ursolic acid as a specific chemical signature for the species *Ilex* (holly). A high ratio of theobromine to caffeine, the primary methylxanthine markers for cacao, is a strong indication for the presence for cacao, while the presence of Ursolic acid indicates the use of *Ilex Vomitoria*. Identifying the use of species of Ilex (holly) is important as it was believed to be used to prepare the ritually important Black Drink for Cahokia culture dating circa A.D. 1050-1250. Theobromine and caffeine extractions were performed with distilled water at elevated temperature, while Ursolic acid extractions were performed with methanol. All samples were analyzed using a Varian 325 LC/MS/MS triple quadropole mass spectrometer.

O3.04
9:15 IMPORTANCE OF METAL SPECIATION FOR COMPLETE GEOCHEMICAL CHARACTERIZATION OF NATURAL SYSTEMS

Anthony Bednar, Aimee Poda, Jennifer Seiter, Mark Chappell, Alan Kennedy
US Army Corps of Engineers, USA

The biogeochemistry of metals in natural systems is controlled by their speciation. Various redox species of many metals will have vastly different sorption and mobility properties, toxicity, and bioavailability. In many cases, remediation techniques are engineered, and most efficient, for specific forms of metal contaminants. This presentation will provide a brief overview of metal speciation techniques, inclusive of nanomaterial characterization tools, and the geochemical application of these techniques to understanding complex natural systems. Examples of arsenic and selenium species release from coal fly ash

remediation efforts, tungsten in soil and trophic transfer scenarios, and depleted uranium mineralogy will be described to demonstrate the importance of metal species determination.

O3.05
9.30 ATMOSPHERIC MERCURY SPECIES (GEM, GOM, PBM) IN NORTHERN MISSISSIPPI DURING 2011-2012

James Cizdziel[1], Yi Jiang[1], Duanjun Lu[2]
[1]University of Mississippi, United States Minor Outlying Islands, [2]Jackson State University, United States Minor Outlying Islands

Mercury (Hg) is a toxic global environmental pollutant. Anthropogenic emissions are leading to a general increase in Hg on local, regional and global scales. Long-range atmospheric transport of Hg, its transformation to more toxic compounds (e.g., methyl-Hg), and their bioaccumulation in the aquatic food chain have motivated intensive research on Hg as a pollutant. Despite years of research, significant gaps in the understanding of the biogeochemical cycling of mercury remain. In this study, gaseous elemental mercury (GEM), gaseous oxidized mercury (GOM) and particulate bound mercury (PBM) were measured on the University of Mississippi campus from July 2011 through June 2012. It is believed to be the first time that concentrations of atmospheric Hg species have been documented in the Mid-South region of the USA. Here, we report on their levels, temporal variations, and sensitivity to meteorological parameters. We include backward trajectory air mass modeling to investigate possible sources for mercury and evaluate the impact of a sudden doubling of population (start of the school year) on airborne mercury.

O3.06
9:45 COUPLING MICROCHIP ELECTROPHORESIS WITH MASS SPECTROMETRY FOR BIOASSAYS

Yiming Liu, Xiangtang Li
Jackson State University, USA

In this presentation a new microchip electrophoresis-nano-electrospray ionization-mass spectrometry (MCE-nanoESI-MS) platform is described. In the glass / polydimethylsiloxane (PDMS) hybrid microchip, an auxiliary microchannel intersecting with the MCE separation channel at an angle of 45° is integrated to transport a make-up flow (MUF) generated by a syringe pump at ~100 nL /min. The MUF has several desirable functions, including making the start of electrospray easy and ESI stable and cleaning the nanoESI emitter continuously when not spraying. The system is evaluated by separating two model compounds, i.e. tryptophan (Trp) and 3,4-dihydroxyphenylalanine (DOPA). A plate number of >10,000 (on a 2.5 cm MCE separation channel) is obtained for both tryptophan and DOPA. Detection limits (S/N =3) is estimated to be 0.12 μM for DOPA. Assay reproducibility is found to be <5% (RSD). On-line derivization of amino acids with 7-fluoro-4-nitrobenzoxadiazole (BND-F) after MCE separation is conveniently achieved on the plateform and shown to enhance MS detection. Chiral analysis of cell lysates byusing the proposed MCE-nanoESI-MS system is also demonstarted.
Acknowledgement: Support from NIH (GM089557) and partialy from a NSF grant (VHE0840450) is gratefully acknowledged.

10:00 – 10:15 AM BREAK

PLENARY SESSION - II
ORGANIC AND BIOCHEMISTRY

Session Chair: Dr. Paige Buchanan

O3.07
10:15 POLYMERIC MIMIS OF NATURALLY OCCURING ANTIMICROBIAL PEPTIDES

Sarah Morgan, Lea Paslay
University of Southern Mississippi, USA

It is well known that polyelectrolytes containing cationic functionality exhibit antimicrobial activity, however creating a polymer that shows selective toxicity towards bacterial cells over eukaryotic cells has proven to be a challenge. This research focuses on a synthetic methacrylamide based system, synthesized via controlled polymerization techniques, that mimics the structure and chemical nature of anti-microbial peptides. Utilizing aqueous RAFT polymerization, 3-(amino)propyl-methacrylamide (APMA), which mimics the cationic amino acid lysine, was statistically polymerized with 3-(dimethylamino)propyl-methacrylamide (DMAPMA) or 3-(diethylamino)propyl-methacrylamide (DEAPMA), to afford a range of polymer compositions. Bacterial and red blood cell toxicity test results demonstrate the effects of polycation structure on microbial toxicity and selectivity.

O3.08

10:30 YFDW FUNCTION IN *ESCHERICHIA COLI*

Cory Toyota
Millsaps College, USA

YfdW, a formyl-Coenzyme A (CoA) transferase, has been kinetically characterized, but its function in Escherichia coli is unknown. This enzyme has a relatively strict specificity for the substrates oxalate and formyl-CoA. DNA array data have suggested that YfdW is involved in acid tolerance response in *E. coli*. E. coli has several mechanisms for surviving low pH stress. We report that oxalic acid, a small chain organic acid (SCOA), induces a moderate acid-tolerance response (ATR) in two ways. Adaptation at pH 5.5 with 50 mM oxalate and inclusion of 25 mM oxalate in the pH 3.0 minimal challenge medium separately conferred protection: 67 ± 7% and 87 ± 17% survival after 2 hours, respectively. Combination of oxalate-adaptation and oxalate supplementation in the challenge medium resulted in increased survival over adaptation or oxalate in the challenge medium alone. Deletion mutant experiments demonstrate that YfdW is required for the adaptation effect, but not during challenge. We theorize that this oxalate ATR could enhance the pathogenesis of virulent *E. coli* consumed with oxalate-containing foods like spinach.

O3.09

10:45 PROGRESS TOWARDS THE CHEMOENZYMATIC SYNTHESIS OF ETHAMBUTOL ANALOGUES CONTAINING 3-AMINOALCOHOLS

Dale Rosado
Mississippi College, USA

Ethambutol (EMB) is a first line anti-mycobacterial drug that consists of two (S)-2-Amino-1 butanol moieties connected by an ethylene linker. The emergence of drug resistant tuberculosis strains and the degradation of vision that occurs with prolonged exposure to EMB, make EMB analogues good candidates further investigation. We have developed two synthetic routes to a variety of aminoalcohols from a common intermediate. This will allow us to study EMB analogues containing 3-aminoalcohols. To obtain the desired 3-aminoalcohhols, malonate diesters are selectively hydrolyzed to half acids by an esterase. The half esters are converted to amides through acyl chloride synthetic intermediates. The amides are then reduced to 3-aminoalchohols by treatment with $LiAlH_4$. Manipulation of the protecting group chemistry and repetition of the amidation / reduction reactions yields the enantiomer of the 3-aminoalcohol. Alternatively, reduction of malonate diesters with $LiAlH_4$ yields 1,3-diols in good yields. Lipases can selectively acylate one of the alcohol functional groups to yield an enantiomerically enriched acyl alcohol. Reaction of acyl alcohols with diphenyl phosphoroazide yields an acyl azide that can be immediately reduced to give the desired 3-amino alcohol. Manipulation of the protecting groups and repetition of the azidation and reduction chemistry results in synthesis of the enantiomer of the 3-aminoalcohol.The synthetic routes presented here offers straight-forward methods for synthesis of both enantiomers of 3-amino alcohols from which EMB analogues can be synthesized.

O3.10

11:00 B-DNA AND BEYOND: ALTERNATE DNA STRUCTURES IN GENETICS AND NANOMATERIALS

Bidisha Sengupta
Tougaloo College, USA

I-motif and quadruplex (G4) forming sequences in telomeric DNA and c-myc promoter regions of human DNA are associated with tumorogenesis. Ligands that can facilitate or stabilize the formation and increase the stabilization of these non Watson-Crick structures can prevent tumor cell proliferation and have been regarded as potential anti-cancer drugs. In the present study, steady state and time-resolved fluorescence measurements provide important structural and dynamical insights into the free and bound states of therapeutically potent plant flavonoid fisetin (3,3',4',7-tetrahydroxyflavone) and its chromophores 3-hydoxyflavone (3HF) and 7-hydroxyflavone (7HF) in a G4 DNA matrix. The excited state intra-molecular proton transfer (ESPT) of fisetin plays an important role in observing and understanding the binding of fisetin with the G4 DNA. Comparative analysis of binding in presence of EtBr proves that fisetin favors binding at the face of the G-quartet, mostly along the diagonal loop. On a different scenario, these unusual DNA structures also provide template for formation of silver nanoclusters. We have synthesized silver clusters on C-rich oligonucleotide scaffold and found a dramatic dependence of the size of the cluster on fluorescence emission. Further studies are underway.

O3.11
11:15 SYNTHETIC STUDIES TOWARD THE SYNTHESIS OF 11-DEOXYFISTULARIN-3

Ashton Hamme[1], Prasanta Das[1], Erick Ellis[1], Edward Valente[2]
[1]Jackson State University, USA, [2]University of Portland, USA

A series of natural products isolated from the sponge of *Verongida* have been intensively studied due to the presence of alkaloids with one, or more bromotyrosine residues. Many of these alkaloid metabolites show interesting bioactivity and cytotoxic properties in tumor cell lines. 11-deoxyfistularin-3 is cytotoxic against human breast carcinoma cell line MCF-7. The purpose of this project was to find a synthetic methodology that will be applied towards the total synthesis of the 11-deoxyfistularin-3 and other spirocyclic isoxazolines. Aromatic ring and ester containing nitrile oxides reacted with disubstituted geminal alkenes in a 1,3-dipolar fashion to afford the analogous 5,5-isoxazolines which were then used to construct the corresponding spiroisoxazolines through an intramolecular cyclization/methylation reaction in one reaction vessel. Due to the fact that the methylation process yields two regioisomeric spiroisoxazolines, other methods were investigated to selectively methylate one enolate oxygen over the other. Subsequent bromination of the spiroisoxazoline affords a product that is a few steps away from the natural product core. The synthesis, mechanistic details, and isolated yields for the reported spirocyclic isoxazoline compounds will be discussed.

Acknowledgments: The project described was supported by Award Numbers SC3GM094081 and G12RR13459 (NMR and Analytical CORE facilities) from the National Institute of General Medical Sciences.

O3.12
11:30 NEW INSIGHTS INTO FLAVONOL CHEMISTRY: SYNTHESIS, STRUCTURE, SPECTROSCOPY, AND METAL CHELATION

Kumudu Peiris, Benjamin Spears, Emma Hughes, Ashley Horn, Julie Lowell, James Henderson, Joshua Browning, Steven Gwaltney, William Henry
Mississippi State University, USA

While flavonols (3-hydroxy-2-phenylchromones) have been studied extensively for their antioxidant properties, few studies have focused on the effects of varying the B phenyl (2-phenyl) ring substituents on the chemistry at the 3-hydroxy-4-keto position. In the current study, flavonols with substituents at the *ortho* positions of this ring to force it out of conjugation with the chromone moiety were synthesized. To study the transmission of electronic effects, the B ring was substituted with a variety of groups at the *para* position. Intramolecular hydrogen bonding, Al^{3+} chelation, spectroscopy, and structural parameters and oxidation potentials of ruthenium complexes were investigated as a function of substitution of the B phenyl ring. In some instances dramatic changes were observed while in others very little effect was evident. Theoretical calculations assisted in the interpretation of some of the results. In addition, new methods for the synthesis of 2-aryl substituted 3-hydroxychromones were investigated. The synthetic strategy developed make it possible to prepare new compounds with a variety of aromatic compounds at the 2-position of the chromone.

11:45 – 1:00 PM ***LUNCH BREAK***

1:00- 2:30 PM

PLENARY SESSION - III
PHYSICAL CHEMISTRY AND MATERIAL SCIENCE

Session Chair: Dr. Ashton Hamme

O3.13
1:00 CURE-ON-DEMAND POLYMERIZATION VIA FRONTAL POLYMERIZATION

John Pojman
Louisiana State University, USA

The goal of cure-on-demand polymerization is to create one-pot systems that have a long shelf live but will react rapidly when curing is desired. We demonstrate that frontal polymerization can used to create a cure-on-demand putty for filling holes in wood, marble, and sheet rock. The putty has a months-to-years shelf life, is a one-pot formulation, can be applied leisurely and then cured rapidly with a flat heat source. We also demonstrate frontal polymerization can be used to create an adhesive for wood and plastic-wood composites that cures rapidly and has impressive shear strength. Finally, we will explore current efforts to commercialize 3P ArtMedium for the art market.

O3.14
1:15 AN NMR-DERIVED MODEL FOR PROTEIN-NANOPARTICLE ADSORPTION

Nicholas Fitzkee, Dongmao Zhang, Karthik Vangala, Ailin Wang
Mississippi State University, USA

Functionalized gold nanoparticles (AuNPs) have broad applications in biomedicine, including drug delivery and cancer detection. One important approach to functionalization is protein adsorption to the AuNP surface. Although many proteins are known to bind to AuNPs, the physical nature of this interaction remains poorly characterized. The stoichiometry of binding is difficult to determine, and it is unclear whether the protein is destabilized when it binds. Additionally, the reversibility of adsorption for many proteins has not been established. In this study, we investigated the physical basis of protein-AuNP binding using NMR spectroscopy. We present a rapid, cost-effective technique for quantifying protein binding to AuNPs, and we examine the binding of several small peptides and intermediate-size proteins. Our method is accurate enough to estimate the orientation of proteins on the nanoparticle surface as well as whether the protein remains folded upon adsorption. For the 56-residue GB3 protein, a lack of chemical shift perturbations and a uniform decrease in all 15N-1H TROSY peak intensities suggest very slow binding kinetics. Our results suggest that GB3 is globular when bound to AuNPs,and we are currently examining other proteins to determine whether this is a general trend.

O3.15
1:30 INTERFACIAL CURVATURE EFFECTS IN THE SELF-ASSEMBLY AND RESPONSIVENESS OF POLYPEPTIDE-BASED BLOCK AND STAR COPOLYMERS

Jacob Ray, Ashley Johnson, Greg Strange, Charles Easterling, Jack Ly, Daniel Savin
University of Southern Mississippi, USA

The self-assembly of amphiphilic block copolymers is dictated primarily by the balance between the hydrophobic core volume and the hydrophilic corona. In these studies, amphiphilic block copolymers containing poly(lysine) (PK) and poly(glutamic acid) (PE) blocks were synthesized and their solution properties studied using dynamic light scattering, circular dichroism spectroscopy and transmission electron microscopy. This talk will present some recent developments in the characterization of peptide-based triblock and star rod-coil block copolymers in solution. First, the effect of morphological changes due to secondary structure transitions will be discussed in the context of interfacial curvature changes with pH and temperature. The second part of this talk will discuss the effect of using 'click' chemistry in the synthesis of rod-coil block copolymers in terms of creating interfacial frustration to control solution morphologies. In particular, the use of thiol-alkyne 'click' reactions yield materials that behave as polymeric phospholipids through the facile creation of 3-arm star polymers. The solution properties and responsiveness of these novel materials will be discussed in terms of their ability to encapsulate and deliver cancer therapeutics.

O3.16
1:45 SYNTHESIS, CHARACTERIZATION AND CRYSTAL STRUCTURE OF TETRA-μ-LEVULINATO- κ^8 O:O'-BIS[(1,3-BENZOTHIAZOLE-κN)COPPER(II)] AND TETRA-μ-LEVULINATO- κ^8 O:O'-BIS[(2-AMINO-1,3-BENZOTHIAZOLE-κN)COPPER(II)]

Ramaiyer Venkatraman[0], Samuel S.R. Dasary[0], Zikri Arslan[0], Alvin M. Holder[0], Frank R. Fronczek[0]
[1]Jackson State University, USA,[2]University of Southern Mississippi, USA,[3]Louisiana State University, USA

Structural studies of copper (II) carboxylates and their formation of adducts with nitrogen bases has been a subject of intensive study for several decades. These complexes are dimeric and form 1:1 syn-syn carboxylate bridged adducts with donor molecules. Most of these compounds exhibit common structural features irrespective of the nature of carboxylate group. In the title compounds, each Cu(II) ion is five coordinated, with a geometry of distorted square pyramidal. Four O atoms of bridging levulinate ligands construct the basal plane of the square pyramid. The base molecule is attached with copper (II) through their thiazole N atom and occupy the axial position. The four carboxylate groups act as a bridge and connect the binuclear copper atoms.

O3.17
2:00 KEEPING TOXICOLOGY ABREAST OF TECHNOLOGY OF ENGINEERED METALLIC NANOPARTICLES

Huey-Min Hwang, Paresh Ray, Hongtao Yu, Xiaojia He
Jackson State University, USA

Metallic nanoparticles include both elemental metallic nanoparticles and metal oxide nanoparticles. Metallic nanoparticles are believed to be the basis of many of the future technological and biomedical innovations of this century. However, it has been shown recently that many of nano-sized particles of these materials, not their macro or micro counterparts, are toxic to living organisms. Thus, there is an urgent need to develop rapid, accurate and efficient testing strategies to assess the potential hazard of these emerging materials. Prevention is always the best strategy to minimize human or environmental exposure to hazardous nanomaterials. Early identification of the potentially hazardous properties of nanomaterials could enable us to design or redesign these materials with less health impact while retaining the main desirable properties. The objectives of this presentation are to provide an overview on the relationship between individual physicochemical parameters and biological response after exposure to engineered elemental metallic nanoparticles (with focus on gold and silver) and metal oxide nanoparticles. Possible mechanisms of observed toxicity, influence of biotic and abiotic factors on particles' toxicity, and different biological models (*in vitro* and *in vivo*) for studying nanotoxicity are discussed. Doped metal oxide nanoparticles, new designer products in the recent development of safe nanotechnology application, are also reviewed. Finally, a brief discussion on research gaps and collaboration needed in nano ecotoxicity studies is provided. This study was supported by NSF-CREST program with grant #HRD-0833178

O3.18
2:15 MANUFACTURED NANOPARTICLES IN ENVIRONMENT: EXAMPLES OF NEW PROPERTIES AND UNUSUAL BEHAVIOR

Danuta Leszczynska
Jackson State University, USA

Custom-made nanoparticles are typically manufactured for their specific properties, and very constricted applications. However, after free discharge to environment, they might be incidentally activated by ambient conditions, and they could be capable to act as unintended catalysts/inhibitors or be part of new reactions. Presented discussion is summarizing results of the studies on the role of oxidation by the chemicals typically used for the mandatory disinfection of water for drinking purposes (chlorine and/or oxygen-bearing compounds, such as ozone and hydrogen peroxide) on unexpected chemical interactions between single-walled carbon nanotubes and organic compounds. Studies were completed in controlled conditions in distilled water, at varied pH, ambient temperature and pressure, constant mixing, and with different mass ratios between oxidant, phenol and SWCNTs. Identification and quantification of by-products was studying by using transmission electron microscopy (TEM), UV and FT- IR spectrophotometry. Preliminary results have shown activation of the initially inert surface of SWCNTs by added oxidants. We believe that this activation was responsible for the altered degradation of phenol, and increased toxicity of final water. Overall, the presence of SWCNTs has caused higher rate of phenol's oxidation, and at the same time, catechol and hydroquinone were formed in the higher concentrations as well, when compared with controlled series without carbon nanotubes.

2:30 – 2:45 PM BREAK

3:00 – 4:15 PM
PLENARY SESSION – IV - COMPUTATIONAL CHEMISTRY AND NANOTECHNOLOGY

Session Chair: Dr. Daniel Savin

O3.19
3:00 COMPUTATIONAL NANOTOXICOLOGY: QUANTUM CHEMISTRY, NANO-QSARS AND PROTEIN-LIGAND DOCKING METHODS FOR ASSESSING THE TOXICITY OF NANOPARTICLES

Bakhtiyor Rasulev, Danuta Leszczynska, Jerzy Leszczynski
Jackson State University, USA

The production of nanoscale materials is expected to increase rapidly over the next few years. Nanomaterials find use in a variety of different areas, such as electronic, magnetic and optoelectronic, biomedical, pharmaceutical, cosmetic,

energy, environmental, catalytic, and materials applications. However, recent studies have shown evident toxicity of some nanoparticles to living organisms, and their potentially negative impact on environmental ecosystems. Because of peculiar physical and chemical features, the study of nanoparticles as potential toxic agents requires an interdisciplinary approach, involving multiple aspects ranging from physics and chemistry to biology and medicine. Moreover, there is a need for new methods to quickly test the toxicity of these materials. Because experimental evaluation of the safety of chemicals is expensive and time-consuming, computational methods have been found to be efficient alternatives for predicting the potential toxicity and environmental impact of new nanomaterials before mass production. This interdisciplinary approach can be considered as computational nanotoxicology approach, which includes contributions of the following, Quantum-Chemical methods; Protein-Ligand Docking Approaches; Quantitative Structure-Activity Relationship approaches (QSAR). The adaptation, application of computational nanotoxicology approach and recent results are discussed.

O2.20
3:15 ORIGIN OF THE LIFE: FEW IDEAS FROM THE COMPUTATIONAL CHEMISTRY STUDIES

Jerzy Leszczynski
Jackson State University, USA

As far as we know life involves processes that establish a delicate balance of metabolism and genetic. It is govern by chemical reactions that require contributions of a number of chemical elements widespread in the Universe. There are various hypothesis related to the initial reactions involving simple molecules that yield larger species. A variety of experimental studies are aimed to provide details of such reactions. However, due to complexity of the studied phenomena, an alternative, efficient approach is necessary that would shed a light on those processes. Computational chemistry provides reliable tools to make predictions related to chemical reactions. The talk reviews our recent results related to chemical reactions that could contribute towards understanding of possible processes yielding DNA fragments.

O3.21
3:30 REACTIVITY PREDICTION FOR CHLORINE RADICAL ADDITION ON CHLORINATED (5,5) ARMCHAIR SWCNT

Tandabany C. Dinadayalane[1], Soumen Saha[1], Jane S. Murray[2], Danuta Leszczynska[3], Jerzy Leszczynski[1]
[1]Interdisciplinary Center for Nanotoxicity, Department of Chemistry and Biochemistry, Jackson State University, 1400 J. R. Lynch Street, USA, [2]CleveTheoComp, 1951 W. 26th Street, USA, [3]Department of Civil and Environmental Engineering, Jackson State University, 1400 J. R. Lynch Street, USA

We have examined the feasibility of addition of chlorine radical on the external surface of mono-chlorinated (5,5) armchair single-walled carbon nanotubes (SWCNTs). The site selectivity for the addition of second chlorine radical has been investigated. We have considered the tubes with two different lengths (9 and 15 carbon layers). We have used M06-2X/6-31G(d,p) level for full geometry optimizations. Computed reaction energy values for second chlorine addition have been used to corroborate the prediction of the reactivities of different sites based on the electron density distribution in the singly occupied molecular orbital (SOMO), total spin density, the DFT based local reactivity descriptors (viz., Fukui function, local softness), and the average local ionization energy. The covalent bonding between the added second chlorine and carbon of SWCNT was confirmed by bond orders using natural bond orbital (NBO) analysis. Our systematic study reveals that the first chlorine attached to SWCNT behaves like an ortho- and para-director. The addition of second chlorine on an already chlorinated SWCNT exhibits positional preference. Different reactivity indices evaluated in this study do not predict exactly similar reactivity trends. Particularly, in case of Fukui function and local softness, some variation in the relative reactivity trends of carbon sites of Cl-SWCNT was revealed. Electron density distribution of SOMO and the results from the average local ionization energy complement those obtained by the reaction energy data.

O3.22
3:45 POINTWISE BASIS SETS IN VIBRATIONAL CALCULATIONS FOR MULTIDIMENSIONAL PROBLEMS

Joe Bentley
Delta State University, USA

A methodology is developed to calculate the quantal ro-vibrational ($J \geq 0$) energies of the electronic ground state of the hydrogen cyanide (HCN/HNC) system. The Jacobi coordinate system is used. The discrete variable representation [J. C. Light and T. Carrington, Jr., Adv. Chem. Phys. **114**, 263 (2000)] is used as a primitive basis set for both radial (r and R) Jacobi coordinates. This is an example of using a "pointwise" basis set and it leads to a sparse Hamiltonian matrix. The technique of using the DVR is briefly reviewed. An angular basis set is used which diagonalizes the rotational ($J \geq 0$) part of the total kinetic energy; subsequently, this basis is contracted through a series of diagonalizations of smaller 1D and 2D Hamiltonian matrices. This produces a set of contracted 2D functions. The final 3D basis set for the full Hamiltonian consists of a direct product of the 2D functions and a primitive radial DVR (along the R coordinate). The eigenvalues are obtained by using the Implicitly Restarted Lanczos Method (IRLM) which is part of a numerical package (ARPACK) designed to solve large scale sparse eigenvalue problems. These are compared with earlier calculations and very recent experimental results by Mellau.

O3.23
4:00 WHEN IS THE AROMATIC ISOMER NOT THE MOST STABLE?

David Magers
Mississippi College, USA

In 1949, Clar and Wright reported that 6-methypentacene exists as 6-methylene-6,13-dihydropentacene at room temperature due to a [1,5]-sigmatropic hydrogen shift. Thus, the aromaticity of the central ring and the planarity of the overall compound are destroyed by this shift. Derivatives of the two parent isomers are investigated to determine which substituents can further stabilize the methylene isomer and which can stabilize the methyl isomer in which the overall planarity of the rings is maintained. The latter is especially important because synthesis of derivatives of alkyl-substituted pentacenes is rare. Specifically, diamino, dinitro, tetraamino, and tetranitro derivatives are investigated. Optimum equilibrium geometries, harmonic vibrational frequencies, and the corresponding zero-point vibrational energies are computed for each set of isomers using density functional theory. The functionals employed are wB97XD and M06-2X. Dunning and coworkers' correlation consistent basis set aug-cc-pVTZ is employed. We gratefully acknowledge support from the NSF (EPS-0903787) and the W.M. Keck Foundation.

O3.24
4:15 IN SILICO PROTEIN TARGET IDENTIFICATION: CHEMOMETRIC ANALYSIS OFANTITRYPANOSOMAL NATURAL PRODUCTS

William N. Setzer[1], Ifedayo V. Ogungbe [2]
[1]*Department of Chemistry, University of Alabama in Huntsville., USA* [2]*Department of Chemistry and Biochemistry, Jackson State University, USA*

Protozoan diseases like trypanosomiasis and leishmaniasis continue to threaten millions of lives in the tropics. This is partly because currently used drugs are ineffective, and they have adverse toxic effects. A molecular docking study has been carried out on 396 natural products that have been previously isolated and characterized from 19 species of medicinal plants. The medicinal plants considered this study have either known to be used ethnopharmacologically to treat parasitic infections or known to have in vitro antitrypanosomal activity. This study revealed that triterpenoid and steroid ligands were largely selective for sterol 14a-demethylase; while anthraquinones, xanthones, and berberine alkaloids docked strongly to pteridine reductase 1 (TbPTR1); chromenes, pyrazole and pyridine alkaloids preferred docking to triose phosphate isomerase (TbTIM); and numerous indole alkaloids showed notable docking energies with UDP-galactose 4' epimerase (TbUDPGE). This in-silico study has identified potential protein targets of antitrypanosomal natural products. The results could provide the framework for synthetic modification of bioactive natural products (structure-based drug design), de novo synthesis of structural motifs, and lead to further phytochemical investigations.

4.15 –4.30 PM **ELECTIONS:**
Nomination and selection of new divisional head(s)

6:30 –8:00 PM **Poster Session I, Chemistry and Chemical Engineering**

P3.01
DNA TEMPLATED SILVER NANO CLUSTER

Kathy Jackson, Brittany Hart, Bidisha Sengupta
Tougaloo College, USA

Small silver clusters that form with short single stranded oligonucleotides are distinguished by their strong spectroscopic properties. To understand how the bases and base sequence influence cluster formation, studies with different sequences are carried out. We initiated studies with sixteen bases long C and G rich oligonucleotide sequences. We made the silver clusters in 10 mM citrate buffer containing 10 mM KNO3 salt using 15 µM [DNA] using the C-rich oligonucleotide initally. Studies on different stoichiometries of [DNA] : [Ag] (1:2, 1:4, 1:6, 1:8) using UV/Vis and fluorescence spectroscopy, which show that 2 Ag form two color fluorescent clusters, one with λex=600 nm / λem 650 nm and λex= 700nm / λem = 735 nm. Specific emission and absorption bands are characteristics of different size of silver clusters. The C-rich oligonucleotide forms i-motif which is characterized by thermal melting at 260 nm and 290 nm. Further studies are underway.

P3.02
DIFFERENTIAL BINDING OF FISETIN AND DAIDZEIN IN Y-CYCLODEXTRIN NANOCAVITYY

Briannica Thomas[1], Dyffreon Mcgowan[1], Biswa pathik Pahari[2], Pradeep K. Sengupta[2], Bidisha Sengupta[1]
[1]Tougaloo College, USA, [2]Saha Institute of Nuclear Physics, India

The mode of binding of fisetin significantly differs from diadzein in the nanocarrier Y-cyclodextrin (CDx). Steady state and time resolved fluorescence along with anisotropy and induced circular dichroism (ICD) spectroscopy provide useful tools to observe and understand the behavior of the therapeutically important plant flavonoids fisetin and diadzein in Y-cyclodextrin (Y-CDx) nanocavity. Benesi-Hildebrand plots indicated 1:1 stoichiometry for both the supramolecular complexes. ICD spectra further confirms the results. The interaction with Y-CDx proceeds primarily through the chromone ring of fisetin whereas the phenyl ring dominates for diadzein. A linear increase of aqueous solubility of the flavonoids was assessed from their gradual increase in fluorescence anisotropy with increasing [Y-CDx] confirming the increase in their bioavailability which is the primary goal of this article.

P3.03
RAPID SYNTHESIS OF POLYMER BRUSH SURFACES VIA MICROWAVE-ASSISTED SURFACE-INITIATED RADICAL POLYMERIZATION

Wei Guo, Ryan Hensarling, Arthur LeBlanc, Emily Hoff, Austin Baranek, Derek Patton
The University of Southern Mississippi, USA

Microwave-assisted surface-initiated radical polymerization (µW-SIP) is demonstrated for the rapid synthesis of polymer brush surfaces on two-dimensional substrates. µW-SIP is carried out at constant temperature and microwave power allowing comparison with conventional SIP carried out in an oil bath at the same effective solution temperature. We show µW-SIP enables significant enhancements in brush thickness at reduced reaction times for a range of monomer types (i.e. acrylamides, acrylates, methacrylates, and styrene). The effects of reaction time, monomer concentration on film thickness are also explored.

P3.04
SPRAY-DEPOSITED SUPERHYDROPHOBIC COATINGS VIA PHOTOPOLYMERIZATION OF HYBRID THIOL-ENE POLYMER NETWORKS

Li Xiong, Bradley Sparks, Ethan Hoff, Derek Patton
University of Southern Mississippi, USA

Engineering the chemical and physical structure of surfaces to achieve tailored wettability has attracted a great deal of attention in recent years. Surfaces with extreme wetting properties such as superhydrophobicity are of interest for self-cleaning, anti-fouling, and anti-fogging applications. Development of simple fabrication methodologies that yield robust coatings is important for widespread implementation of such applications. In this work, we present a simple technique for fabrication of superhydrophobic coatings based on photopolymerization of hybrid

thiol-ene resins. Thiol-ene resins containing hydrophobic silica nanoparticles were sprayed onto a variety of substrates (i.e. glass, aluminum, paper, cotton cloth) and cured under UV light. [figure1] Coatings exhibited water contact angles greater than 156° with low contact angle hysteresis and low sliding angles (< 5°). Scanning electron microscopy images show the typical nano- and micro-scale roughness required for superhydrophobicity. Strategies toward achieving superhydrophobic/superoleophobic thiol-ene coatings will also be presented.

P3.05
BINDING OF FISETIN AND ITS CHROMOPHORES 3-HYDROXYFLAVONE AND 7-HYDROXY FLAVONE IN DUPLEX AND TETRAPLEX DNA

Donald Davis, Laura Blackmon, Bidisha Sengupta
Tougaloo College, USA

Fisetin (3,7,3′,4′-tetrahydroxyflavone) is a bioactive plant flavonoid of immense importance as a potentially useful therapeutic drug, for various free radical mediated as well as other diseases. 3-hydroxy flavone (3HF) and 7-hydroxy flavones (7HF) are synthetic compounds which are the chromophores of fisetin. We have exploited dual luminescence property of fisetin along with 3-HF and 7HF to examine its interactions with relevant macromolecular targets, namely double stranded (from calf thymus, CT), and quadruplex (QD, G_4) DNA. In the presence of CT DNA dramatic changes are observed in the intrinsic fluorescence behaviour of fisetin, 3HF and 7HF. Spectroscopic data suggest that fisetin binds intercalatively between the base pairs, whereas 3HF is a groove binder of DNA. 7HF bind differently in CT and QD DNA. Dramatic changes in differential absorbance spectra of G-quartet DNA with and without fisetin and 3HF were observed, suggesting the stability of quadruplex structures with plant flavonoids. Absorption, melting, fluorescence and CD spectroscopy, combined with molecular modeling approaches were used for the present study.

P3.06
FORMATION OF FOUR-WAY DNA JUNCTION FACILITATED BY A SMALL MOLECULE

Anthony Bell, Arik Shams, Ann Brahan
The University of Southern Mississippi, USA

The short-term goal of this research project is to employ small molecules as a means to stabilize four-way DNA junctions (4WJs) composed of natural DNA and chimeric nucleic acids. The long-term goal of the project is utilizing the 4WJs as extracellular therapeutic inhibitors of DNA binding proteins [i.e. Histones and High Mobility Group Protein B (HMGB1b)]. A number of studies have shown that classical intracellular DNA-binding proteins have a variety of deleterious side-effects when present in the extracellular milieu. In order to develop a successful 4WJ therapeutic, we are focused on using modified nucleic acids to enhance the stability of the resulting 4WJ. The chimera of interest is PNA (peptide nucleic acid). PNA was selected because it is known to form DNA-PNA duplex/triplex structures with elevated thermo- and nuclease stability. 4WJs are prepared using fluorescently labeled DNA strands and a single PNA strand. Small molecules – derivatives of acridines – are currently being investigated as tools to potentially link the PNA-DNA strands to form 4WJs composed of multiple PNA strands. The junctions were visualized using polyacrylamide gels. Circular dichroism studies will be employed to characterize the structural properties of chimera of interest. Once a stable 4WJ structure is identified, the chimera was used to study binding and inhibition of HMGB1 in cell-based assays.

P3.07
EVALUATION OF SMALL MOLECULES AS A METHOD TO STABILIZE THE FORMATION OF A STABLE FOUR WAY JUNCTION (4WJ)

Anthony Bell, Ann Brahan, Arik Shams
The University of Southern Mississippi, USA

Can a class of small molecules be used in vitro to form stable four-way junction DNA structures? The purpose of this research is to investigate the potential of small molecules as a method to induce the stable formation of four-way DNA junctions (4WJ). 4WJs are referred to as Holliday junctions. 4WJs are most well known as intermediate structures involved in DNA recombination and repair. The proposed recombination model is based on genetic transfer between different chromosomes making contact points via Holliday junctions. It is widely suspected that 4WJs facilitate replication. However, there is an emerging view that 4WJs may serve as ideal substrates to stall replication. If the second scenario is plausible, the controlled formation of 4WJs could offer a potential method to inhibit the replication of pre- and cancerous cells. The long term goal of this project is to use small molecules to promote the

formation of 4WJs in vitro. Our short term research goals are focused on screening commercially available small molecules to determine their efficiency in forming 4WJs. Polyacrylamide gel electrophoresis (PAGE gels) is the method of detection to monitor junction formation. Once a successful compound has been identified, the stability of the resulting 4WJ will be investigated further using circular dichroism.

P3.08
EFFECTS OF MORPHOLOGICAL DIFFERENCES ON TOXICITY OF NANOPARTICLES: A STUDY OF NANO TiO_2WITH *ARTEMIA SALINA*

Terriona Cowan, Martha Johnson, Mehmet Ates, Zikri Arslan
Jackson State University, USA

Metal oxide nanoparticles are utilized in industrial applications and consumer products. Toxic effects could be mediated by the metal ions and nanoparticles. Further, effects could vary with size and shape of the nanoparticles. It is therefore important to understand the sources and mechanism of the toxic effects to avoid adverse consequences on environment and human health. In this regard, the role of particle morphology is rather unknown to the extent how it influences the reactivity and toxicity of metal oxide nanoparticles. Here, we examined the effect of particle morphology with different polymorphs of TiO_2 nanoparticles to elucidate their toxicity. Artemia salina larvae were exposed to anatase, rutile and a mixture of both polymorphs of TiO_2nanoparticles. Acute exposure was conducted for 24 h and 96 h. Uptake was measured by ICP-MS. Mortality rates were determined along with malondialdehyde assay (MDA) to elucidate oxidative stress induced by exposure. Mortalities increased with increasing concentration of TiO_2 NPs suspensions. MDA assay also revealed increasing oxidative stress with increasing concentration. Anatase polymorph of TiO_2 NPs accumulated substantially compared with rutile polymorph. The mixture of both anatase and rutile showed much larger chemical uptake then both anatase and rutile alone.

P3.09
MULTIELEMENT VAPOR/HYDRIDE GENERATION WITH TRANSITION METAL CYANIDES

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Hydride generation is an attractive approach in atomic spectrometry for sensitive determination of hydride/vapor forming elements. Covalent hydrides and vapor of certain elements are often generated with chelating agents to eliminate the interferences from transition metals, such as Cu, Fe and Ni. Though this approach is highly sensitive, application to simultaneous determination of multiple elements is a challenge due to the differences in experimental conditions. In this study, we evaluated the performances of three transition metal cyanide complexes, potassium chromic cyanide, $K_3Cr(CN)_6$, potassium ferricyanide $K_3Fe(CN)_6$ and potassium manganic cyanide $K_3Mn(CN)_6$. Each cyanide complex was evaluated alone as well as in combination with other. Samples solutions in HCl were mixed on-line with 1% solutions cyanide complexes. Preliminary results indicated that both K3Cr(CN)6 and K3Mn(CN)6 enhance signals for P, As, Se, Sb, Sn and Te. Signals were enhanced by a factor of up to 100 for P, As, Se and Te that ionize poorly in argon plasma. No interferences were observed from alkali and alkaline earth elements up to 1000 µg/mL levels. The method was applied to the determination of Cd from seawater and various calcium-rich samples by ICP-MS.

P3.10
Au30(SC4H9)18 & Au23(SC4H9)16 'MAGIC SIZE' NANOPARTICLES

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Nanoparticles stabilized with bulky ligands are gaining particular attention because of the altered Au:thiolate ratio assignments, the sharpened size distribution between the nanoparticles formed, and the acute steric-effects that accompany these bulky-ligated Au nanoparticles, making the purification of a single core-size difficult upon a direct synthesis. Additionally, fragmentation patterns in the mass spectrometer suggest that the formation of the Au-S staples on the surface monolayer is reduced in comparison with common, conventional thiolate-capped Au nanoparticles. In this study, we report the synthesis, identification, and purification of two additional 'magic' core sizes, Au30(SL)18 & Au23(SL)16, stabilized by the employment of a bulky, tertiary ligand (tert-butanethiol). The presence

of these nanoparticles has first been identified using MALDI-TOF MS, and then confirmed following an analysis of ESI-TOF MS Isotope Distribution Modeling. Further, we report the characterization of these nanoparticles using Powder X-Ray Diffraction and UV/Vis Spectroscopy to gain further insight into the underlying properties of these 'magic size' Au nanoparticles.

P3.11
OXALIC ACID AND *ESCHERICHIA COLI*

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Small chain organic acids (SCOA), like acetate and benzoate, have long been used as preservatives because of their bacteriostatic properties. Interestingly, these same acids also induce protective effects in *Escherichia coli*cells that are subsequently challenged under low pH conditions. Here we report that increasing concentrations of oxalate (1 – 250 mM) have a bacteriostatic effect on cells grown in complex medium (pH 5.5). However, exposure to oxalate also induces an acid tolerance response (ATR) that protects stationary phase *E. coli* for several hours at pH 3.0. Unlike acetate and benzoate, this protective effect does not appear to be under the control of the sigma factor RpoS, also known as the master regulator of stress in *E. coli*. Our deletion mutant data indicate that this oxalate-dependent ATR is linked to *phoQ*, part of the two component PhoPQ signal transduction system, and *gadE*a central regulator of acid resistance in *E. coli*.

P3.12
YFDW AND YFDU ARE REQUIRED FOR OXALATE-INDUCED ACID TOLERANCE IN *ESCHERICHIA COLI*

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Millsaps College, USA

E. coli has several mechanisms for surviving low pH stress. We report that oxalic acid, a small chain organic acid (SCOA), induces a moderate acid-tolerance response (ATR) under two conditions. Cells adapted at pH 5.5 with 50 mM oxalate and subsequently challenged in minimal medium at pH 3.0 demonstrate increased surivival. In addition, there is also a significant protective effect when cells are challenged in the presence of 25 mM oxalate at pH 3.0. We report that the enzymes YfdW, a formyl-CoA transferase, and YfdU, an oxalyl-CoA decarboxylase, are required for the adaptation effect, but are not necessary the protective effect during challenge alone. The mechanism is not yet understood, but we demonstrate this oxalate-dependent ATR is not affected by Ca2+ depletion.

P3.13
OXALATE-DEPENDENT ACID TOELRANCE RESPONSE IN *ESCHERICHIA COLI*

Salmon Kristin, Cory Toyota
Millsaps College, USA

E. coli has evolved several mechanisms for surviving low pH stress. We report that oxalic acid, a small chain organic acid (SCOA), induces a moderate acid-tolerance response (ATR) in two ways. Adaptation at pH 5.5 with 50 mM oxalate and inclusion of 25 mM oxalate in the pH 3.0 minimal challenge medium separately conferred protection: 67 ± 7% and 87 ± 17% survival after 2 hours, respectively. Combination of oxalate-adaptation and oxalate supplementation in the challenge medium resulted in increased survival over adaptation or oxalate in the challenge medium alone. Cells show significant protection after 15 min exposure to 50 mM potassium oxalate. This oxalate-dependent ATR is strongest at pH 3.0, but there is also significant, but reduced protection at pH 2.5. We theorize that this oxalate ATR could enhance the pathogenesis of virulent *E. coli* consumed with oxalate-containing foods like spinach.

P3.14
THE INTERACTIONS OF MWCNTs WITH HYDROGEN PEROXIDE IN AQUEOUS MEDIA

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The objective of this study was to determine the interactions between multi-walled carbon nanotubes and hydrogen peroxide in distilled water at pH=5.4, using a few mass ratios MWCNTs : hydrogen peroxide, 100:25, 50:37.5, 25:44 mg/L, for each reagent. Samples were mixed for 10 hours and after 48 hours their FTIR spectra and TEM images were recorded. The changes in FTIR spectra of MWCNTs were similar for all runs: 1.the intensity of peaks at 620.9 and 725.12 cm^{-1} of nanocarbon FTIR spectra increased and they moved to lower wave numbers; 2.the formation of broad bands with

maxima at 1112.7-1110.8 cm^{-1} and sharp peaks at 1176.4-1172.5 cm^{-1}, 1270.9-1269 cm^{-1} due to the presence of C-O, C-O-C, C-OH groups were determined; 3.peaks at 1349.9 and 1444.4 cm^{-1} became very small, but the other from 1384.7 cm^{-1} was the most intense due changes of C=C uniformity and the formation of new C=O bonds; 4.for higher concentration of hydrogen peroxide, run 3, there was a shift of the band due to C=C at 1594.9 cm^{-1}; the appearance of a distinct peak at 1741.4 cm^{-1} revealed the formation of carboxyl and ester groups. The progress of absorption maxima from FTIR spectra of MWCNTs after treatment with hydrogen peroxide was depended on oxidant dose. TEM images showed changes in the morphology of carbon nanotubes.

P3.15
A NOVEL C3-SYMMETRIC THIOUREA-BASED RECEPTOR FOR FLUORIDE AND SULFATE ANIONS

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Because of the biological and environmental relevance of common inorganic anions, the development of neutral receptors capable of anions recognition through non-covalent interactions has gained a considerable interest in recent years. Tripodal receptors bearing urea/thiourea functional groups could be employed in the binding of anions due to the directional conformation of two NH groups. In this study, we have synthesized a new thiourea receptor, and studied for anions in both solution and solid state. This presentation highlights the solid state evidence of an encpsulated sulfate anion within a dimeric capsule of the receptor stabilized by twelve H-bonds. We also discuss the fluoride complex of the receptor in which the anion is encapsulated within the cavity. The results obtained from ^{1}H NMR titrations and NOESY experiments, confirm the strong interactions and selectivity for fluoride and sulfate in solution.
Acknowledgement: The NSF is acknowledged for a CAREER award (CHE-1056927) to MAH.

P3.16
IMPORTANCE OF METAL SPECIATION FOR COMPLETE GEOCHEMICAL CHARACTERIZATION OF NATURAL SYSTEMS

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US Army Corps of Engineers, USA

The biogeochemistry of metals in natural systems is controlled by their speciation. Various redox species of many metals will have vastly different sorption and mobility properties, toxicity, and bioavailability. In many cases, remediation techniques are engineered, and most efficient, for specific forms of metal contaminants. This presentation will provide a brief overview of metal speciation techniques, inclusive of nanomaterial characterization tools, and the geochemical application of these techniques to understanding complex natural systems. Examples of arsenic and selenium species release from coal fly ash remediation efforts, tungsten in soil and trophic transfer scenarios, and depleted uranium mineralogy will be described to demonstrate the importance of metal species determination.

P3.17
SYNTHESIS AND BINDING STUDIES OF *BIS*-UREA RECEPTORS FOR HALIDES

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Among various important anionic analytes, fluoride is one of the most significant anions due to its critical role in dental care and treatment of osteoporosis; therefore. fluoride binding and recognition by synthetic receptors is attracting a growing interest. Fluoride is found more frequently in different sources of water but with higher concentrations in groundwater due to the presence of fluoride-bearing minerals. Because of duplicitous nature of fluoride, it is important to design the artificial receptor for extracting, removing and separating this particular anion from fluoride-bearing minerals or fluoride containing systems. During this study, we have synthesized a new *p*-cyano based bis-urea receptors from the reaction of 2,2'-Diamino-N-methyldiethylamine with*p*-cyano isocyanate under refluxed condition in chloroform. In the solid state, the *bis*-urea urea are bonded with halide through N-H···halide interactions. In solution, the host bind halides with an order of Iodide< Bromide< Chloride<< Fluoride. In this poster, the detailed studies of this receptor for halides will be discussed.
Acknowledgement: The National Science

Foundation is acknowledged for a CAREER award (CHE-1056927) to MAH. This work was supported by the National Institutes of Health (G12RR013459).

P3.18
BIFUNCTIONAL 1,8-NAPHTHALIMIDES AS FLUORESCENCE SENSORS

Wolfgang Kramer, Anna Allred, Irene Correio, Melinda Solomon, Woods Curry, Emily Stewart
Millsaps College, USA

The fluorescence properties of napththalimides have been extensively studied. 1,8-naphthalimides, due to their efficient and economical synthesis and versatility are the most appealing derivative for an undergraduate research laboratory. Covalently attached pyridines efficiently quench the naphthalimide fluorescence. The quenching depends on the oxidation and protonation state of the pyridines. The oxidized pyridine N-oxides are more efficient fluorescence quenchers and protonation of both the N-oxides as well as the parent pyridines decreases fluorescence quenching. Alkylation also recovers fluorescence and thuse the N-alkyl derivatives can be used as standards. Stern-Vollmer analysis suggests different modes of quenching for the N-oxides and parent heterocycles. Solvent polarity strongly influences fluorescence behavior.

P3.19
OPTIMIZING THE SYNTHESIS OF BIFUNCTIONAL NITROGEN ONIUM SALTS USED FOR DNA-CLEAVAGE

Courtney Mullins, Woods Curry, Emily Stewart, Jonathan Giurintano, Wolfgang Kramer
Millsaps College, USA

Nitrogen onium salts have a photoactivatable Nitrogen-Oxygen bond which yields two reactive species upon photolysis, a radical cation and an oxygen centered radical. Those reactive species have been identified as effective DNA cleavers. Simple nitrogen onium salts based on quinoline, isoquinoline and phenanthridine have been shown to cleave DNA inefficiently even though the DNA cleaving intermediates are produced with high quantum yields of about 0.6. Weak ground state association presumably leads to a decay of the transient species without interaction with DNA. Combination of a known DNA binder, 1,8-naphthalimide, with N-alkoxy aromatic heterocycles has led to the synthesis of bifunctional DNA cleaving reagent. Separate synthesis of the building blocks leads to a library of compounds which then can be combined in several ways. The approaches to the synthesis procedure sare discussed and all new compounds are fully characterized. An investigation of the spectroscopic and photochemical properties is presented.

P3.20
ANALYSIS OF THE DNA-CLEAVING EFFICIENCIES OF BIFUNCTIONAL DNA-CLEAVING REAGENTS

Lauren Hoth, Emily Stewart, Woods Curry, Wolfgang Kramer
Millsaps College, USA

Current Photodynamic therapy uses sensitizers to generate singlet oxygen which causes cell death. The hypoxic environment of most cancer tissues makes oxygen a limiting reagent for this approach and several methods have recently been developed to circumvent this problem. The photoinduced homolytic N-O bond cleavage of N-Heteroaromatic compounds with an N-alkoxy substituent (onium salts) leads to the formation of a heteroaromatic radical cation and an alkoxy radical. Both of these species have been shown to induce DNA cleavage, each with a different mechanism. The synthesis of the nitrogen onium salts includes the oxidation of the heteroaromatic nitrogen and subsequent O-alkylation. To increase the DNA cleaving effiency by enhancing ground-state association we synthetically attached a known DNA-binder, 1,8-naphthalimide. Several binfunctional compounds have been synthesized and their photochemistry has been investigated. Here we present the DNA cleaving efficiency of a series of bifunctional DNA-cleavers which has been analyzed by gele electrophoresis and CD spectroscopy.

P3.21
PHOTOCHEMISTRY OF N-ALKOXY HETEROAROMATIC TETRAFLUOROBORATES: ANALYSIS OF THE REACTION PATHWAYS BY pH MONITORING

Priya Patel, Katie Odom, Brooke Lassiter, GeNita Finley, Wolfgang Kramer
Millsaps College, USA

N-methoxy substituted aromatic heterocycles undergo a photoinduced homolytical N-O-bond cleavage. The reaction produces a methoxy radical and a heteroaromatic radical cation. The quantum yields of ion/radical formation have been

determined by laser flash photolysis/quenching for the title compounds. Each transient species was produced with a yield of about 0.6 (±0.05). The energy wasting step appears to be a radical recombination reaction, which also produces a proton. Because of acid base equilibrium it was inefficient to monitor the reaction by NMR. GC-MS analysis of the extracted irradiation solution led to the identification of several methoxy quinoline isomers. To have a quantitative tool for the analysis of the energy wasting side reaction in the photochemistry of nitrogen onium salts, the measurement of the produced proton is the focus of this study. Several attempts are compared, such as pH monitoring in water, buffer, and titration with p-nitrophenolate.

P3.22

APPLICATION OF THE DECARBOXYLATIVE PHOTOCYCLIZATION: MEMORY OF CHIRALITY EFFECTS IN TRIPLET BIRADICAL REACTIONS

Resham Rahat, Eli Smith, David Sandlin, Wolfgang Kramer
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The decarboxylative photocyclization is an elegant photochemical way to synthesize small to medium sized heterocycles. The product is a pyrrolizidine annelated structure. Several functional groups are tolerated and ring sizes up to 36 members have been isolated with appropriate precursors. The synthetic potential of the reaction is diminished by the incorporation of the phthalimide nitrogen into the product. Targeting a product that requires the nitrogen in the structure uses this shortfall as an advantage. [1,4]-benzodiazepines are the basic structure for tranquilizers such as valium. Incorporation of the chromophor nitrogen can lead to the photochemical synthesis of those compounds with the decarboxylative photocyclization. Interestingly, a memory of chirality effect conserves any stereochemical information over the course of the reaction. Even though the intermediate is a triplet-1,7-biradical, 86 % ee of the inversion product were isolated. The stereochemical information was preserved as axial chirality between anthranilic acid and phthalimide. Using a less rigid spacer destroyed the Memory of Chirality effect. The decarboxylative photocyclization can also be used to cyclize cationic precursors.

P3.33

THIOPHENE BASED MONOCYCLIC RECEPTORS FOR SELECTIVE BINDING OF FLUORIDE IN WATER

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Recognition and binding of anions has become an emerging field in chemical science because of their substantial health and environmental issues. While designing anion sensor and receptors, consideration should be given on the properties of anions i.e. size, symmetry, hydration properties, charge density etc. For example, fluoride is found hydrated in an aquatic system because of its high electronegativity and small size. During this study, we synthesized thiophene based aza-monocyclic receptor with extended space and investigated for its anion binding ability in solution state by ^{1}H NMR, ^{19}F NMR and in solid state by X-ray crystallography. Surprisingly, in both cases it was found that our receptors bind selectively with fluoride in 1:2 fashion. Furthermore, x-ray crystallographic results reveal four fluoride and four water assembles a fluoride and water tetrameric cluster stabilized inside the cavity formed by two parallel receptors by hydrogen bonding. Formation of dimer and the role of water in it were farther confirmed by concentration dependent NMR and water dilution experiment.

P3.34

A NEW THIOPHENE BASED TRIPODAL AMINE RECEPTOR FOR ANION BINDING

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In many fields, ranging from environmental monitoring, industrial purposes to clinical diagnostics, selective recognition and sensing of anions are of great importance. Some of the anions are harmful while present in excess and some are even carcinogenic even while present in trace. Therefore, a significant effort has been recently given on designing selective receptors for anions. The topology of these receptors is important to understand their interactions with anions. Tripodal based amines

contain functional group in each arm making them capable of encapsulating anions within their cavity. In this study we have synthesized a new receptor functionalized with thiophene groups, and studied for anions with a variety of techniques. This poster will focus the details of binding studies of the new compound for halides and oxoanions.
Acknowledgement: This research was supported by the Minority Access to Research Careers/Undergraduate Student Training in Academic Research (MARC/U*STAR) Program (Grant No. 5T34GM007672-31).

P3.35
BIOLOGICAL EVALUATION AND SYNTHESIS OF SPIRO-ISOXAZOLINES VIA INTRAMOLECULAR CYCLIZATION

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Psammaplysins A-E are a family of natural products that were isolated from marine sponges of the order Verongida. Many of these natural products display antiviral and antineoplastic activities. The most interesting structural motifs of the psammaplysins are the oxepin and isoxazoline moieties which are connected in a spirocyclic array. The synthesis of this type of ring system was accomplished in two steps. These synthetic processes involve a 1,3-dipolar cycloaddition and an intramolecular ring closure of a pendant alcohol or carboxylic acid onto an activated isoxazole. The 1,3-dipolar cycloaddition of an alkyne with an alpha-chlorobenzaldoxime derivative afforded the desired isoxazole. Intramolecular cyclization was achieved through the reaction of the isoxazole ring with pyridinium tribromide (PTB) and potassium carbonate in dichloromethane. The proposed mechanism of intramolecular cyclization involves the activation of the isoxazoline ring with PTB to form a bromonium ion. Neighboring group participation of the oxygen can cause an opening of the bromonium ion intermediate and thereby give rise to an oxonium ion. Intramolecular attack of the alkoxide or carboxylate oxygen onto the oxonium ring system and loss of a proton can then afford the spiro-isoxazoline. The spiro-isoxazolines and their precursors were biologically evaluated, and the synthetic analogues were found to be active against a variety of breast cancer cell lines. The synthesis, mechanistic details, isolated yields, and biological activity for the reported spiro-isoxazoline compounds and their precursors will be discussed.
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P3.36
APPLICATION OF 1,3-DIPOLAR CYCLOADDITION TOWARD SWCNT FUNCTIONALIZATION AND SUBSEQUENT ATTACHMENT OF GOLD NANOPARTICLES

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Similar to other allotropes of carbon, single walled carbon naonotubes (SWCNTs) are insoluble in a variety of solvents. A number of synthetic methods have been used to add non-carbon functional groups to SWCNTs in order to make them soluble in organic solvents. Among those synthetic techniques is 1,3-dipolar cycloaddition. Due to the fact that a SWCNT is essentially a rolled up graphene sheet, SWCNTs have pi orbitals that can react as a dipolarophile toward 1,3-diples. In our studies, we used a synthetic protocol that incorporated the use of pyridinium ylides, which were generated from Krohnke salts, as 1,3-dipoles that reacted with the SWCNTs in a [2+3] fashion when heated via conventional methods or microwave promotion. In order to confirm that cycloaddition was realized, FTIR was used to identify the salient carbonyl functional group of the desired product. Reaction of the ester functional group of the SWCNT with cysteamine under microwave conditions formed the targeted thiol capped SWCNT where the presence of the thiol functionality was determined through Raman Spectroscopy. After the the thiol capped SWCNT was reacted with gold nanoparticles, TEM was used to verify that the gold nanoparticle successfully attached to the SWCNT.
Acknowledgments: We thank the National Science Foundation (HBCU-RISE: HRD-1137763) and the National Institutes of Health RCMI program (G12RR13459 (Analytical CORE facilities)).

P3.37
SELECTIVE DETECTION AND PHOTOTHERMAL THERAPY OF CANCER CELLS USING IRON CORE GOLE SHELL NANOPARTICLES: SWCNT HYBRID NANOSCTUCTURES

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Due to the fact that gold nanoparticles possess unique optical properties and are considered to have low toxicity toward humans, the use of gold nanoparticle based biological detection devices and therapeutic agents are very attractive. Multifunctional nanomaterials can potentially be even more superior because more than one physical property can be exploited to target or separate a particular biological agent. Single walled carbon nanotubes (SWCNTs) arrayed with iron core gold shell nanoparticles have the potential to be used for medical diagnosis via MRI because of the magnetic properties of the iron core, and the plasmonic gold shell can be useful for photothermal therapy through irradiation at a specific wavelength or cancer detection through surface enhanced Raman spectroscopy. After synthesizing the desired iron oxide nanoparticle, a specific synthetic protocol was used to encase the iron nanoparticle with a gold nanoparticle thereby creating a gold nanoshell. Confirmation of the encapsulation of the iron nanoparticles with gold nanoparticles was realized through a combination of UV, Raman spectroscopy, and TEM. These iron core gold shell nanoparticles were then anchored onto a functionalized SWCNT through the formation of a sulfur carbon bond. TEM images provided evidence of the gold shell/iron core nanoparticle decorated SWCNTs.

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P3.38
EVALUATION OF THE SUSPECTED ROLE OF HIGH MOBILITY GROUP PROTEIN B (HMGB1) IN APOPTOSIS.

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High mobility group box one (HMGB1) is an abundant chromatin associated protein that medicates transcription by “loosening” or remodeling chromatin. During remodeling, the DNA regions of chromatin are exposed to facilitate the binding of transcription factors such as nuclear factor-kB (NF-kB) and homeobox gene (HoxD9). More recently, HMGB1 has been confirmed to function extracellularly as well. In its alternate capacity, HMGB1 binds to immune receptors such as RAGE1 and TLR2,4 to promote leukocyte recruitment and amplify cytokine production. These investigations suggest that HMGB1 may be involved with additional cellular reactions. Several new studies indicate that HMGB1 binds to the surface of apoptotic cells to reduce the clearance of dead/dying cells. The proper clearance of apoptotic cells is critical because the presence of residual apoptotic cells may initiate harmful autoimmune responses. More specifically, these new reports indicate that HMGB1 binds the cell surface phospholipid phosphatidylserine (PS) to effectively block the apoptotic clearance signal. As a result, large numbers of apoptotic cells undergo secondary necrosis – a process that triggers autoimmune reactions. The short-term goals of this research project are to use standard biochemical assays such as electrophoretic gel shift assays (EMSAs), circular dichroism (CD) and UV spectroscopy to determine the binding affinity (K_D) of HMGB1 toward PS. The premise of these studies are to provide biophysical characterization of HMGB1:PS interactions that can be used to support cell-based investigations.

P3.39
POTENTIAL OXIDATIVE REACTIVITY OF *P*-NITROPHENYL POLYSULFIDES

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The synthesis of *p*-nitrophenyl trisulfide was attempted using *p*-nitrophenylthiol and freshly distilled sulfur dichloride; the reaction produced an assortment of polysulfides, which were analyzed by high performance liquid chromatography and melting point determinations. Recrystallization of the synthesized products using a 2:1 hexanes/chloroform solvent mixture did not improve the purity of the trisulfide. Each of the samples exhibited a relative range of polysulfide compounds, distinctly di-, tri-, and tetrasulfides. The trisulfide appears to undergo decomposition to form the *p*-nitrophenyl disulfide and tetrasulfide. The retention times for the di, tri, and tetrasulfides were found to be 5.5, 6.2, and 7.8 respectively using a 90/10 ratio of acetonitrile and water. The strong electron-withdrawing nitro group may encourage interesting regiochemistry in relation to the oxidative reactivity of the trisulfide.

P3.40
CALCULATING ENTHALPIES OF FORMATION FOR THE OXADIAZOLES AND THEIR CYANO DERIVATIVES VIA ISODESMIC AND HOMODESMOTIC REACTIONS

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Homodesmotic reactions are a subset of isodesmic reactions. Isodesmic reactions conserve bonds and bond types; homodesmotic reactions further preserve bonding environments. Homodesmotic reactions and isodesmic reactions which are almost homodesmotic can be used to compute enthalpies of formation to within one or two kcal/mol of experimental results without having to compute atomization energies. Despite the different zeros of energy, one may set the computed enthalpy of the model reaction equal to the experimental enthalpy for the same reaction. From the computed enthalpy of reaction, the desired enthalpy of formation is determined by use of reference values for all other systems in the reaction.
All four isomers of oxadiazole are investigated: 1,2,3-oxadiazole, 1,2,4-oxadiazole, 1,3,4-oxadiazole, and 1,2,5-oxadiazole which is also known as furazan. Optimum equilibrium geometries, harmonic vibrational frequencies, and the corresponding enthalpies are computed for all of the reactants and products in each model equation using SCF and density functional theory. The DFT functionals employed are B3LYP, wB97XD, and M06-2X. We gratefully acknowledge support from the NSF (EPS-0903787) and the W.M. Keck Foundation.

P3.41
RAFT POLYMERIZATION AND PH-RESPONSIVE STUDIES OF A LIBRARY OF SULFONAMIDE-BASED POLYMERS

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Targeted delivery of cancer therapeutics offers an exciting new opportunity for utilization of controlled polymerization techniques. However, a major obstacle in achieving the desired therapeutic effect is facilitating endosomal release of active agents following endocytosis. Peptides and pH-responsive polymers have been utilized as a means of triggering endosomal release via phase transition-induced membrane disruption. Unfortunately, the fidelity by which the pKa of these polymers/peptides can be varied is limited, such that it reduces their versatility in altering the phase transition point to best match the endosomal pH of a particular cell-type. Herein, we report the controlled polymerization of a library of methacryloylsulfonamide derivatives via reversible addition-fragmentation chain transfer (RAFT) polymerization that exhibit a range of physiologically relevant pKa's. Polymerization control was observed by noting the low polydispersity indices of the polymers along with the linear progression of Mn with time during the polymerizations. The pH-dependent phase transition behavior of the polymers was tunable by varying the "R-group" of the sulfonamide, thus altering the pKa of the resulting polymer. Future work includes pH-dependent hemolysis studies to determine which sulfonamide derivatives promote endosomal disruption under physiological conditions.

P3.42
A PRELIMINARY STUDY: BIOGEOCHEMISTRY OF THE GRAND BAY RESERVE AND ITS EFFECT ON ENVIRONMENTAL QUALITY

Jacqueline McComb, F Han, Paul Tchounwou
Jackson State University, USA

This preliminary study is to investigate the biogeochemistry of trace elements (mercury, arsenic, lead, cadmium, etc.) in coastal and marine ecosystems. Three areas will be focused initially: Bayou Heron, and possible BP affected areas in the Grand Bay. Laboratory simulation experiments on various biogeochemical background scenarios will be conducted to reveal the relationship between biogeochemistry and environmental quality**.** The biogeochemistry of trace metals such as arsenic, lead and mercury are with relation to human and animal health. Consequently, the spatial distribution and bioavailability of trace elements are very important in their biogeochemical cycles, food safety, and human health via food chains. This study is aimed at providing the essential information of these trace elements, heavy metals and their environmental risk in one of NERR sites Grand Bay areas. Our goal was to investigate the biogeochemistry of the region and the overall contribution to the environmental quality at the Grand Bay Reserve. This study is essential to define and characterize the whole coastal ecosystem health and water quality as stated in ECSC focus areas on ecological processes and risk assessment

thematic areas. Understanding basic biogeochemical cycling in costal ecosystems strongly supports ECSC core goals on enhancing the scientific understanding of human interactions with the coastal environment in support of NOAA's place-based management and specifically in the response of coastal and marine ecosystems to natural and human induced stressors. This study is not only biogeochemical studies, but also the comprehensive investigation ecosystems subject to anthropogenic disturbance.

P3.43

DFT STUDY OF CATION-π INTERACTIONS FOR 1,3,5-TRIS(NAPHTHYL)BENZENE WITH Li^+, Na^+, K^+ : THE EFFECT OF NAPHTHYL RING SUBSTITUTION

Ali Mirchi, Tandabany C. Dinadayalane, Jerzy Leszczynski
Interdisciplinary Center for Nanotoxicity, Department of Chemistry and Biochemistry, Jackson State University, USA

The ligands of systematically substituted naphthyl ring (a and b positions are attached) to benzene were taken in the theoretical study to understand the effect of substitution on cation-π interactions. The interaction energies for the binding of alkali metal ions (Li^+, Na^+ and K^+) with 1,3,5-tris(naphthyl)benzene (**TNB**) have been calculated and compared the results with those for prototype benzene-alkali metal cation systems. Calculations were performed using B3LYP/6-31G(d) level. Harmonic vibrational frequency calculations indicate that all the structures are minima. The interaction energies were corrected for basis set superposition error (BSSE). The substitution of the naphthyl ring to the alternate carbon sites of benzene significantly increases the binding affinity of alkali metal cations. By using the electrostatics potential surfaces, it is also found that the strength of interaction with the same cation decreases as we change the fusion point from α to β position of naphthalene. Similar to benzene-alkali metal ion complexes, the interaction energies decreases by the increase in the cation size: $Li^+ > Na^+ > K^+$ for any considered ligand. The distance between ring centroid and the metal ions was also calculated for all the complexes to see any correlation with interaction energies.

Friday, February 22, 2013

Friday MORNING
COCHRAN 216

8:15 – 8:30 OPENING REMARKS

8:30 - 10:00 AM
PLENARY SESSION – V – (CONCURRENT SESSION)
Session Chair: Dr. Wolfgand Kramer

O3.25

8:30 ENANTIODIVERGENT SYNTHESIS OF DIVERSE ORTHOGONALLY PROTECTED A-METHYL-LYSINE AND PROLINE ANALOGUES

Souvik Banerjee, Justin Smith, Jillian Smith, Douglas Masterson
The University of Southern Mississippi, USA

Our aim is to construct optically pure α-methyl lysine and proline analogues from a common synthon. Enzymatic desymmetrization (using PLE) of achiral diethyl 2-methyl-2-alkyl phthalimido malonate gives us ethyl 2-methyl-2-alkyl phthalimido acid-ester with high optical purity. Our synthetic strategy allows us to vary the "R" group of lysine from 1-6 methylene units and backbone of lysine as well from "α"-"β", from the same common synthon. We obtained high optical purity in case of enzymatic hydrolysis of α- methyl lysine diesters with 2, 3 and 4 methylene groups in the side chain. The lysine half-esters containing 1 to 6 methylene units are predominantly with (***R***) enantiomers. We have been able to obtain enantiomerically enriched t-Boc-Fmoc protected 1 and 4 carbon α-methyl-α-Lysine and α-methyl-β-Lysine from the common synthetic intermediate. We have also obtained (***R***)-α-methyl-β-proine from the same common synthon (n=2) through stereo controlled cyclization.

O3.26

8:45 INVESTIGATION OF CO-SOLVENT EFFECTS ON THE SELECTIVITIES OF PLE ISOENZYMES

Maureen Smith[1], Souvik Banerjee[1], Marlen Schmidt[2], Uwe Bornscheuer[3], Douglas Masterson[1]
[1]The University of Southern Mississippi, USA, [2]Enzymicals, AG, Germany, [3]Greifswald University, Germany

Hydrolase enzymes, such as Pig Liver Esterase (PLE), are widely used in organic synthesis due to their low cost, stability, and ability to accept a wide range of substrates. PLE is composed of at least 6 isoenzymes, which have recently been produced recombinantly. However, the role of each individual isoenzyme in the PLE mixture has not yet been explored completely. It has been demonstrated that the addition of organic co-solvents to the phosphate buffer can dramatically alter the enantiomeric excess (ee) of the reaction. We have found that the addition of just 2% EtOH into our buffer solution greatly increased the enantiomeric excess of the hydrolysis of compound **(1)**from 23 %ee to 85 %ee. We have found that this increase in enantioselectivity is highly substrate specific. For example, addition of varying amount of EtOH co-solvent to the hydrolysis of compound **(2)** showed only moderate increases in enantioselectivity, and addition of EtOH co-solvent to the hydrolysis of compound **(3)** did not show any effect. Similar trends were observed when i-PrOH was used as a co-solvent, however, the magnitude of effect was much less than with EtOH. We believe this is due to the hydrogen bonding ability of the side chain in the substrate. We propose that as the hydrogen bonding ability of the substrate decreases, the ability of EtOH to influence the enantioselective outcome of the reaction is decreased. We have conducted several NMR titration experiments to measure the extent of hydrogen bonding between our substrate and co-solvent.

O3.27
9:00 SYNTHESIS OF PYRIDINYL PHENYLALANINE ANALOGS

Harikiran Kotapati, Douglas Masterson
University of Southern Mississippi, USA

Our goal is to synthesize various analogs of α-methyl pyridinyl phenylalanine from a common optically enriched synthon. We hypothesize that the involvement of the side chain of pyridinyl phenyl alanine in hydrogen bonding with the peptide back bone to prevent the peptide from forming secondary structures. Our hypothesis is to prove the hydrogen bonding ability of the pyridinal moiety to the PLE active site will enhance the "ee" of the chiral malonic half ester. We are focused on preparing the analog of phenyl alanine with nitrogen atom at position 1-4 in the phenyl ring. We have been able to accomplish the synthesis of chiral half ester with Nitrogen at position 1 in the phenyl ring in decent "ee" by subjecting the corresponding prochiral diester to asymmetric enzymatic hydrolysis by PLE. We are in the process of improving the "ee" of the half ester by adding diverse polar protic co-solvents in the PLE hydrolysis.

O3.28
9:15 A STEREODIVERGENT STRATEGY FOR THE PREPARATION OF δ-LACTAMS AND THEIR USE IN THE SYNTHESIS OF A NIPECOTIC ACID ANALOGUE

Daniel Hinton, Souvik Banerjee, Douglas Masterson
University of Southern Mississippi, USA

A straightforward stereoselective and entantiodivergent cyclization strategy for the construction of δ-lactams is in progress. Recently, the Masterson Research Group has submitted a manuscript reporting a cyclization strategy, which makes use of chiral malonic esters prepared from enantiomerically enriched mono esters of disubstituted malonic acid. The cyclization occurs with the selective displacement of a substituted benzyl alcohol as the leaving group. The resulting δ-lactam can be readily converted into a novel nipecotic acid analogue. Nipecotic acid has been shown to be a GABA reuptake inhibitor. To the best of our knowledge, there has been no optically enriched synthesis of this compound reported in the literature to date. Our strategy overcomes this challenge and also can potentially enhance this drug's ability to cross the blood-brain barrier by affording it with the increased hydrophobicity provided by an added α-methyl group.

O3.29
9:30 SELF-ASSEMBLED GOLD NANOPLEXES FOR CANCER-TARGETED siRNA DELIVERY

Yongliang Shi, John Grenn, Faqing Huang
University of Southern Mississippi, USA

Small interfering RNA (siRNA) has been proposed as the next generation therapeutic agent to treat various diseases, including cancer. Yet its unfavorable physicochemical properties make the delivery of siRNA in vivo a great challenge. Recently AuNPs (gold nanoparticles) have emerged as the siRNA delivery agent due to their ease of synthesis and modification, nontoxicity and high biocompatibility. However, current AuNP systems are mostly nonspecific to tumor cells. Here we report preparation of novel cancer cell-targeted siRNA delivery systems constructed through a layer-by-layer

approach. The core of the system is PEI (polyethylenimine) modified AuNPs, which is further coated with siRNA via electrostatic interactions and folic acid conjugated PEI-PEG (polyethylene glycol) copolymers. Folic acid serves as the tumor-targeting molecule based on overexpression of folate receptors on certain types of cancer cells. By using tRNA, we have constructed the entire system and optimized the conditions for each coating step. We have also successfully replaced the tRNA by a siRNA against luciferase (Gluc-siRNA) for optimization of siRNA delivery efficiency. The final AuNPs are neutral, stabilized by the PEGs. The siRNA carrying capacity was 200 RNA molecules each nanoparticle and the final nanoplex coverage was about 50 molecules of PEI-PEG-FA. We are currently treating cancer cells with the nanoplexes and investigating siRNA delivery efficiency, cancer cell specificity, and gene knockdown efficiency. Finally, we will apply the siRNA delivery nanoplex system to knock down critical cancer genes to examine the effects on cancer cell growth, the suppression of cancer cell growth, and cell death.

O3.30
9.45 A NEW SYNTHETIC METHOD FOR PREPARING α,α-DISUBSTITUTED γ-UNNATURAL AMINO ACIDS THROUGH A LACTAM INTERMEDIATE

Emily Vogel, Douglas Masterson
University of Southern Mississippi, USA

γ-unnatural amino acids have gained significant interest recently because they are capable of forming stable secondary structures, and are readily used as pharmaceuticals. However, the syntheses of these γ-amino acids currently are limited to sterically unhindered substrates. Our research aim is to develop a novel synthetic method for the preparation of enantiomerically enriched C^{α}-methyl-γ amino acids. The strategy involves installing a phthalimide protected γ-side chain to the inexpensive diethyl methyl malonate. Then pig liver esterase is used for the hydrolysis to gain an enantiomerically enriched chiral half ester. This intermediate is esterified and the phthalimide group is deprotected selectively cyclizing to form a lactam. The lactam is then functionalized to contain an amino acid side chain and then subjected to a hydrolysis which opens the lactam to the γ-unnatural amino acid. Finally, the amino acid is Fmoc-protected for future incorporation into peptides. Currently, studies have been focused on the optimization of this new synthetic strategy, and our model serine analogue has been successful prepared using the outlined procedure.

10:00 – 10:10 AM BREAK

COCHRAN 214
8:30 - 10:00 AM
PLENARY SESSION – VI
(CONCURRENT SESSION)
Session Chair: Dr. Zikri Arslan

O3.31
8:30 PLUTONIUM CONCENTRATION AND 240Pu/239Pu ATOM RATIO IN BIOTA COLLECTED FROM AMCHITKA ISLAND, ALASKA: RECENT MEASUREMENTS BY ICP-SFMS

James Cizdziel, Kaixuan Bu
University of Mississippi, United States Minor Outlying Islands

Three underground nuclear tests, including the United States largest, were conducted on Amchitka Island, Alaska. Monitoring the radiological environment around the island is challenging because of its remote location. In this study, we analyzed lichen (Cladonia spp.), freshwater moss (Fontinalis neomexicanus), kelp (Eualaria fistulosa) and horse mussel (Modiolus modiolus) collected from Amchitka Island and Adak Island (a control site). Plutonium concentration and 240Pu/239Pu ratios were measured using inductively coupled plasma sector field mass spectrometry (ICP-SFMS) after column chemistry to isolate the Pu. 239+240Pu levels (mBq/kg, dry weight) randed from 3.79-57.1 for lichen, 167-700 for kelp, 27.9-148 for horse mussel, and 560-573 for moss. Lichen from Adak Island had higher Pu levels than Amchitka Island, the difference likely due to higher precipitation levels on Adak. The 240Pu/239Pu ratio was significantly higher in marine samples compared to terrestrial and freshwater samples. These observations provide supporting evidence that a large input of enriched Pu occurred into the North Pacific Ocean, likely from the Marshall Island high yield nuclear tests, but other potential sources such as the Amchitka underground site cannot be ruled out. Discharges from the damaged Fukushima Daiichi Nuclear Power Plant may represent a new source of enriched Pu to the North Pacific.

O3.32
8:45 SYNTHESIS AND EXAMINATION OF METABOLIC DISTRIBUTION OF SILICA COATED LEAD SELENIDE QUANTUM DOTS

Zikri Arslan[1], Mehmet Ates[1], Oliva Premira-Pedrozo[2], Ibrahim Farah[1]
[1]Jackson State University, USA, [2]Universidad Metropolitana, USA

Semiconductor quantum dots of lead selenide (PbSe QDs) are strong absorbers of near- and mid-IR and thus possess useful properties for solar energy conversion, communication and sensing devices operating in IR frequencies. Optical properties can be tuned by changing the particle size. The use of PbSe QDs in consumer products is concerning due to possible toxic effects to human health. In this study, we have synthesized silica coated PbSe QDs and examined their bioaccumulation, excretion and toxicity on mice. CD-1 mouse were exposed to aqueous suspension of PbSe QDs for forty two days. Exposure was made intravenously by single injection of 0.3 mL QDs solution through tail vein. Urine and feces were collected over the course of the exposure. Animals were sacrificed periodically and organs, including the brain, heart, intestine, kidneys, liver, spleen and lungs were collected. The urine, feces and organs were digested in acid and analyzed for Pb and Se by ICP-MS. Significant accumulation of PbSe QDs was observed in the liver and kidneys. Levels in other organs were not significant. Lead was high in fecal samples while selenium was higher in urine. Lead was eliminated from body within forty two days. Selenium levels were relatively constant. Malondialdehyde levels increased within first two weeks then returned to normal levels when Pb was completely eliminated.

O3.33
9:00 SYNTHESIS, ISOLATION AND CHARACTERIZATION OF GOLD NANOCLUSTERS (<2nm) CAPPED BY AROMATIC LIGANDS

Praneeth Reddy Nimmala, Amal Dass
University of Mississippi, USA

Gold nanomolecules are entities in the nanometer size regime that contain a specific number of gold atoms and passivating organic thiolate ligands with distinct chemical and physical properties. Some of the well known stable clusters synthesized in this research area are $Au_{25}(SR)_{18}$, $Au_{144}(SR)_{60}$, $Au_{38}(SR)_{24}$, $Au_{68}(SR)_{34}$, and $Au_{102}(SR)_{44}$. These are highly stable compounds which can be synthesized, dried, redispersed in solutions and stored in ambient conditions for years without any change in their physical or chemical properties.
In this talk, we will present the synthesis, isolation and characterization of a 14 kDa mass nanomolecule $Au_{67}(SR)_{35}$. The synthesis of $Au_{67}(SR)_{35}$ follows modified Brust-Schriffin synthesis in THF to make a crude product containing the title compound as a major component with two other clusters lower and higher in mass to Au_{67}. The isolation or purification of Au_{67} is performed by using solvent fractionations where the solvents with different polarities are used to precipitate out higher mass clusters. Once the title compound is obtained, it was then used for characterization studies. The cluster's exact mass was determined by using high resolution ESI-MS. The optical features were determined by UV-Vis spectroscopy. The HOMO-LUMO gap of the cluster was determined by electrochemistry (CV and DPV) and the structural characteristics of the cluster core were investigated by powder XRD measurements. This composition and structural evidence suggests a model featuring a Au_{17} Marks-decahedral type central core that is encapsulated by the 30 anchoring atoms of 15 staple-motif units plus an equatorial belt comprised of five long stapling units.

O3.34
9:15 SYNTHETIC RECEPTORS FOR INORGANIC ANIONS

Md. Alamgir Hossain
Jackson State University, USA

The field of anion coordination chemistry emerged in 1968 with the discovery of diazabicyclic compounds, known as *katapinands*, by Park and Simmons. These compounds were shown to form inclusion complexes with halide anions by hydrogen bonding interactions in acidic solution, which was later confirmed by X-ray structure determination. During the last two decades, this area has been progressed significantly. A variety of synthetic receptors have been reported that show high binding affinity and selectivity for common inorganic anions. In particular, recognition of simple inorganic anions has received significant interests because of their impact on life and environment. In this presentation, several types of artificial receptors and their affinity toward oxoanions will discussed. (The project described was supported by NSF-CAREER

award, CHE-1056927 to MAH).

O3.35
9:30 LIGAND EXCHANGE REACTIONS ON ULTRASMALL GOLD NANOCLUSTERS

Vijay Bhaskar Reddy Jupally, Amala Dass
University of Mississippi, USA

Applications of nanoparticles in different fields are increasing day by day. Nanoparticles have already exhibited their applications in the fields of medicine, drug delivery and organic catalysis. Ultra small gold nanoclusters are significant because of their stability and the experience gained in their synthesis. Gold nanoclusters have definite number of gold atoms in the core; and, organothiolate ligands are attached to the surface of the core. Along with organothiolate ligands, some gold atoms are also present in the monolayer in the form of protecting groups called as "staple motifs". The organothiolate ligands are linked to the gold atoms in the core and also from the surface. For developing potential applications using these nanoclusters it is important that the monolayer be modified. Ligand exchange reactions could be a potential tool to make wide variety of materials using gold nanoclusters. In this presentation, some fundamental aspects of the ligand exchange reactions will be portrayed; past and present work will be summarized. Future prospects and goals of such ligand exchange reactions would be addressed

O3.36
9:45 THERANOSTIC STAR SHAPE CORE-SHELL NANOPARTICLE FOR THE ISOLATION, FLUORESCENCE IMAGING AND PHOTOTHERMAL DESTRUCTION OF TARGETED RARE TUMOR CELLS FROM WHOLE BLOOD

Paresh Ray, Zhen Fan
Jackson State University, USA

Cancer is one of the most life-threatening diseases, which causes 7.6 million deaths and around 1 trillion dollars economic loss every year. Here we will discuss our recent development of a theranostic plasmonic shell-magnetic core star shape nanomaterial based approaches for the targeted isolation of rare tumor cells from the whole blood sample, followed by diagnosis and photothermal destruction. We will show the possible mechanism and operating principle for the targeted imaging, separation, and photothermal destruction using theranostic magnetic/plasmonic nanotechnology. We beleive that, after the optimization of different parameters, this theranostic nanotechnology-driven assay could have enormous potential for applications as contrast agent and therapeutic actuators for cancer.

10:10 – 12:10 AM-COCHRAN 216
PLENARY SESSION - VII
(CONCURRENT SESSION)
Session Chair: Dr. James Cizdziel

O3.37
10:10 TAILORABILITY OF BISPHENOL-BASED POLYBENZOXAZINES

Austin Baranek, Laken Kendrick, Jananee Narayanan, Ginger Tyson, Steven Wnad, Derek Patton
University of Sounthen Mississippi, USA

Polybenzoxazines (pBZ) have been investigated as attractive alternatives to traditional phenolic resins for a variety of high performance applications. However, it is observed that the majority of bisphenol-based pBZ consist of short cores resulting in highly cross-linked, but extremely brittle materials. Additives and blends (i.e. rubber toughening) have been used to improve the mechanical strength; however, for material simplicity, it would be advantageous to incorporate the flexibility directly into the pBZ network via monomer design.

This project investigates unexplored molecular design opportunities that are available by incorporating long aliphatic cores into the bisphenol, from which BZ can be easily synthesized and purified. In this study, a series of aliphatic-bridged bisphenol-based pBZ are studied to demonstrate the viability of tailoring the mechanical properties of diphenol-based pBZ networks through monomer design. The synthesized pBZ show high conversion for the ring opening polymerization (ROP), lower and easily tailored glass transition temperature (Tg), but most important improved film integrity (i.e. less brittle).

Additional tailorability is also explored through the copolymerizations of a synthesized monomer (low Tg) with commercially available BZ monomers (high Tg). The Tg of the copolymerizations show a linear relationship based on the weight percent of each monomer and can be easily predicted. This technique further expands the tailorability and brodens the applications of pBZ systems.

O3.38
10:25 REVERSIBLE POST-POLYMERIZTION MODIFICATION OF BRUSH SURFACES VIA DYNAMIC COVALENT HYDRAZONE LINKAGES

Emily Hoff, Will Adkins, Ryan Hensarling, Arthur LeBlanc, Derek Patton
University of Southern Mississippi, USA

The development of surface modification techniques for "on-demand" control of surface properties is essential in order to engineer modular surface platforms with a high degree of control over complexity, functionality, and responsiveness to external stimuli. Most examples of surface modification are irreversible; however, "on-demand" reversible functionalization of surfaces would enable strategies such as "catch-and-release" and "reusable" surfaces important for advances in biosensors, self-healable materials, antifouling coatings, etc. Dynamic covalent chemistry (DCC) can be used to establish reversible covalent bonds that are responsive to external stimuli such as pH, UV light, and temperature. Dynamic covalent hydrazone linkages, which are formed through an imine reaction of a hydrazide moiety and an aldehyde or ketone, are responsive to changes in pH while still exhibiting reasonable product stability thus making this chemistry an ideal handle for controlling surfaces properties.
In order to facilitate "on-demand" control of surface properties, pH-responsive, reversible hydrazone linkages were incorporated as substituents on polymer brush surfaces via surface-initiated atom transfer radical polymerization (SI-ATRP) and subsequent post-polymerization modification (PPM). Reversible changes in wettability of substrates were achieved over multiple cycles through the formation of hydrazone linkages with various hydrophobic/hydrophilic aldehydes or ketones. This research also investigated changes in surface wettability via an *in situ* exchange reaction between surface bound aldehydes and aldehydes in solution enabling changes in functionalization without separate hydrazone formation and reversal steps.

O3.39
10:40 ASSESSMENT OF TOXICITY OF SUSPENSIONS OF ZINC AND ZINC OXIDE NANOPOWDERS ON ARTEMIA – FREE ZINC IONS OR PARTICLES?

Mehmet Ates[1], James Daniels[1], Zikri Arslan[1], Ibrahim Farah[1], Hilsamar Félix Rivera[2]
[1]Jackson State University, USA, [2]University of Puerto Rico-Mayaguez, USA

Artemia salina larvae were exposed to different sizes of zinc (Zn) and zinc oxide (ZnO) nanoparticles (NPs) to elucidate the sources of toxic effects. Acute exposure was conducted in seawater at 10, 50 and 100 mg L^{-1} levels for NP for 24 h and 96 h. *Artemia* accumulated the particles substantially from medium regardless of their initial size. Accumulation in ZnO NP suspensions was higher. Mortalities were not significant within 24 h, but increased remarkably in 96 h with increasing concentration of NP suspension to 42% for Zn NPs (40-60 nm) (LC_{50} ~100 mg L^{-1}) and to about 34% for ZnO NPs (10-30 nm) (LC_{50} >100 mg L^{-1}). Suspensions of Zn NPs were more toxic to*Artemia* than those of ZnO NPs under comparable regimes. This effect was attributed to higher Zn^{2+} levels (8.9 mg L^{-1}) in the medium of Zn NPs. The concentration of free Zn in suspensions of ZnO NPs was lower, about 5.5 mg L^{-1}. Aggregation was significant at all sizes, yet smaller Zn NPs (40-60 nm) were more toxic than relatively larger Zn NPs (80-100 nm). Similarly, mortalities in the suspensions of 10-30 nm ZnO NPs were higher than in those of 200 nm ZnO NPs. Lipid peroxidation levels increased in 96 h ($p<0.05$) suggesting that toxic effects were caused oxidative stress.

O3.40
10:55 NOVEL MOLECULES SYNTHESIZED FROM NATURAL PRODUCTS USED WITH LANTHANIDE METALS IN AN INDICATOR DISPLACEMENT ASSAY FOR DETECTION OF OCEANIC IRON

William Jones
University of Southern Mississippi, USA

In the past twenty years a plethora of research has been put into study of Fe^{3+} in the ocean. Since 1993 there have been 12 large-scale “seeding” studies carried out throughout the world. More recently a private endeavor into ocean seeding in the Pacific Ocean has come to public attention, rekindling the ethical questions of seeding projects. Now more than ever there is a need for better, simpler, and more mobile techniques for detecting oceanic Fe^{3+}. Fluorescent molecular sensor technology is an alternative to current techniques that require expensive or fragile equipment. The question then is how to design a fluorescent sensor able to

selectively detect Fe^{3+} in an oceanic environment. Proposed here are novel fluorescent molecules synthesized using natural products to create Indicator Displacement Assays. These sensors are able to coordinate and sensitize Eu^{3+} or Tb^{3+} to give a luminescent signal then quenched by the entry of Fe^{3+} to displace the lanthanide. The natural product base of these sensors provides a ready-made ability to function in aqueous buffers as well as being highly selective for trivalent metals, Fe^{3+} in particular. Lanthanide metals as indicators avoid background fluorescence and provide a useful on-off sensing system. This research focuses on the design of selective, sensitive molecular sensors to monitor Fe^{3+} in aqueous buffer. An evaluation of the lanthanide indicator, fluorpohore to sensitize the lanthanide, and methods to avoid quenching the lanthanide's emission with water will be discussed as well as immobilization of the sensor within a polymer matrix.

O3.41
11:10 SYNTHESIS OF COMPLEX HETEROCYCLES VIA NOVEL TRANSITION METAL-CATALYZED REACTIONS

Hannah Box
Mississippi State University, USA

Functionalized heterocycles have played an increasingly important role in the development of novel pharmaceutical compounds. Aziridinones are of great interest due to their highly strained 3-membered heterocyclic ring structure. Based on the strength of the nucleophile, aziridinones can ring open at the C-2 and C-3 position to give a library of potential products. In 1984, Howard Alper converted aziridinones into azetidine-2,4-diones using rhodium and cobalt complexes providing the first example of metal insertion into these compounds, but the 3-membered heterocycles ring opening chemistry has yet to be explored. We believed that by inserting a metal into these aziridinones, the complexes formed could perform further chemistry with highly functionalized compounds. We have developed a new transition metal-catalyzed process for the *N*-functionilization of a variety of heterocyclic precursors. The benefit of the developed method is that complex heterocycles may be synthesized from strained heterocyclic precursors under mild reaction conditions in 25 minutes.

O3.42
11:25 BIOGEOCHEMISTRY OF CARBON, HEAVY METALS AND TRACE ELEMENTS IN THE GRAND BAY NATIONAL ESTUARINE RESEARCH RESERVE

Jaquenline McComb, Fengxiang Han, Paul Tchounwou
Jackson State University, USA

The ecosystem-based management of national estuarine and marine coastal resources is the NOAA's strategic plan focuses. This requires better understanding of the natural and anthropogenic stresses that change the ecosystems. We investigated biogeochemistry of carbon, heavy metals and trace elements in the Grand Bay National Estuarine Research Reserve. The specific goals are to investigate the scientific background baseline of C, heavy metals and trace elements in the Grand Bay ecosystems and to study the bioavailability and bioaccumulation of mercury and arsenic in the major sea food production in the Grand Bay. We have taken 120 special soil and sediment samples representing both background level and potential industrial areas to determine As, Hg, Cd, Ni, Pb, C etc. A series of sets of sea-food samples will be taken from the area to examine the potential effects of recent BP oil leakage on accumulation of As and Hg in sea foods.

O3.43
11:40 SYNTHESIS AND CHARACTERIZATION OF POLY-FUNCTIONALIZED FULLERENE MONOMERS FOR INCLUSION IN POLYMER NETWORKS

Justin Strong, Amber Windham, J. Paige Buchanan
The University of Southern Mississippi, USA

Since their discovery in 1985, fullerenes have been an interest in research due to their unique chemical and physical properties, as well as their potential for use in an array of application areas, including electronics, materials science, nanotechnology, and biomedical. Recent interests of our group include the incorporation of fullerene derivatives into polymer networks, such as that generated from the reactions of polyfunctional thiols and enes. Fullerols (C60OHx) are readily converted to poly-ene monomers and reacted with trimethylolpropane tris(3-mercaptopropionate) to produce

networks. The use of Matrix-Assisted Laser Desorption/Ionization (MALDI) mass spectrometry to characterize monomers is discussed.

O3.44
11:55 POTASSIUM MANGANIC CYANIDE – A NEW REAGENT FOR GENERATION LEAD HYDRIDE (PbH_4) FOR SENSITIVE DETERMINATION OF LEAD

LaKeysha Rose, Vedat Yilmaz, Zikri Arslan, Maria Little
Jackson State University, USA

Lead forms covalent hydride - plumbane (PbH_4), when reacted with a strong reducing agent such as sodium borohydride ($NaBH_4$). The generation of PbH_4 is an attractive approach in atomic spectroscopy for determination of Pb at ultratrace levels. However, generation of PbH_4 is highly difficult due to the interferences of numerous factors. The most effective additive known today for generation of PbH_4 is potassium ferricyanide, $K_3Fe(CN)_6$. Alternative methods have been reported with oxidizing reagents and additives, but they were not as robust as that for $K_3Fe(CN)_6$. Recently, we have developed a new method by using potassium manganic cyanide, ($K_3Mn(CN)_6$), new additive to affect the generation of PbH_4. Experimental conditions were optimized for hydrochloric acid (HCl), $K_3Mn(CN)_6$ and $NaBH_4$ system. HCl concentration of the sample solutions were varied from 0 to 10%, which were on-line reacted with 0.5% m/v $K_3Mn(CN)_6$ followed by reaction with 2% m/v $NaBH_4$. Optimum sample acidity was between 1 and 3% v/v HCl. Sensitivity was enhanced by factor of about 40 compared to nebulization mode. The detection limits were about 7 ng/L (ppt) by HG-ICP-MS. Effects of various transition metals were investigated. Copper interfered with generation of PbH_4. No interferences were observed from other metals and hydride forming elements. The method was successfully applied to determination of Pb in various certified reference samples.

10:10 - 12:10 PM-COCHRAN 214
PLENARY SESSION – VIII
(CONCURRENT SESSION)
Session Chair: Dr. Alamgir Hossain

O3.45
10:10 A RHODAMINE-SUGAR BASED FLUORESCENT CHEMOSENSOR FOR DETECTION OF Fe^{3+}

Erendra Manandhar[1], Peter J. Cragg[2], Karl J. Wallace[0]
[1]University of Southern Mississippi, USA, [2]University of Brighton, UK

A new sugar (methyl-2, 3, 4-tri-O-acetyl-α-D-Glucopyranoside) functionalized rhodamine triazole-based fluorescent chemosensor was synthesized by a "click" reaction. It exhibits a high sensitivity and selectivity for the Fe^{3+} over other metal ions in aqueous solution. Upon the addition of Fe^{3+}, the spirocyclic ring of the compound was opened and a significant enhancement of visible colour and fluorescence in the range of 500-600 nm was observed.DFT calculations support the proposed structure.

O3.46
10:25 ANIONS BINDING AND SELECTIVITY WITH TRIPODAL UREAS

Avijit Pramanik[0], Douglas R. Powell[0], Md. Alamgir Hossain[0]
[1]Department of Chemistry and Biochemistry, Jackson State University, USA, [2]Department of Chemistry and Biochemistry, University of Oklahoma, USA

Molecular recognition is a biological phenomenon and occurs spontaneously in many biochemical processes. Because of the ability to act as H-bond donors, urea and thiourea-based neutral receptors are potential to bind anions. These classes of receptors bind anions strongly through NH···anion interactions, and could be useful as extractants, separations, and sensors for anions. In this study, we have synthesized two urea-based tripodal receptors functionalized with amine- and cyno-groups and studied their comparative binding properties in solution and solid state. From the NMR titrations, we observed that the *p*-cyano functionalized receptor shows higher binding affinity than the *p*-amino functionalized analogue. Furthermore, NOESY NMR experiments support the binding of halides and oxoanions in the solution. In this presentation, we will discuss the comprehensive binding studies of these two compounds in both

solution and solid state. Acknowledgement: The NSF is acknowledged for a CAREER award (CHE-1056927) to MAH.

O3.47
10:40 SYNTHESIS AND ANION BINDING STUDIES OF POLYAMINE-BASED MACROMONOCYCLES

Md Mhahabubur Rhaman[1], Doug Powell[2], Md. Alamgir Hossain[1]
[1]Jackson State University, USA, [2]University of Oklahoma, USA

Amine-based compounds are effective anion receptors which are often used for anion recognition in water under a wide range of conditions. During the course of our studies, we have been interested to introduce electron-rich spacers and also big spacer within the macrocyclic frameworks. We successfully synthesized four polyazamacrocycles using 2,5-diformylfuran; 2,6-pyridinedicarboxaldehyde; 4,4′-biphenyldicarboxaldehyde and bis(4-formylphenyl)phenylamine spacers individually with linkage N-methyl-2,2′-diaminodiethylamine from Schiff base condensation followed by reduction. The receptors were studied for a variety of anions by X-ray crystallography, 1H NMR, 31P NMR and 19F NMR technique. This oral presentation will focus on the comprehensive binding studies in both solution and solid states. Acknowledgement: The National Science Foundation is acknowledged for a CAREER award (CHE-1056927) to MAH. Acknowledgement: The NSF is acknowledged for CAREER award (CHE 1056927) to MAH.

O3.48
10:55 SYNTHESIS AND BINDING STUDIES OF *BIS*-UREA RECEPTORS FOR HALIDES

Abdallah Gana[0], Md. Hossain Alamgir[0], Avijit Pramanik[0], Frank R. Fronczek[0]
[1]Jackson State University, USA, [2]Louisiana State University, USA

Among various important anionic analytes, fluoride is one of the most significant anions due to its critical role in dental care and treatment of osteoporosis; therefore. fluoride binding and recognition by synthetic receptors is attracting a growing interest. Fluoride is found more frequently in different sources of water but with higher concentrations in groundwater due to the presence of fluoride-bearing minerals. Because of duplicitous nature of fluoride, it is important to design the artificial receptor for extracting, removing and separating this particular anion from fluoride-bearing minerals or fluoride containing systems. During this study, we have synthesized a new *p*-cyano based bis-urea receptors from the reaction of 2,2'-Diamino-N-methyldiethylamine with*p*-cyano isocyanate under refluxed condition in chloroform. In the solid state, the *bis*-urea urea are bonded with halide through N-H···halide interactions. In solution, the host bind halides with an order of Iodide< Bromide< Chloride<< Fluoride. In this poster, the detailed studies of this receptor for halides will be discussed. **Acknowledgement:** The National Science Foundation is acknowledged for a CAREER award (CHE-1056927) to MAH. This work was supported by the National Institutes of Health (G12RR013459).

O3.49
11:10 META-BISCLICK: ELECTROCHEMISTRY, ELECTROGENERATED CHEMILUMINESENCE, AND ITS INTERACTIONS WITH Zn^{2+} IONS

Yiliyasi Wusimanjiang, Erendra Manandhar, Karl Wallace, Wujian Miao
Department of Cehmistry and Biochemistry, The University of Southern Mississippi, USA

Sensitive detection of Zn^{2+} ions in biological systems could be realized by electrochemical and spectroscopic methods upon the formation of Zn^{2+} with pyrene-containing ligand, meta-bisclick. Electrochemically, meta-bisclick was found to be irreversibly reduced at ~-1.4 V and oxidized at ~+1.3 V vs Ag/Ag^{+}. The large and broad anodic wave probably results from the overlap of the oxidations of pyrene moieties and N-containing groups. After the addition of 2-(dibutylamino)ethanol (DBAE) into meta-bisclick MeCN solution, electrogenerated chemiluminescence (ECL) was produced when both meta-bisclick and DBAE were oxidized, which is consistent with the commonly accepted anodic coreactant ECL mechanism. Formation of 1:1 Zn^{2+}/meta-bisclick complex was characterized by differential pulse voltammetry and differential normal pulse voltammetry, where positive potential shifts and peak current decreases were observed upon the complexation.

Financial support from the NSF CAREER Award (CHE-0955878) is gratefully acknowledged.

O3.50
11:25 A SELF-ASSEMBLY BASED FLUORESCENT RATIOMETRIC SENSOR FOR Fe^{3+} ION

Pradip Bastola[1], Erendra Manandhar[1], Peter Cragg[2], Karl Wallace[1], Wujian Miao[1]
[1]Department of Chemistry and Biochemistry, The University of Southern Mississippi, USA, [2]School of Pharmacy and Biomolecular Sciences, University of Brighton, UK

A sugar (methyl-2, 3, 4-tri-O-acetyl-α-D-Glucopyranoside) functionalized pyrene-based molecular receptor was synthesized as a fluorescent ratiometric sensor for Fe^{3+} based on a self-assembly process in MeCN solution. The compound is believed to interact with Fe^{3+} to form a 2 (ligands) : 1 (Fe^{3+}) molar ratio complex. The formation of excimer band at 465 nm on addition of Fe^{3+} suggests that pyrene units are in syn orientation. DFT calculations support the proposed structure. Electrogenerated chemiluminescence (ECL) also indicates the formation of the complex as the ECL signal was enhanced upon the addition of Fe^{3+} ion when the molar ratio of ligand to $Fe^{3+} \geq 2:1$ in MeCN solution using 20 mM tri-*n*-propylamine (TPrA) as the anodic ECL co-reactant. Financial support from the NSF CAREER Award (CHE-0955878) is gratefully acknowledged.

O3.51
11:40 ELECTROGENERATED CHEMILUMINESCENCE OF WATER SOLUBLE SILICON QUANTUM DOTS

Kathleen Johnson, Mahesha Herath, Yiliyasi Wusimanjiang, Paul Stoulig III, Wujian Miao
Department of Chemistry and Biochemistry, The University of Southern Mississippi, USA

Water soluble silicon quantum dots (Si QDs) were synthesized by chemical reduction of $SiCl_4$ with $LiAlH_4$ and catalytically capped with allylamine in the absence of air. As-prepared Si QDs showed strong fluorescent emissions at 425 nm. Electrogenerated chemiluminescence (ECL) was observed from Si QDs using tri-*n*-propylamine (TPrA) as the anodic ECL coreactant. Effect of solution pH on the ECL intensity was studied, which shows a maximum emission at ~pH 9.0. A large red-shift of ~200 nm on ECL spectra with respect to the fluorescence suggests that the surface coverage of the capping agent on Si QDs was imperfect. Financial support from the NSF CAREER Award (CHE-0955878) is gratefully acknowledged.

O3.52
11:55 POLYMER MICROSPHERE PRODUCTION AND CHARACTERIZATION: INVESTIGATING THE EFFECTS OF ACOUSTIC WAVE EXCITATION AND MONOMER VISCOSITY ON SIZE DISTRIBUTION

W. Tyler Byrd[1], Amber D. Windham[1], J. Paige Buchanan[1], Anton D. Netchaev[2], Randy K. Buchanan[2]
[1]University of Southern Mississippi, Department of Chemistry and Biochemistry, USA, [2]University of Southern Mississippi, School of Computing, USA

The popular thiol-ene "click" reaction—facile, high yielding, stereospecific, insensitive to oxygen, and producing few by-products—can be used in making polymer microspheres. These polymer beads have many potential applications, such as immunoassays, flow/image cytometry, and cosmetics formulations. The production of microspheres was explored using a combination of well-established "click" photopolymerization chemistries and a novel acoustic excitation technique. A frequency sweep was conducted, with the goal of defining the relationship between frequency/amplitude and microsphere diameter. The effect of monomer viscosity on microsphere morphology was also investigated, and optical microscopy, dynamic light scattering, and scanning electron microscopy were used for microsphere characterization.

12:15 PM

ANNOUNCEMENT OF STUDENTS' AWARDS

ECOLOGY AND EVOLUTIONARY BIOLOGY

Chair: Dr. Brent Hendrixson,
Millsaps College

Vice-Chair: Paul Mack,
Mississippi University for Women

THURSDAY MORNING
COCHRAN 227

8:45 OPENING REMARKS

O4.01

9:00 A PLEA FOR INTEGRATIVE TAXONOMY: SPECIES DELIMITATION IN THE NORTH AMERICAN TARANTULA GENUS *APHONOPELMA*

Brent E. Hendrixson

Millsaps College, Jackson, MS, USA

Tarantulas in the North American genus *Aphonopelma* are poorly known due to their challenging patterns of morphological variation and questionable taxonomy; few specimens can be confidently identified using existing keys or comparisons to original descriptions. In an effort to identify new strategies for resolving what has been characterized as a "taxonomic and nomenclatural nightmare", we employed five different approaches for delimiting species in a group of closely related tarantulas from the Mojave Desert in the southwestern United States. These methods included the application of single techniques (morphology, DNA barcoding, shared genealogical exclusivity among independent loci, and generalized mixed Yule coalescent) and an integrative approach that incorporates genealogical and ecological information. Results demonstrate that the taxonomy of these spiders as presently defined underestimates actual species-level diversity and the group is in need of revision. The number of species delimited by each approach, however, was variable and we argue that it is this discordance that emphasizes the importance of incorporating multiple lines of evidence into an integrative taxonomic framework that can be used for constructing robust taxonomic hypotheses for *Aphonopelma* species.

O4.02

9:15 DNA EVIDENCE FOR THE RECOGNITION OF SEVERAL SPECIES OF CUDWEEDS (*GAMOCHAETA*, ASTERACEAE) IN THE EASTERN UNITED STATES

Mac Alford, Kree Cameron
University of Southern Mississippi, Hattiesburg, MS, USA

Gamochaeta (Asteraceae) is a common genus of weedy plants in the eastern United States. Some have recognized as few as one species in this region, but others have recognized as many as eight species. Although the eastern North American representatives are morphologically variable, the variation could be environmental, allelic (intra-specific), representative of unique features for several species, or even indicative of unrecognized introductions to the flora. Here a genetic study was undertaken to assess whether the morphological variation as represented in putative species corresponds to genetic differences. A nuclear region of DNA, the internal transcribed spacer (ITS), was sequenced, and haplotypes were compared among the morphological samples of the eight putative species. The results indicate that the putative species have unique genetic markers as well as morphological features. Given the sampling of U.S. species, the phylogeny also indicates that the cudweeds with bicolor leaves form a monophyletic group.

O4.03

9:30 MONITORING THE FERAL HOG (*SUS SCROFA*) POPULATION AT DAHOMEY NATIONAL WILDLIFE REFUGE IN NORTHWEST MISSISSIPPI

Chase Hall, A. H. M. Ali Reza, Eric Blackwell
Delta State University, Cleveland, MS, USA

Feral hogs (*Sus scrofa*) are spreading rapidly across most of the United States. In some regions they have become abundant and destroying native habitats. Monitoring the population of *Sus scrofa* at Dahomey National Wildlife Refuge (DNWR) now could help to manage the population of feral hogs on the refuge in the future. To the monitor the population we baited several areas within the refuge and monitored the bait with trail cameras. We used the photos to determine where to place traps that were provided by the U.S. Fish and Wildlife Services. Trail cameras were emplaced in early June and checked twice weekly. We established six

baiting sites, all of which produced photos of hogs. Photos of hogs indicated that some sites were more densely populated than others. Traps were emplaced in late June and were wired open to encourage hogs to enter them until mid-August when the traps were set. Trapped hogs were anesthetized by a veterinarian and had radio frequency ear tags attached in order to track movements and determine habitat preferences. Only two hogs were tagged due to trap shyness and an extraordinary ability to escape from the traps. While still early in the project, we are hopeful that this project will yield results which will be helpful to wildlife managers' efforts to control invasive feral hogs.

O4.04
9:45 TESTOSTERONE AND FEEDING BEHAVIOR IN THE EASTERN BLUEBIRD

Lauren Gillespie, Jodie M. Jawor
University of Southern Mississippi, Hattiesburg, MS, USA

Eastern bluebirds (*Sialia sialis*) are of conservation interest as the widespread loss of nesting habitat due to urbanization caused populations to dramatically decrease, however, through the use of human made nest boxes populations are rebounding and interest is gaining in their behavioral ecology and physiology. The objectives of this study are to examine and correlate behaviors that are thought to be hormonally mediated in bluebirds. Adults were captured after observing nestling feeding to collect blood and morphometric measures; a testosterone (T) ELIZA immunoassay was performed to determine T concentrations in plasma. Results indicate that plasma T does not differ between males and females. Plasma T was not correlated with feeding rate, body mass, tarsus length, tail length or wing chord for males and females. Date of bleed for males was slightly significant in that males bled earlier in the spring have higher T. It was unexpected for male and female T to be similar as males display aggressive behavior and aggressive interactions throughout the breeding season. Males were expected to have higher T earlier in the spring as this is when males compete for mates and have the highest frequency of aggressive interactions with other males. There are few accounts in the literature regarding hormonal correlates of male behaviors in bluebirds and even less information is available for females, this study represents some of the first information on female behavioral endocrinology in bluebirds.

10:00 BREAK

O4.05
10:15 PARTIAL ELUCIDATION OF THE LIFE HISTORY OF TWO PARASITIC FLUKES (DIGENEA: BUCEPHALIDAE), ONE FROM THE PASCAGOULA RIVER, AND ONE FROM INSHORE WATERS OF COASTAL MISSISSIPPI

Lynnae Manuel, Stephen Curran
University of Southern Mississippi, Ocean Springs, MS, USA

The Bucephalidae Poche, 1907 is family of aquatic parasitic flukes (Digenea) consisting of approximately 235 species in 22 genera worldwide. Bucephalids have complex life cycles, with early larval stages parasitic in bivalves, and subsequent larval stages parasitic in the flesh of small fishes. Flukes almost always mature in the gut of piscivorous fishes. Digenean taxonomy is based on features present in adult worms. Larval stages bare little resemblance to their adult forms. Consequently, larval stages encountered are not identifiable using conventional techniques. Our study uses molecular tools to match larval stages of two species of bucephalids with their adult stages in order to more accurately assess their roles in the environment. We amplified ribosomal DNA (rDNA) from two species of adult worms from 4 fishes, and larval worms from a variety of fishes and a bivalve in the Pascagoula River and associated estuary. Resulting rDNA sequences were aligned and those from adults were compared with those from larval stages. Adult worms representing *Rhipidocotyle lepisostei* lived as adults in 3 species of gars in the Pascagoula River and estuary. Associated larval stages of this species occurred in 4 species of fishes. The bivalve host remains unknown. Adult and larval worms representing *Paurorhynchus hiodontis* lived in the body cavity and liver respectively, of the mooneye fish in the Pascagoula River. The associated early larval stage of this species was found in a unionid bivalve, *Lampsilis teres*. This represents the only species of bucephalid known to have a truncated, 2-host life cycle.

O4.06
10:30 THE UTILITY OF NUCLEAR *GBSSI* AND *EMB2765* DNA SEQUENCES FOR INFERRING PHYLOGENY IN THE TROPICAL ANGIOSPERM FAMILY SAMYDACEAE

Chelsa Williams, Mac Alford
University of Southern Mississippi, Hattiesburg, MS,

USA

Samydaceae are a tropical family of woody flowering plants, poorly known because they were once included in the 'dustbin' family Flacourtiaceae and because there are few economically important species. The family has recently been studied using DNA sequence data, but most of the data were from plastid DNA and some relationships had low statistical support. For this study, two nuclear regions, *EMB2765* and *GBSSI*, were sequenced in order to affirm or refute the relationships inferred from plastid DNA and in order to find stronger statistical support for relationships. The data collected mostly affirm previously collected data from plastid DNA and indicate that these nuclear regions are suitable for inferring species-level phylogenies.

O4.07

10:45 TESTOSTERONE PRODUCTION IN THREE SPECIES OF SONGBIRD THROUGHOUT SPRING MIGRATION

Kristen M. Covino[1], Frank R. Moore[1], Sara R. Morris[2]
[1]*University of Southern Mississippi, Hattiesburg, MS, USA,* [2]*Canisius College, Buffalo, NY, USA*

If we are to understand the biology of migratory species, we must understand how phases of the annual cycle interact. Testosterone may be an important signal for the onset of vernal migration, and early arriving males on breeding grounds generally have higher circulating testosterone levels. What is poorly understood is the role of testosterone during migration. We determined testosterone levels for male and female Magnolia Warblers (MAWA; *Setophaga magnolia*), Northern Waterthrushes (NOWA; *Parkesia noveboracensis*), and Swainson's Thrushes (SWTH; *Catharus ustulatus*) at two stopover sites representing different distances remaining to the breeding grounds. Testosterone levels were higher at our northern site in male MAWA and NOWA as well as in female MAWA. There were no differences between male and female MAWA or male and female SWTH within a site, however, male NOWA at our northern site had higher testosterone levels than females at that site. Further, testosterone levels increased over the 40 days in which male NOWA were captured at our southern site. Our study indicates that while some species are increasing testosterone production throughout spring migration, this is not universally true. Further investigations as to whether this lack of increase in some species represents a modulation of testosterone release are currently underway. Since testosterone is such a potent hormone and has many effects on breeding behaviors, it is intriguing to consider the role testosterone may play in mediating behavior of en route migrants as they make the transition from spring migration to breeding.

O4.08

11:00 FLORA OF THE "GOPHER FARM" SANDHILL, WAYNE COUNTY, MISSISSIPPI

Mac Alford, S. Brittany Nicholson
University of Southern Mississippi, Hattiesburg, MS, USA

A survey was initiated in order to document the plants, fungi, and lichens of the "Gopher Farm" sandhill, Wayne County, Mississippi. The sandhill is located in the Chickasawhay Ranger District of the DeSoto National Forest and is of interest due to its distance from other sandy, xeric habitats nearer the coast of the Gulf of Mexico. The sandhill was surveyed 11 times from Spring 2011 to Spring 2012, primarily during the spring and fall and resulted in the collection and identification of 181 species, including 15 fungi or lichens, one fern, two gymnosperms, and 163 flowering plants. The principal woody plant community consisted of longleaf pine (*Pinus palustris*), turkey oak (*Quercus laevis*), and sand post oak (*Quercus margarettae*). Collections include rare species and new range extensions.

O4.09

11:15 COMPARATIVE OSTEOLOGY OF NEW WORLD SNAKES

Markus Tellkamp, Matthew Elliot
Millsaps College, Jackson, MS, USA

Proper identification of fossils is crucial for reconstructing paleoenvironments. Osteology can also improve our understanding of the functional anatomy and phylogeny of animals. To fill a void of information in the literature we analyzed the largest mid-thoracic vertebrae of seventeen species of mostly tropical New World snakes. The vertebrae were described qualitatively, photographed, and scanned on a flat bed scanner. Various measurements on the vertebra were taken digitally using ImageJ software. Principal components analysis (PCA) was used and various ratios were calculated to supplement the qualitative data. Our study shows that snake vertebrae are fairly distinct and identifiable to at least

genus. Three traits are especially useful: the metapophysis, hypapophysis, and zygosphene. The PCA separated individuals from different families as the Boidea, Crotalidae, and Colubridae, respectively, tended to cluster, but within family variation is too large to make generic identifications based on quantitative data alone. Based on one ratio and qualitative data we devised a dichotomous key that we are now using to identify fossilized snake vertebrae from the archaeological Las Vegas site, Ecuador. Two vertebral structures, the metapophysis and hypapophysis, seem to be linked to the snakes' ecology. All Boidae and Viperidae species examined had small metapophyses and were largely terrestrial. Within the Colubridae, a small metapophysis suggested and arboreal snake, while a longer metapophysis suggested a terrestrial, fast moving snake. Twe hypothesize that the presence of a prevalent hypapophysis in front-fanged venomous snakes is required for striking prey. Well developed haemal keels were generally found in non-venomous snakes.

11:45 DIVISIONAL BUSINESS MEETING

Poster Session (Following Dodgen Lecture)

P4.01
USE OF POPULATION GENETICS TO ASSESS STABILITY OF CONSERVATION EFFORT OF ANDROS ROCK ENDEMIC IGUANIDS

George Stoner[1], Giuliano Colossimo[2], Charles Knapp[3], Mark Welch[2]
[1]University for Women, Columbus, MS, USA,[2]Mississippi State University, Starkville, MS, USA ,[3]Shedd Aquarium, Chicago, IL, USA

Cyclura cychlura cychlura is the largest terrestrial vertebrate native to Andros, the Bahamas. These iguanas are currently listed as "Endangered" in the IUCN Red List of Threatened Species. In fact the Andros iguana faces unique anthropogenic pressure relative to other species in the Bahamian archipelago, including habitat loss, predation by feral mammals and illegal hunting. The combined effects of human mediated disturbance and the natural history of Andros Island have resulted in a series of populations that are highly fragmented. Small groups of individuals occur nowadays on different cays in pockets of appropriate habitat. The conservation programs currently under way have been designed without taking population genetic data into account. Genetic data has been proven critical when launching conservation efforts to protect endangered species. If a species is to survive, a sufficient level of genetic diversity is necessary to withstand environmental stochasticities. Thus, to ensure the greatest chance of long-term survival, the conservation efforts need to be focused on source populations, the ones presenting high level of genetic variation

GEOLOGY AND GEOGRAPHY

Chair: Dr. Stan Galicki,
Millsaps College

Vice-chair: Dr. Zach Mussellman,
Millsaps College

FRIDAY MORNING
Room 229

O5.01
9:00 MISSISSIPPI EARTHQUAKE INVESTIGATIONS

Michael B. E. Bograd
Mississippi Office of Geology, Jackson, MS, USA

The compilation of information about the infrequent and low-magnitude earthquakes within Mississippi provides insight into where earthquakes occur and perhaps where future, larger magnitude earthquakes might occur. Within the last year, two small earthquakes were detected north of Meridian and one in northern Coahoma County. Of the 52 recorded earthquakes with epicenters within Mississippi, 30 were felt and 22 were not known to have been felt. The 1931 earthquake in the Batesville-Charleston area cracked walls and toppled chimneys, illustrating that damaging earthquakes are possible. Many of Mississippi's earthquakes are located in the northwestern quadrant of the state, nearest the New Madrid Seismic Zone, which poses the greatest risk to the state from earthquake shaking. Earthquakes have occurred in other parts of the state, notably east-central Mississippi and even the coastal counties. Earthquakes occur in all neighboring states and in the Gulf to our south, so it is important to map earthquake hazards. Maps depicting geology susceptible to soil amplification and liquefaction show parts of the state are at risk, especially flood plains of rivers, including the Mississippi River alluvial plain. Unstable slopes also pose a hazard during earthquake shaking. Deployment of additional seismic instruments in the state would add to the record of detected earthquakes. Scientifically useful

information can be obtained also by conducting felt area studies when events occur, conducting paleoseismological investigations, and searching archived records for reports on the effects of past earthquakes.

O5.02

9:15 SITE EFFECTS EVALUATION OF NORTHERN MISSISSIPPI

Zhen Guo, Adnan Aydin
University of Mississippi, Oxford, USA

Considering seismic intensity equal, damages caused by earthquake can be totally different within the areas of influence due to the variations in local surface geological conditions, so-called site effect. Northern Mississippi, located in moderate to heavy potential damage area of New Madrid Seismic Zone (NMSZ), is deep (up to 1000m) and unconsolidated fluviatile deposits, which has an important, though poorly understood effect on site effect to earthquake. Researchers have estimated an 86% - 97% probability of an earthquake with magnitude larger or equal than 6 occurring by 2035. In this case, it is essentially necessary to evaluate the site effect. To evaluate the site effect, essentially to find the predominant frequency and amplification factor, microtremor is chosen to be the method due to its fast and low cost operation and reliable evaluation result. 3-D Microtremor measurements were carried out at more than 211 points in Northern Mississippi. H/V spectra ratio was calculated for each measurement to estimate the predominant frequency and amplification factor. The measuring points are classified in terms of predominant frequency value and amplification factor respectively, and then plotted on the geological base map with unconsolidated sediment thickness contour lines. Kriging raster is created to display the distribution of predominant frequencies and amplification factor. The overall correlation between predominant frequency and unconsolidated sediment thickness are estimated.

O5.03

9:30 ENVIRONMENTAL JUSTICE'S HISTORY AS A SOCIAL MOVEMENT

John Kendall Crumpton
University of Southern Mississippi, Hattiesburg, MS, USA

The concept of Environmental Justice (EJ) blends political action, the science of environmental systems and the uneven development of urban landscapes. This paper examines primary and secondary sources to explain EJ's history as a social movement which propelled it to the national scene as evidenced in forms of popular culture. I draw a parallel to the modern Civil Rights Movement and its rise to national prominence in the 1960s due to grassroots efforts. By the early 1990s, some themes of EJ, such as the dire effects of toxic pollution, were so well-known that they had become pervasive agents in children's cartoons (*Teenage Mutant Ninja Turtles*, *Captain Planet and the Planeteers*, and the *Toxic Avengers*). Local groups collectively acting across the United States helped push the agenda of what became EJ. Therefore, the Environmental Justice movement has gained momentum and national awareness through localized social movements.

O5.04

9:45 CARBON MANAGEMENT IN MISSISSIPPI: THE NEED FOR AN INTEGRATED APPROACH

Omar Harvey
The University of Southern Mississippi, Hattiesburg, MS, USA

With evidence (and the consequences) of global warming becoming more apparent, a business-as-usual approach to managing carbon emissions may not be a feasible approach for Mississippi and other Gulf States. In addition to the risks posed by global-warming-induced sea-level rise, the warming of the Gulf of Mexico would result in more frequent and more powerful hurricanes. More frequent and powerful storms would have devastating effects on the States critical infrastructure and natural resources, with escalating recovery cost – as observed from recent hurricanes. The presentation will seek to establish why a proactive, integrated and interdisciplinary approach to carbon management is necessary for Mississippi. Focus will be placed on three primary themes; 1) carbon management to support the State's energy industry; 2) carbon management to support the agriculture industry; and 3) carbon management in natural (unmanaged) systems. In addition to fundamental science and engineering research, the need for complimentary efforts in education, entrepreneurship and community outreach will be discussed. Potential avenues for collaboration across disciplines and institutions will also be discussed.

O5.05

10:00 TERRAIN ANALYSIS OF A FLAT TERRAIN: THE HIDDEN TOPOGRAPHY IN THE MISSISSIPPI-YAZOO ALLUVIAL PLAIN

Pat Mason
Mississippi Office of Land & WaterResources, Jackson, MS, USA

Generations have learned about meandering river systems by studying aerial photos of the meander scars and other subtle topographic features left by the shifting course of the lower Mississippi River. However, moving to the regional scale on this very low-relief topography, the detail evident in photo tiles is degraded in topographic contours or digital elevation models of the 'Delta' region of northwest Mississippi. The gentle north-to-south slope of the plain dominates the topographic contours, so that local details are partially obscured.This obscuring slope can be removed by processing a digital elevation model data set of the area, and the methodology is described in detail. The result is a synthetic landscape which may be referred to as 'de-trended' topography. When this process is done for the Mississippi-Yazoo alluvial plain, the paleocourses of the Ohio, Mississippi, and Yazoo rivers are much more readily discerned, and the varying lithologies of the floodplain topstratum are more easily delineated and studied.

10:15 BREAK

O5.06

10:30 DEPOSITIONAL PATTERNS OF FLOODPLAIN SEDIMENTS DURING THE 2011 LOWER MISSISSIPPI RIVER FLOOD IN WILKINSON COUNTY, MISSISSIPPI, AND WEST FELICIANA PARISH, LOUISIANA

Franklin Heitmuller[1], Paul Hudson[2], Richard Kesel[3]
[1]The University of Southern Mississippi, Hattiesburg, MS, USA, [2]Leiden University College The Hague, The Hague, The Netherlands, [3]Louisiana State University, Baton Rouge, LA, USA

The 2011 flood along the Lower Mississippi River established new stage records between Vicksburg, Mississippi (17.4 m) and St. Francisville, Louisiana (16.3 m), and overbank conditions lasted for over 45 days from early May to mid-June. Thickness and particle size of overbank sediments were sampled immediately following the flood at 55 sites in non-embanked floodplains in Wilkinson County, Mississippi, and West Feliciana Parish, Louisiana. Results indicate relatively minor amounts of sedimentation in various depositional sub-environments (e.g., natural levees, meander scroll zones, backswamps) across the floodplains. Only four sites had >100 mm of deposition, and twenty-seven sites had <10 mm of deposition. Generally, sediment thickness and particle size decreased from the channel bank, but some sites directly on the bank exhibited <10 mm of sedimentation despite being inundated to a depth >4 m. Such discrepancies can be associated with advective overbank flow patterns across the floodplain, whereby abandoned channel segments proximal to the main channel facilitated return flows and thus serve as a localized reversal of the oft-assumed channel-to-floodplain flow direction during floods. Finally, a comparison of thickness and particle-size data with the prolific 1973 flood in the same study areas indicates that overbank flow velocities were probably greater in the 2011 flood, as evidenced by relatively coarse sediment deposits in meander scroll swales and backswamp deposits. These findings could indicate that soil particles from levee backslopes and meander scroll ridges were detached (i.e., eroded) and transported to swales or distal backswamps.

O5.07

10:45 KAOLIN AND BAUXITE DEPOSITS IN MISSISSIPPI - A POTENTIAL SOURCE FOR CERAMIC PROPPANT

David Thompson
MDEQ, Mississippi Office of Geology, Jackson, MS, USA

The surge of hydraulic fracturing in oil and gas production has resulted in a heightened demand for proppant materials. One primary source for proppants (i.e. frac sand) has been from ancient Paleozoic sands in the Upper Midwest and Texas, which consist of very hard, spherical, quartz grains. While Mississippi possesses enormous sand resources, typically, these deposits do not meet the industry quality standards for proppants. Another source for proppant material comes from the manufacture of ceramic material (bauxite, kaolin). Through the process of sintering, ceramic materials are baked at high-temperature, which alters the molecular structure and generates spherical, uniformly dense particles. Mississippi holds substantial deposits of high-alumina clay (kaolin) and bauxite, which may be suitable material for the manufacture of ceramic proppant. These deposits are associated with the Naheola Formation, which

outcrops in an arc from Lauderdale County (along to the Alabama state-line) northward to Tippah County (along the Tennessee state-line). More specifically, the kaolinitic/bauxitic stratigraphic horizon is positioned in the upper portion of the Oak Hill Member of the Naheola Formation. These deposits were recognized as early as 1922, when Paul W. Morse published MGS Bulletin 19, which detailed his exploratory program for bauxite and included analyses of high-alumina clays. Marshall K. Kern revisited the topic in 1963 (Bulletin 97) by discussing the economic potential of alumina-rich clays and bauxite in Mississippi. Kern reported chemical analyses of kaolinitic and bauxitic material as follows: Al_2O_3 (26.0 - 54.95%), SiO_2 (16.94 - 59.0%), Fe_2O_3 (0.5 - 3.42%), TiO_2 (1.0 - 2.2%).

Lunch 11:00-1:00

FRIDAY AFTERNOON
Room 229

O5.08
1:00 BUILDING ON THE YAZOO CLAY

David T. Dockery III
Mississippi Office of Geology, Jackson, Mississippi, USA

The Yazoo Clay is a smectitic marine clay, which swells and shrinks with rain and drought, causing foundation problems in the Jackson, Mississippi, metro area and across the state from Yazoo City in the west to Shubuta in the east. Britt Maxwell of Maxwell Engineering recognizes the swell-and-shrink "active zone" to occur within the upper fourteen feet of the weathered Yazoo Clay. Below fourteen feet, the weight of the overburden is greater than the general swell pressure of the clay. However, tests run on clay samples at the Nissan Plant south of Canton, Mississippi, found swell pressures of 1 to 9.5 tons per square foot (tsf). A swell pressure of one tsf can lift 17 feet of typical fill dirt; a pressure of 9.5 tsf can lift 165 feet of dirt. Overburden helps reduce moisture loss, so it is less likely that clay at depth will reach its full swell or shrink potential. Thus, it is recommended that slab foundations have seven feet of cover above the weathered Yazoo Clay, including a seven foot buffer zone extending out from the foundation. Foundation work for a slab, where the clay is at the surface, requires a seven-foot deep excavation of clay to be replaced by suitable fill material. An alternative foundation consists of pilings, which extend into the unweathered Yazoo Clay, supporting a building with a crawl space beneath the first floor.

O5.09
1:15 THE RACE FOR SPACE: FOULING FOSSIL-FEEDERS FROM THE LATE CRETACEOUS AND PALEOGENE OF MISSISSIPPI

George Phillips
Museum of Natural Science, Jackson, Mississippi, USA

Several different types of sedentary organisms compete for living space on hard surfaces of the seafloor. The longer a solid object lies exposed on the bottom of the ocean, the greater the degree of fouling it will experience from encrusting organisms, namely filter-feeders. Tropical coral reefs are the extreme example of cumulative encrustations, sometimes forming immense build-ups, but encrusting epibenthos are found on even the seemingly barest of seafloors. Cementation to a stable surface is typically the final act of the larva following settlement but may become less important as the animal reaches a critical size. If the object providing substrate is smaller than the average adult of the encrusting taxon, then the object may be overgrown by the encruster. Benthic foulers with sturdy carbonate skeletons that cement to equally durable substrates have a strong likelihood of preservation in the fossil record. Encrusting invertebrates are well represented in calcareous deposits of Late Cretaceous and Paleogene age in Mississippi. Among the bivalves, oysters and spondylids commonly encrust hard objects, and large oysters are important substrates for other foulers, including smaller oysters. Foraminiferans, corals, bryozoans, and polychaetes are among the commoner invertebrate groups observed encrusting skeletal fossils and rocks in Mississippi's pre-Neogene fossil record. Gorgonian (octocoral) bases are also found attached to fossil oysters on occasion. Paul Taylor of the Natural History Museum in London is currently studying Mississippi's Cretaceous and Paleogene bryozoans, and Manfred Jäger will be studying the sedentary polychaetes in the collections at the Mississippi Museum of Natural Science

O5.10
1:30 STROMATOPOROIDS FROM GRAVELS OF THE PRE-LOESS TERRACE DEPOSITS IN MISSISSIPPI

James Starnes, RPG

Mississippi Office Of Geology, Jackson, Mississippi, USA

Paleozoic Era stromatoporoids have been identified in the coarse, chert-bearing gravels of the Pre-loess Terrace Deposits of the ancestral Mississippi River along the river's eastern valley wall in western Mississippi. Stromatoporoids were a reef-forming, sponge-like animal that inhabited warm shallow seas during the Ordovician, Silurian, and Devonian times. They are identified in cross-section, under microscopic inspection, as layered masses divided by lace-like interlocking septa. Specimens from the Pre-loess Terrace Deposits which have undergone uniform secondary replacement by chert tend to maintain a high level of structural detail. Alternately, where interlaminated layers of chert and quartz druse have replaced the stromatoporoids, much of the minute structural detail, such as the galleries, laminae, and pillars have been destroyed. This poorer type of preservation makes macroscopic identification of these fossils difficult, so identification is based typically on the layered form of the latilamina or by the presence of the mamelon and astrorhiza on the outer surfaces. Stromatoporoids are abundant in bedrock formations in the upper reaches of the Ohio River Valley particularly in the Devonian rocks of the Ohio River Falls region. The relative abundance of these fossils in the Pre-loess Terrace Deposits may be attributed to the outwash of the Ohio River into the Mississippi River Valley during the Pleistocene. These fossils are either curiously rare or absent from the older Plio-Pleistocene age gravels of the Citronelle Formation, east of the Pre-loess Terrace Deposits in Mississippi. Consequently, their presence may indicate shifting bedrock source areas as a result of Pleistocene glaciation.

O5.11
1:45 OSTRACODA FROM BAYOU DESIARD, OUACHITA PARISH, NORTHEAST LOUISIANA

Mervin Kontrovitz, A. Dale Magoun, John F. Anderson
University of Louisiana at Monroe, Monroe, Louisiana, USA

Freshwater ostracodes have received little attention compared to other invertebrates across much of North America, including Louisiana. Here ostracodes are considered from Bayou Desiard, an isolated, abandoned channel of the Ouachita River. Cluster analysis was used to identify species associations or assemblages. Seven species represented by 7502 valves were recovered from the 10 sites. *Candona elliptica* Furtos, 1933, *Cypria ophtalmica* (Jurine, 1820) and *Cypridopsis vidua* (O.F. Muller, 1776) comprised an assemblage. *Darwinula stevensoni* (Brady & Robertson, 1879), *Potamocypris smaragdina* (Vavra, 1891) and *Ilyocypris bradyi* G.O. Sars, 1890 formed another assemblage. *Physocypria globula* Furtos, 1933, most commonly occurred where other ostracode species were rare or absent. Water conductivity, biological oxygen demand and suspended solids appear to be important factors related to the abundance of valves at each station.

O5.12
2:00 E. COLI CONTAMINATION AND NUTRIENT LOADING IN URBAN STORMWATER, JACKSON, MISSISSIPPI

Stan Galicki[1], Hunter Berch[2]
[1]*Millsaps College, Jackson, MS, USA,* [2]*Louisiana State University, Baton Rouge, LA, USA*

Interest in reviving urban areas with the development of water features is becoming popular. The implications of manipulating the flow of urban creeks should be fully investigated prior to construction. Jackson, Mississippi has a population of over 170,000 residents in the 265 km^2 city limit and features land use ranging from residential to light industrial. An assessment of nitrate, phosphate, TDS, TSS, and E. coli contamination on five streams within the urban watershed was conducted between 2010 and 2012. The average E. coli concentrations of 150 water samples from 32 storm events averaged 18,700 CFU/100 ml. Nitrate values averaged 1.27 mg/L and phosphate averaged 0.69 mg/L. TSS and TDS values averaged 345 ppm and 119 ppm respectively. Contamination of Jackson's urban creeks should not come as a surprise; the city has filed 674 sewer bypass reports with the MDEQ over the past three years on 14 urban creeks. The finding of street-level E.coli in excess of 25,000 CFU/100 ml, however, is indicative of contamination by domestic animal waste. A municipality that utilizes surface water as its primary source of drinking water, operates a water treeatment plant from an out take within the urban watershed, and receives an average of 60 in of precipitation annually should consider regulations to better protect its water source.

2:15 BUSINESS MEETING

HEALTH SCIENCES

Co-Chair: Arron Pucket, University of Mississippi Medical Center
Co- Chair: Zelma Cason, University of Mississippi Medical Center

Thursday, February 21, 2013

THURSDAy MORNING
COCHRAN 226

8:45 Welcome and Opening Remarks

O6.01
9:00 THE EFFECTS OF PRR ON MSC CELLS IN CULTURE

Will Johnson, Gerri Wilson, Michelle Tucci, Ayman Asfour, and Ham Benghuzzi
University of Mississippi Medical Center, Jackson, MS 39216

The success of tissue engineering applications can potentially be dramatically improved with the addition of adjuncts that increase the proliferation and differentiation of progenitor or stem cells. Platelet-rich plasma (PRP) has recently emerged as a potential biologic tool to enhance healing of acute and chronic inflammatory conditions. The regenerative potential of PRP is based on the release of factors that occurs when the platelets degranulate. The purpose of this study was to determine the effects of 1 x 10^6 of platelets on cultured mesenchymal stem cells (MSCs) for 1-9 days. The cells were evaluated for cell growth, cell damage and cell morphology and compared with cells grown in control media. The most significant changes were seen in the cellular morphology over time. These results confirm that PRP enhances suggests that PRP causes differentiation of MSC in vitro.

O6.02
9:15 EFFECT OF EXTRACELLULAR ADENOSINE TRIPHOSPHATE ON ACTIVITY OF OSTEOBLAST-LIKE CELLS

Siddhant K. Mehta, Michelle A. Tucci, and Hamed A.Benghuzzi
University of Mississippi Medical Center, Jackson, MS 39216

Platelet dense granules contain serotonin, adenosine triphosphate (ATP), and adenosine diphosphate (ADP). These molecules are present in platelet rich plasma (PRP), and may therefore have an impact on the efficacy of PRP therapy. Additionally, nucleotides are important extracellular signaling molecules in a variety of tissue types including bone. The purpose of this investigation was to evaluate the in vitro dose-dependent effects of extracellular adenosine triphosphate (ATP) exposure on activity of human osteoblast-like cells. MG-63 cells were exposed to phosphate buffered saline (control group) or ATP solution (20 µM, 100µM, 200 µM). Osteoblast viability was evaluated at 24, 48, and 72 hours using nonspecific and osteoblast-specific markers and cellular morphology.
No significant differences in total protein, MDA, or glutathione were observed with ATP exposure at any timepoint. High dose ATP exposure resulted in a significantly higher production of nitric oxide compared to controls and other groups. With respect to alkaline phosphatase activity and osteopontin production, no significant differences were present with ATP exposure. Overall conclusion: Extracellular ATP exposure modulated osteoblast activity with no change in cell viability in vitro.

O6.03
9:30 BUILDING A TRUSTED HEALTHCARE INFORMATICS PLATFORM: IMPLEMENTATION OF THE ENTERPRISE DATA WAREHOUSE AT THE UNIVERSITY OF MISSISSIPPI MEDICAL CENTER

Denise Krause
University of Mississippi Medical Center, Jackson, MS 39216

The essential foundation necessary to integrate disparate and heterogeneous data in a large organization is a trusted informatics platform. The University of Mississippi Medical Center is one of many academic health science centers taking strides to build capacity in biomedical informatics and data analytics. The enterprise data warehouse is a vital component to unleash the power of informatics in healthcare, bringing together clinical and financial information from various data sources to identify and analyze data for interpretation. To provide this critical infrastructure and to meet needs across the institution, our main objective was to use open source software and analytics on health-related data to speed the transition of biomedical research into new treatments that improve health outcomes.

The healthcare informatics platform, capable of serving all institutional needs, eliminates the need for disparate data sources housed in silos. The centralized data resource should be governed, not owned, by a well-represented data governance organization. Developing an informatics platform is not a typical IT project. It is a very high-level enterprise initiative that spans all departments and functional areas in the organization. Careful planning and a good implementation are keys to success.

Such a comprehensive institutional data resource can be instrumental in, 1) supporting quality improvement and controlling costs, 2) facilitating research and discovery across datasets, groups, and departments, and 3) providing infrastructure necessary to build the institution's capabilities in biomedical informatics.

O6.04

9:45 USE OF CASEIN HYDROLYZATE IN THERMIZED WHEY-BASED EDIBLE COATING SOLUTIONS TO REDUCE COLIFORM GROWTH IN SHOULDER CUT BEEF STEAK

Yin Zhang, Zahur Haque, Byron Williams, Dipaloke Mukherjee, Sam Chang
Mississippi State University, Mississippi State, MS, USA

We investigated the antimicrobial efficacy of thermized cheddar whey-based edible coatings containing casein hydrolyzate (CH) to reduce coliform growth on shoulder cut beef steak. Samples of equal weight (5g) were treated with the coating solution (5% w/v cheddar whey powder, 0.125% calcium chloride, 2.5% sorbitol, 0.25% carboxymethyl cellulose, 0.25% glucomannan), with and without CH of varying concentrations up to 0.4% (w/v), incubated at 37°C for 48 hours and coliform growth was estimated by plate count method. At the very lowest concentration of CH (0.05%), microbial growth was not markedly affected. However, as concentration was increased, coliform growth was thwarted. CH exhibited its best antimicrobial efficacy at concentrations of 0.15 – 0.20% as evident from total prevention of growth. Beyond concentration of 0.2% (w/v) CH seemed to lose its antimicrobial efficacy. Beef steak samples coated with edible films containing 0.25, 0.30 and 0.35% (w/v) of CH showed colony counts of 4.83 X 103, 6.30 X 102 and 4.10 X 104 CFU/mL, respectively. It is conceivable that at concentrations above 0.2% (w/v) the hydrophobic peptides in CH, that have a high entropy driven association tendency, cluttered and micellized effectively reducing the total number of peptide particles that were available for cell lysis; the purported mechanism of this bacteriostatic effect. beef steak samples with an edible-coating solution containing appropriate concentrations of CH can markedly reduce coliform contamination, thus result in the improvement of beef safety during retail marketing.

Key Words: Coliform, casein hydrolyzate, antimicrobial effect, coating solution

O6.05

10:00 THE EFFECT OF ELECTRONIC EMERGENCY PROVIDER WRITTEN PLAN OF DISCHARGE HANDOFF COMMUNICATION ON OUTPATIENT STRESS-TEST/MYOVIEW AND PRIMARY CARE FOLLOW-UP DAYS AFTER DISCHARGE FROM AN EMERGENCY DEPARTMENT IN MISSISSIPPI

Linda Watkins[1], Elgenaid Hamadain[2]
[1]*University of Alabama, Alabama, Birmingham, 35487, USA,* [2]*University of Mississippi Medical Center, Jackson, MS 39157, USA*

Lack of proper handoff communication at patient care transition points contributes to medical errors, mistakes or near misses resulting in adverse patient outcomes including death(1). Patient safety is dependent upon accurate communication in health care (2). One of the most crucial points of communication occurring in the health care setting is from hospital to home and even more critical is the discharge from the emergency department to home (3). We examined the effect of the electronic Emergency Provider Written Plan of Discharge *e*EPWPD on outpatient testing and primary care follow-up. We reviewed the medical records of 132 low risk chest pain patients prior to the *e*EPWPD and 226 low risk chest pain patients after the implementation of the *e*EPWPD comparing the number of days for outpatient stress-test/myoview and primary care follow-up days. Two independent sample t-tests were performed on the pre-*e*EPWPD and post *e*EPWPD days to compare the two groups. Results showed that both outpatient stress-test/myoview days (mean= 78.78 ± 13.82 SE vs 36.97 ± 7.12 SE; p-value= 0.008 and primary care follow-up days (mean=90.30 ± 13.81 SE vs 49.69 ± 7.39; p-value= 0.01) were significantly higher in the control group. We conclude that the *e*EPWPD handoff communication appears to positively impact the safety and continuity of care for the patient discharged from the emergency department

10:15 BREAK

O6.06

10:30 ASSESSING INSTRUMENTAL VERSUS INTUITIVE GRIEF PATTERNS BY KEY CHARACTERISTICS IN RESIDENT PHYSICIANS

Therese Sison, Warren May, Ralph Didlake

University of Mississippi Medical Center, Jackson, MS, USA

Introduction: Physician grief and meager professional support for it have been increasingly examined (Aase, 2008; Moores, 2007). Recently, grief and loss patterns have been characterized as instrumental (problem-solving), intuitive (demonstrative), and blended (Doka, 2010). We assessed grief patterns in residents and compared outcomes with key physician characteristics.

Methods: 281 residents (female 98, primary care 178, specialties with more patient contact 163, no recent personal loss 225, no patient loss 141) from 15 specialties participated in this voluntary, anonymous survey, using a recently developed and validated grief pattern instrument (Doka, 2010), modified for resident physicians and to include only quantitative items.

Statistical Analysis of Data: Statistical analysis was performed by ANOVA.

Results: Data reflected a blended grief pattern for most residents. Statistically significant differences by specialty were observed only for Pediatrics and Neurosurgery. When specialties were grouped as ‘primary’ vs. ‘non-primary’ care, respondents in the former had significantly higher instrumental scores (p-value<0.001). Intuitive score means were significantly higher for specialties with more patient contact (p-value<0.001); conversely, instrumental scores were significantly higher with less contact (p-value=0.0130). Females had significantly higher intuitive, and males significantly higher instrumental, scores (p-value<0.001). No statistical significance was observed for experiences with personal and patient loss, nor any meaningful correlation between scores and age.

Discussion: Most residents showed a blended grief pattern. However, meaningful differences were observed for some characteristics. Studies to gain greater insight into influential characteristics, clinical experiences, and grief patterns could help yield effective, evidenced-based postgraduate education and professional support for physician grief.

O6.07

10:45 HEARING AID USE BY UNILATERALLY IMPAIRED INDIVIDUALS: OUTCOME OF THE TINNITUS HANDICAP INVENTORY

Charles Bishop, Elgenaid Hamadain, Alex Ashford, Jason Galster, Ian Windmill

University of Mississippi Medical Center, Jackson, MS 39126, USA

Tinnitus is associated with unilateral sensorineural hearing impairments; however, little has been published on the most efficacious approach to treating tinnitus in this population. Conditions that result in unilateral hearing impairments may lead to different outcomes than conditions that commonly result in bilateral hearing impairments. In 2011-2012, 16 individuals with unilateral sensorineural hearing loss and tinnitus were dispensed a hearing aid for a three month field trial. Each participant was given the Tinnitus Handicap Inventory (THI) in pre- and post-hearing aid fitting conditions. Differences in THI total scores as well as sub-scale item scores were assessed between test conditions. The THI sub-scale items that saw the most reduction from ‘unaided' to ‘aided' conditions involved the impact of tinnitus on hearing function. Paired comparison t-test of THI total score group means was significantly reduced ($p < 0.05$) from the ‘unaided' to the ‘aided' condition. We conclude that use of a unilaterally prescribed hearing aid may benefit patients who suffer from significantly handicapping tinnitus. The observed benefits were variable (some reporting greater benefit than others). Reason for this variability is not clearly understood.

O6.08

11:00 POLYMERIZATION SHRINKAGE AND FILLER LOADING OF FLOWABLE DENTAL COMPOSITES

Suzanna Ellzey, Michael Harkins, Aaron Puckett

Department of Biomedical Materials Science, University of Mississippi Medical Center, Jackson MS, USA

New lower viscosity composites (Flowable Composites) have been introduced for use in dentistry. These materials are thought to give improved adaptation to tooth structure when used under higher filled conventional composites. Although these materials have lower viscosities, the filler loading is greatly reduced. The lower filler leading leads to increased shrinkage during polymerization. The shrinkage causes increased

stresses at the interface between the composite and tooth structure and may cause break down of this interface leading to earlier failure of the restoration. The objective of this study was to measure the filler loading and polymerization shrinkage of five different flowable composites. The specific gravity of ten composite samples was measured before and after polymerization. The difference in specific gravity was used to calculate the polymerization shrinkage. Three samples of each composite were pyrolyzed in an oven at 900^0 C to determine the glass content. All composite samples showed a polymerization shrinkage > 5% and correlated with the filler content. Due to the high polymerization shrinkage, these new Flowable composites may not be suitable for use as direct filling materials.

11:30 BUSINESS MEETING

Poster Session I
Authors should be available with their posters to answer questions 1:00-4:15 PM

P6.01
THE EFFECTS OF NEUROPEPTIDE Y ON OSTEOBLAST AND OSTEOCLAST CELLS LINES

Kierrariel Mitchell, Simeyon Butler, Gerri Wilson, Michelle Tucci, and Ham Benghuzzi
University of Mississippi Medical Center, Jackson, MS 39216

Neuropeptide Y (NPY) is a 36-amino acid neuropeptide that acts as a neurotransmitter in the brain and in the autonomic nervous system. In the autonomic system it is mainly produced by neurons of the sympathetic nervous system and serves as a strong vasoconstrictor and also causes growth of fat tissue. Recent evidence suggests NPY serves as a neuronal regulator in bone remodeling. Studies of neuropeptide Y (NPY) knock-out mice show increased bone formation, suggesting NPY directly affects bone cells. The purpose of this study was to evaluate the role of NPY (concentrations 0.1×10^{-9} (low), 0.2×10^{-9} (medium), and 0.5×10^{-9} (high)) on osteoblast and osteoclast cells in vitro for periods of 24, 48 and 72 hours. Our results show that NPY did not have a direct effect on osteoblast cells but showed enhanced nitric oxide production by osteoclast cells. According to our findings, osteoclast cell numbers were decreased as early as 24 hours and remained depressed through 72 hours of culture. Osteoclast cellular nitric oxide levels were elevated after 24 hours and remained elevated for the duration of the study in all three doses of treatment. The concentrations of NPY used in this study were consistent with levels of NPY found in control (0.1×10^{-9}) intact female animals and ovariectomized (0.2×10^{-9}) rats with evidence of osteoporosis. Our data suggest a direct stimulation of osteoclast cells, which is consistent with evidence in the literature suggesting NPY increased oxidative burst in rat peritoneal macrophages at similar doses. Additional in vivo studies are needed to address the changes in osteoclast nitric oxide production and its relationship to bone remodeling in pathophysiological states of bone loss.

P6.02
THE EFFECTS OF ALENDRONATE ON OSTEOBLAST CELLS IN CULTURE

Soaad Ibrahim, Esosa Adah Gerri Wilson, Michelle Tucci, and Ham Benghuzzi
University of Mississippi Medical Center, Jackson, MS 39216

Studies have shown that alendronate plays a major role in maintaining bone density and decreasing bone breakdown. Because of these effects, alendronate is used in the treatment of osteoporosis. The purpose of our experiment was to evaluate osteoblast cells in the presence of alendronate and to evaluate osteoporotic bone of animals that were given the drug for a period of eight weeks. In vitro, our results showed that the effect of alendronate on osteoblasts was dose dependent. Alendronate at a dose of 10^{-4}M significantly decreased cell numbers for the duration of the experiment, while a lower dose of drug (10^{-7}M) had no effect on cell number. In a second set of in vivo experiments, ovariectomized rats were treated with a physiological dose of alendronate, 0.025 mg/day (6.25×10^{-4} M), for 28 days. After 28 days of treatment femurs were harvested, fixed in formalin, decalcified, paraffin embedded, sectioned, stained and evaluated histologically. The evaluation showed no significant change in osteoblast or osteoclast number; however, there was an obvious size difference in both the osteoblasts and osteocytes. The data suggest over time the therapeutic dose of alendronate may directly affect the osteoblast cells which may ultimately effect bone strength.

P6.03
SUSTAINED RELEASE OF MANNITOL FROM TRICALCIUM PHOSPHATE DRUG DELIVERY DEVICE

Zack Watson[1], Courtland Brown[2], Michelle Tucci[2], and Ham Benghuzzi[2]
[1]Mississippi State University and [2]University of

Mississippi Medical Center, Jackson, MS 39216

Mannose, an isomer of glucose, is thought to aid in the healing of certain tissues, including tendons, when directly applied to the affected area. Sustained delivery of Mannose, or closely related sugars, is believed to substantially aid in the repair process and quality of certain tissues compared to those tissues treated directly. In this experiment, Mannitol, a sugar similar to Mannose, was encapsulated in fifteen porous, ceramic drug delivery devices of which three were shams, six were filled with 0.05g Mannitol, and six with 0.1g Mannitol. A delivery profile was found after soaking the capsules in sterile PBS for one week. The concentrations of released Mannitol were checked each day at noon. A graph of the concentration data did reveal a sustained release pattern with the sham showing no delivery, the 0.05g Mannitol showing a delivery of 3 micrograms/day over seven days, and the 0.1g Mannitol showing 4.5 micrograms/day over seven days. It was found that the capsules containing 0.05g Mannitol released 21 micrograms over the seven day period and the capsules containing 0.1g Mannitol released 31.5 micrograms over the seven day period. This shows that doubling the dosage does not necessarily mean doubling the amount delivered per day; rather, an increased dosage would be able to deliver a slightly larger amount for a longer period of time than the smaller dosage. This data shows that the device was successful in achieving a sustained delivery pattern. Subsequent tests on cells and later on larger, more complex models should be carried out to reveal the effects of this sustained release on living organisms.

P6.04

THE EFFECTS OF MANNOSE 6-PHOSPHATE AND MANNITOL ON MCCOY FIBROBLAST CELLS

Zack Watson[1], Courtland Brown[2], Michelle Tucci[2], and Ham Benghuzzi[2]
[1]Mississippi State University and [2]University of Mississippi Medical Center, Jackson, MS 39216

Mannose, an isomer of glucose, is thought to aid in the healing of certain tissues, including tendons, when directly applied to the affected area. Sustained delivery of Mannose, or closely related sugars, is believed to substantially aid in the repair process and quality of certain tissues compared to those tissues treated directly. In this experiment, the effects of Mannitol and Mannose-6-Phosphate were tested on McCoy fibroblasts. Two phases were performed: a direct delivery phase and a sustained delivery phase. In each phase, two well plates were used. Phase I yielded favorable results for the controls. For Mannose, the cell counts reached a peak at 48 hours and then declined. For Mannitol, the cell counts were inversely proportional to time. In Phase II, all controls and 24 hour cells were normal, but those cells treated with Mannose and Mannitol at 48 and 72 hours appeared morphologically and organizationally different. There are a few possibilities for this difference; however, it was seen that these cells began to organize into matrices or tissues. This organization suggests that the sustained delivery speeds the organization and repair of the cells, causing them to begin forming tissues just after 72 hours. This expedited organization caused by the sustained delivery is seemingly beneficial to the cells; however, further testing on cells and more complex models should be carried out to ensure the safety of this process.

P6.05

THE EFFECTS OF PLATELET RICH PLASMA ON DEGENERATING INTERVERTEBRAL DISCS.

Alicia Benjamin, Christina James, Michelle Tucci, Joseph A. Cameron, and Ham Benghuzzi
University of Mississippi Medical Center, Jackson, MS 39216

Platelet-Rich Plasma (PRP) was first discovered in the 1970s. PRP is a substance that plays a role in blood clotting and wound healing. PRP consists of plasma that is rich with platelets and is injected for inflammation and pain relief. In our investigation we studied the use of PRP during the healing process of degenerative disc in animal models over a period of time. The objective of this study is to analyze the early and late phase effects of platelet-rich plasma (PRP) injection into and around the damaged intervertebral disc using an animal model. The L4-L5 intervertebral disc of 21 adult Sprague-Dawley rats was injured with a 21-gauge needle. Specimens received an immediate injection of PRP, a delayed injection of PRP, or no further intervention (sham). MRI was performed for a control at time 0 and each group at 4 weeks post injury. Three specimens were collected at 2 and 4 weeks post PRP injection, as well as 2 sham and 2 controls. Each disc was sectioned followed by histolopathological analysis. **RESULTS**: The sham group had clear degenerative changes with loss of organizational structure, empty space, fibrous tissue, and inflammatory cells. The PRP treated groups had fibers that were damaged with some empty spaces and inflammatory cells.

However, there was maintenance of the ring structure and the nucleus appeared to have a healthy central portion. Overall, the PRP treated group retained more normal morphologic features, contained fewer inflammatory cells, and did not appear as damaged on MRI. The disk height was significantly different in the sham and immediate injection group at the 4 week interval.

CONCLUSIONS: The needle puncture technique is an effective method for creating a degenerative disk model. The administration of PRP has a protective effect on damaged disks and decreases the amount of inflammation in the acute and delayed injection settings. However, the greatest effect is noted with earlier injection.

P6.06

PLATELET-RICH PLASMA EFFECTS ON HEALING TISSUE INTERFACES: HISTOLOGICAL ANALYSIS IN A SPINAL DECOMPRESSION MODEL

Megan Williams, Michelle Tucci, Zelma Cason, and Ham Benghuzzi
University of Mississippi Medical Center, Jackson, MS 39216

Epidural fibrosis is thought to be an important factor in failed back syndrome. Fibrotic scar formation over the dura mater and around nerve roots following decompression surgery is thought to be the source of continued insult to these structures. Iatrogenic soft tissue trauma at the operative site is the cause of this fibrosis. While minimally invasive techniques have evolved to limit the degree of soft tissue trauma, it is ultimately unavoidable. Platelet-rich plasma (PRP) is an autologous product derived from whole blood containing a high concentration of platelets. Depending on the method used to derive the PRP the final product contains a variable concentration of platelets, white blood cells and other fractions of whole blood. These platelets release powerful growth factors as well as other signaling molecules. Preparations of PRP have been shown to affect the local inflammatory response and enhance healing in certain applications. Specific emphasis has been placed on the ability of PRP to promote tissue healing without formation of scar tissue, a desirable result in some situations. This phenomenon likely occurs through platelet modulation of macrophage activity during the inflammatory phase of healing and subsequent growth factor enhancement of the proliferative and remodeling phases. Our objective was to evaluate the effect of PRP on local inflammation and fibrosis post-operatively in the setting of laminectomy for spinal decompression. Our results show preservation of the disc in the PRP treated group compared with Sham treated animals. In addition, we found significant increase in the muscle bone attachment in the PRP treated group compared with both control and sham treated animals after eight weeks of treatment. Our results indicate that PRP has significant growth factors that contribute to re-establishing an interface between the muscle and bone as well as provide nutrients to sustain the disc. Additional studies are needed to evaluate the long term effects on the tissue response surrounding the nerve.

P6.07

THE EFFECT OF SUSTAINED DELIVERY OF DEMINERALIZED BONE MATRIX PROTEIN IN THE FEMALE RAT

Octavia Ingram, Michelle Tucci, Zelma Cason, and Ham Benghuzzi
University of Mississippi Medical Center, Jackson, MS 39216

INTRODUCTION: Several investigations have documented that sustained delivery of DBM is able to repair critical defects in male rats. However, the literature is lacking scientific evidence regarding the use of DBM in female animals. **OBJECTIVE:** The objective was to explore the role of sustained delivery of DBM and its effects on the vital and reproductive organ in female rats. **METHODS:** A total of 80 rats (OVX, n=24; intact control, n=8) were divided into 4 equal groups (intact control, sham (implanted with empty capsule, OVX + DBM (30 mg), and OVX control. Vaginal Pap smears and body weights (BW) were evaluated at baseline and at 2, 4 and 8 week post implantation. At the end of each phase, animals were euthanized and vital and reproductive organs were retrieved for histopathological evaluation. **RESULTS**: The results revealed significant differences in BW between intact control and OVX animals. Furthermore, there was a significant statistical difference ($P<0.05$) in BW between OVX, OVX + DBM. Vaginal Pap smear evaluation revealed that animals exposed to sustained delivery of DBM appeared similar to OVX. There were no significant differences ($P<0.5$) in vital organ wet weights among and between animals in all groups. **CONCLUSION:** Overall conclusion of this investigation proved that the sustained delivery of DBM did not result in pathophysiological changes in the female reproductive organs.

P6.08

THE EFFECT OF NEUROPEPTIDE Y ON MOUSE MSCS CELLS IN CULTURE.

Justin Reid, Michelle Tucci, Zelma Cason, and Ham Benghuzzi
University of Mississippi Medical Center, Jackson, MS 39216

Osteoporosis affects over half of our population beyond the age of 50, and hip fractures related to osteoporosis accounted for direct costs of $18 billion in 2002 ("About Osteoporosis: Fast Facts", 2006). The average length of a hospital stay for a primary fracture diagnosis is nearly one week, and approximately 25% of previously independent older patients who sustain hip fractures remain in long-term care for over a year. In response to the necessity for improved fracture care and shortened healing time, the field of orthopaedic surgery has begun to turn toward cellular and molecular biology research for the next answer. The goal of the proposed research is to determine if current treatment and potentially new therapeutic compounds are capable of regulating bone cell function. MSC cells were treated for periods of 24, 48 and 72 hours in the presence of neuropeptide Y. Following the incubation, cell viability, cell function, and morphology were determined. The results indicated a significant increase in MSC proliferation without evidence of cellular damage. The data shows NPY agonist has effects on the precursor to bone cells.

P6.09

THE EFFECTS OF NEUROPEPTIDE Y ANTAGONIST ON TWO EWING SARCOMA CELL LINES

Cory Gemelli, Michelle Tucci, Zelma Cason, and
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Ewing's sarcoma is a malignant small, round, blue cell tumor. It is a rare disease in which cancer cells are found in the bone or in soft tissue. Ewing's sarcoma occurs most frequently in teenagers and young adults, with a male/female ratio of 1.6:1. Although usually classified as a bone tumor, Ewing's sarcoma can have characteristics of both mesodermal and ectodermal origin, making it difficult to classify. Recent evidence in the literature suggests that Ewing's sarcomas have increased number of NPY receptors. The purpose of this study was to determine the effects of using an NPY antagonist on two different Ewing sarcoma cell lines (epithelial vs fibroblast). Our results showed significant differences in cellular morphology following administration of NPY antagonist regardless of cell line. The data suggest that NPY antagonist may be useful in targeting the cancer cells with NPY antagonist linked to chemotherapeutic drugs.

P6.10

REVERSING THE EFFECTS OF NPY ON BONE CELLS USING NPY ANTAGONIST

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Neuropeptide Y (NPY) is a 36-amino acid neuropeptide that serves as a neuronal regulator in bone remodeling. The purpose of this study was to evaluate the role of NPY (0.2×10^{-9}M) on osteoblast cell morphology for periods of 24, 48 and 72 hours, and to determine if changes could be reversed using an antagonist against NPY. Cells treated with NPY showed evidence of hyperchromasia after 24 hours in culture. At 48 and 72 hours the cells showed evidence of vacuolization and anucleation. The changes in morphology were reversed using an NPY antagonist. The data suggest that NPY can affect osteoblast cells. In addition, the antagonist can be used to block the effects of the NPY. Additional work needs to be performed to determine if the NPY is inducing apoptosis which is responsible for bone loss seen when NPY levels are high or in NPY knock-out animals.

P6.11

EARLY EFFECTS OF POSS ON TISSUE HEALING USING A PIG MODEL

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Polyhedral oligomeric silsesquioxane or POSS chemicals have been used to prepare nanosized designed novel composites with a variety of potential applications. . POSS is composed of a silicon–oxygen framework that can be easily functionalized with a variety of organic substituents. The purpose of this study was to determine if POSS can be used as a protectant barrier in wound care, and to determine with the response of the healing tissue towards the material. A pig skin wound model was used to test the POSS material over time. Biopsies were taken after 3 days to determine the short term response to

the material which was compared with wounds which were not treated. The data shows that POSS was able to protect the skin against infection and did not interfere with the normal tissue healing response. The data suggests that the material may be serving as a barrier to protect against bacterial infection or may have antibacterial properties. More studies are needed to determine the longer term effects on wound healing.

P6.12

DEVELOPMENT OF A LC/MS METHOD TO QUANTIFY PODOCIN, A POTENTIAL BIOMARKER FOR CHRONIC KIDNEY DISEASE

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Chronic kidney disease (CKD) results in significant illness and mortality in the United States. It can progress through several stages with increasing loss of kidney function that ultimately leads to end stage renal disease (ESRD) and kidney failure. Our goal is to develop a liquid chromatography/mass spectrometry (LC/MS) assay to measure levels of important biomarkers of CKD in urine samples. The biomarker we have chosen is podocin, a protein found in specialized cells in the glomerulus of the kidney called podocytes. Since kidney disease results in loss of podocyte function and number, we hypothesize that podocin levels in the urine may be an accurate indicator of kidney disease state. We used database searches to obtain the sequence of podocin and selected candidate peptides to use in our LC/MS method. We confirmed that the peptides chosen had transitions that had been observed in other proteomics studies. We optimized MS conditions and began development of an LC/MS method to be used in the analysis. Standard curves generated for each of the peptides demonstrated appropriate concentration dependence and were found to be suitable for the research project. We are currently performing quality control (QC) measurements to quantify known amounts of podocin peptides in mock sample extracts to eliminate matrix-dependent interferences. We will then proceed with trypsin digests proteins prepared from rats prone to developing CKD. (Supported in part by an award from the Howard Hughes Medical Institute to the Base Pair Program)

P6.13

SURFACE CHARACTERIZATION OF POLYPEPTIDE-POLYELECTROLYTE CONJUGATE COATINGS FOR CELL CULTURE

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In order to study and treat liver diseases such as non-alcoholic fatty liver disease, an improved *in vitro* hepatic cellular model is needed. Elastin-Like Polypeptides (ELPs) are a class of genetically engineered polypeptides that have demonstrated promise as a hepatocyte culture substrate, encouraging adherence and hepatic function from primary rat hepatocytes. Furthermore, hydrophobic ELP molecules conjugated with hydrophilic polyethyleneimine (PEI) induce an accumulation of primary rat hepatocytes into 3D spheroid aggregates in culture. Cells of these spheroids demonstrate increased production and cell function more closely aligned to *in vivo* hepatocytes than do cells comprising traditional monolayer morphology. To extend our knowledge of electrochemical and morphological properties of ELP-PEI conjugates, we characterized hydrophilicity of ELP-PEI conjugates with a range of surface charge distribution by performing contact angle measurements (goniometry) on ELP-PEI coated TCPS surfaces. We also mapped the morphology of these surfaces using atomic force microscopy (AFM). We seek to correlate hydrophilicity, spatial topography, and surface charge distribution with hepatoma cell culture function, adherence patterns, hepatic spheroid size, and hepatic spheroid movement. This work is supported by NSF Award # 1033525.

P6.14

THE GEOGRAPHIC DISTRIBUTION OF MAMMOGRAPHY RESOURCES IN MISSISSIPPI

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Breast cancer is the most frequently-occurring cancer and the second-leading cause of cancer death in women. Since 1990, breast cancer mortality rates have steadily declined in the U.S.A. due to the combined use of screening mammography and adjuvant therapy. However, improvements in survival have not been uniform in all populations and in all geographic regions. Despite having lower incidence rates for breast cancers, African-American women die from these diseases at higher rates than do Caucasian women. Because of the profound impact

of population-based disparities on Mississippi's overall breast cancer control outcomes, we investigated whether the geographic distribution of mammography resources affects breast cancer incidence, staging and/or mortality. We used Geographic Information Systems (GIS) technology to map all mammography facilities in Mississippi and the surrounding states. Publicly-available population characteristics available through the U.S. Census Bureau, and breast cancer statistics available through the Mississippi Cancer Registry, were geocoded into this map. The geographic distribution of mammography resources primarily correlates with population densities and major traffic arteries in Mississippi. The relationships between cancer outcomes and mammography resources are complex, and must be interpreted in the context of other demographic characteristics. Our results may be useful in identifying counties where breast cancer education and screening programs should be modified or intensified.

P6.15

DEVELOPMENT OF AN EXERCISE AND PHYSICAL ACTIVITY RESOURCE GUIDE FOR CANCER PATIENTS

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Throughout the fall semester, an intern worked with Maggie Clarkson in the Singing River Health System Regional Cancer Center assisting in the development of an exercise and physical activity resource guide. Studies documented that engaging in exercise and physical activities are linked with improved physical conditions for cancer patients undergoing active treatment, as well as those who have completed treatment. Research conducted by the American College of Sports Medicine has corroborated the benefits and guidelines for cancer patient exercise and physical activity. The American Cancer Society reported that post-diagnosis exercise was associated with 34% lower risk of breast cancer deaths, a 41% lower risk of all-cause mortality, and a 24% lower risk of breast cancer recurrence. The Exercise Resource Guide developed during this project provided a quick overview of exercise and physical activities that a patient and/or a health care team can use to customize a regimen complementary to the disease and treatment plan that will optimize the patient's flexibility, balance, and manage physical effects of treatment. The guide charts physical activities such as passive range of motion, active-assisted and active-resisted exercises to accommodate various exertion, and pain levels. The use of weight-bearing, tai chi, yoga, and aerobic exercises are constructed within the guide. The Resource Guide has aided patients, in treatment and post-treatment, with improved bone health, muscle strength, flexibility, self-esteem, depression, and a reduction of the impact of cancer and/or treatment from side effects, such as nausea and fatigue.

P6.16

SCREENING DISTRESS AMONG CANCER PATIENTS BY STUDY THE NUTRITIONAL PROBLEMS USING DISTRESS THERMOMETER SCALE AND PROBLEM CHECKLIST

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Cancer is a major public health problem in the United States and in many other countries. Treatments of cancer have practical, emotional, spiritual, and physical problems. All cancer patients experience some level of distress associated with the diagnosis and treatment of the disease. This study explores cancer-related distress using screening tools such as Distress Thermometer (DT) and Problem List (PL) from the National Comprehensive Cancer Network (NCCN). The DT tool is a 0-10 scale where 0 = no distress and 10 = severe distress. The PL is a complete checklist that identifies practical, family, emotional, spiritual/religious, and physical, problems. A total of 32 adult cancer patients completed the DT and Pl questionnaires prior to receiving their first dose of radiation therapy. The study sample had a mean age of 60 years (range, 37-74 years) and included 15 females and 17 males. There are 22 (69%) of the patients are white and 10 (31%) are black. The three most common cancer sites included lung involving 9 patients (28%), breast involving 7 patients (22%), and 5 patients with gastrointestinal sites (16%). Seventy-five percent of participants received both radiation and chemotherapy as cancer treatment while 25% of the sample received radiation

treatment only. The aim of this study was to identify patients who have significant distress that need support and psychosocial care. Results of the study suggest that distress assessment in cancer patients using these tools supports identification of contributing factors and referral for assistance to the appropriate health care team member.

P6.17

PROBLEMS RELATED DISTRESS AMONG CANCER PATIENTS PARTICIPATING IN SCREENING PROGRAM

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Distress is an unpleasant experience of an emotional, psychological, social, or spiritual nature that interferes with people's ability to cope (National Comprehensive Cancer Network). Many studies have looked at distress levels in cancer patients. The Institute of Medicine (2007) recommends psychosocial screening for all cancer patients to improve the quality of care. The purpose of this study was to identify how the distress has the greatest impact on patients' health. A cross-sectional group of 100 patients of mixed cancer diagnosis who participated in a screening program asked to rate the severity of 36 problem-related distress items. The results indicated that screening data can be used to inform programs, improve resources designed to reduce distress in cancer patients.

P6.18

THE CHARACTERIZATION OF RENAL INJURY IN FEMALE T2DN RATS FED A HIGH FRUCTOSE DIET

Brianca Fizer, Tiffani Slaughter, LaTeia Taylor, Richard J. Roman, Jan Michael Williams
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In Type 2 diabetes, studies have shown that males have a greater risk of albuminuria than females. Recent studies from our laboratory have demonstrated that male Type-2 diabetic nephropathy (T2DN) develop severe renal injury while female T2DN rats do not. Moreover, the fasting blood glucose levels are significantly lower in females when compared to male rats. The overall goal of the current project is to determine whether feeding female T2DN rats a high fructose (HF) diet increases their blood glucose levels similar to the levels observed in male T2DN rats. And if so, will the female rats develop renal disease. At 9 months of age, the rats were placed in metabolic cages for an overnight urine sample to measure baseline protein excretion. The rats were then divided into 3 groups: (1) female - normal diet, (2) female - high fructose diet, and (3) male - normal diet. After 5 months of treatment, glucose levels were similar in females when fed either a normal or HF diet (114±15 mg/dL) but significantly lower than males (273±17 mg/dL). However, protein excretion increased to 171±53 mg/day in female T2DN rats fed a HF diet while only increasing to 49±5 mg/day in female T2DN on a normal diet. Protein excretion was similar between males fed a normal diet (267±47 mg/day) and females fed a HF diet. These data indicate that female T2DN rats fed a HF diet develop proteinuria similar to that of their male counterparts without changing glucose levels.

P6.19

DIGITAL IMAGING TO MEASURE WOUND HEALING

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Two-dimensional wound measurement is a convenient way to assess healing. Length and width are used to estimate the wound surface area. Measurement over time helps in evaluating the wound progression or regression and the effectiveness of treatment regimes. Several techniques can be used to measure the wound. One method uses the length and width measurements to obtain the area in squared centimeters. One problem with this technique is the wounds are not perfect squares or rectangles so the measurements of the wounds are not accurate, and the estimated areas are greater than the actual area. Other techniques include tracing the wounds and using a metric grid to count the number of square centimeters within the wound perimeter. This is a more reliable method, but it can introduce discomfort or can disrupt the healing process of the wounds. We attempted to use a computerized wound measuring technique. A digital photograph of the wound was uploaded into the NIH image J program to determine the ease of calculating changes in wound during healing. Wounds were created surgically and followed at day 1, 7 and 14. Digital pictures of the wounds and a scale at the same magnification of the pictures were taken and uploaded into NIH image J for evaluation. Our

results show excellent reproducibility with this system in determining changes in the wound bed with time. One major advantage of this system is the wounds are not disturbed by photographing whereas other measurements direct contact with the wound is required.

P6.20

MODIFIED INFLUENZA VIRUS FOR USE IN TRANSGENIC THERAPIES

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The object of this study is to create through PCR amplification and mutagenesis expression plasmids containing modified Influenza A hemagglutinin (HA) and Nonstructural Segment (NS) genes. These modified plasmids will be used in the viral rescue of a novel influenza A virus. The HA gene is modified via PCR amplification which should create a segment encoding a "headless" HA protein. Headless HA diminishes influenza's ability to bind and infect normal human cells. The NS gene is modified via mutagenesis to prevent expression of the NS-1 protein. Lack of NS-1 in influenza viruses has previously shown to reduce influenza infection of normal cells. The plasmids are first modified by either PCR or mutagenesis reactions and then grown up in *E. coli* cultures. Promising cultures are sequenced. Thus far potential candidates have been selected in both modification groups and are currently undergoing off site DNA sequencing to verify that the modifications were successful. (Research Supported by the Howard Hughes Medical Institute)

P6.21

DETERMINING THE INHIBITION AND RESISTANCE OF STAPHYLOCOCCUS AUREUS USING EGCG EXTRACT

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Staphylococcus aureus is one of the most researched and well known bacterium in the world. S. aureaus is the leading causes of many nosocomial and skin infections. Many of the most common treatments for this pathogen include penicillin, methicillin, and vancomyocin. Whereas the first two medications are the first order of treatments, MRSA, or methicillin resistant *Staphylococcus aureus* can only be treated with vancomyocin. Research has indicated green tea extract can be beneficial in treating infections with methicillin resistant *S. aureus*. **HYPOTHESIS:** The EGCG extracts will inhibit the growth of Staphylococcus aureus. **OBJECTIVE:** The objective of this project is to determine the minimum inhibitory concentration (MIC) of various concentrations of EGCG and its effectiveness against *Staphylococcus aureus*. **METHODS:** Mueller-Hinton plates were inoculated with a 0.5 McFarland of S. aureus. A 30 mM concentration of EGCG extract was prepared and dilutions were made using standard laboratory procedures. 10 µl of each dilution was placed on a blank disk and placed on a Mueller Hinton plate inoculated with a 0.5 McFarland of S. aureus and incubated for 24 hours at 36 ^{0}. Oxidized and Alcohol extraction were also prepared and antimicrobial activity was determined. **CONCLUSION:** Data obtained suggests (1) EGCG alcohol, EGCG oxidized and EGCG non oxidized were not effective in inhibiting the growth of S. aureus. (2) The zones produced were not large enough to be effective in the treatment of Staphylococcal infections in patients. Future studies should include combinations to determine if EGCG will enhance the effectiveness of conventional antibiotics.

P6.22

BLAME IT ON THE ALCOHOL

Candice Hatcher, Courtney Levi and Dr. Stacy Hull Vance
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Alcoholic ketoacidosis is most likely seen in chronic alcohol abusers. However, it also seen in individuals who recently consumed adequate amounts of alcohol or occur in individuals who had recent binge. AKA is characterized by metabolic acidosis with an elevated anion gap, elevated serum ketone levels, and a normal or low glucose concentration.

HYPOTHESIS: Our hypothesis is the variations seen between the first reported results and the second results are due to a discrepancy with the tube collection method that was utilized.

CASE DESCRIPTION: An emergency department nurse calls the lab relating a possible laboratory error after observing low sodium and chloride levels in a patient. She thinks there may be something wrong with the lab's instrument. The patient's lab values

obtained at 2000 and 2200 was then analyzed on an instrument with different methodology (direct ion selective electrodes) and the results are displayed in panel. A 21 year old Caucasian male presents after being transported to the ER by a friend. The patient returned from a party with unclear thought processes and smelling of alcohol. He smokes cigarettes, and has a history of diabetes. He denies drug use but acknowledges that he drank 2 beers at a party.

DISCUSSION: This case suggests the patient has Alcoholic Diabetic Ketoacidosis. Alcoholic ketoacidosis usually occurs following binge drinking and lack of food intake. The glucose levels are typically low or normal in these patients. However, this patient has a known history of diabetes, which explains the elevated glucose levels.

P6.23

A STICKY CASE OF MAPLE SYRUPS DISEASE

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Amino acid disorders are a major group of inborn errors of metabolism that can present with a variety of clinical presentations. The metabolic defect occurs due to abnormalities in function of an enzyme in the metabolic pathway or in specific membrane transport systems. The defect will result in the accumulation of amino acids and its precursors. The excess will eventually raise blood levels and the symptoms of the disease will manifest. Maple syrup urine disease (MSUD) is predominantly caused by mutations in the BCKDHA, BCKDHB and DBT genes, which encode for the E1α, E1β and E2 subunits of the branched-chain α-keto acid dehydrogenase complex, respectively. The urine, skin, and breath from patients with Maple Syrups disease typically has a characteristic maple syrup or burnt sugar odor. The urine will have high levels of the following three essential amino acids leucine, isoleucine, and valine.

HYPOTHESIS: Our hypothesis is the clinical data for the patient is due to liver disease/failure.

CASE DESCRIPTION: A 70 year old African American female with a past medical history of hypertension, dyslipidemia, and a stroke who was admitted the hospital for evaluation of a headache and dizziness.

DISCUSSION: This case demonstrates a patient that has maple syrup urine disease which would account for the presence of leucine crystal in the patient's urine. The patient has continuously high glucose according to the lab results, and diabetes was confirmed due to the high Hgb AlC levels. Treatment will include dietary restrictions to maintain low levels of the amino acids in the patient's blood and urine.

P6.24

THE ANTIMICROBIAL EFFECTS OF GREEN TEA (EGCG) ON ESCHERICHIA COLI

Lindsay Holden, Brian Chase Bennett, Dr. Stacy Hull Vance

Medical Laboratory Science, University of Mississippi Medical Center, School of Health Related Professions, Jackson, Mississippi

Green tea has been of interest for its health benefits since ancient time. The catechins (polyphenols), in particular (-) epigallocatechin gallate (EGCG) are considered to be associated with anti-cancer, anti-obesity, anti-atherosclerotic, anti-diabetic, anti-bacterial, anti-viral, and anti-dental properties. It has been suggest that green tea catechins inhibit the reproduction and growth of many bacteria, including *E.* Coli. There many conflicting studies on the effectiveness of EGCG against E. Coli, which may be due to different strains of the bacteria and different concentrations of EGCG used in these studies. **HYPOTHESIS:** EGCG will be an effective antimicrobial agent against *E.* Coli alone and in combination with conventional antibiotics. **OBJECTIVE:** The objective of this project is to determine the antimicrobial properties of the polyphenol fractions, (EGCG) of green tea in vitro using *E. coli* alone or in combination with conventional antibiotics. **Methods: Phase I:** Ten Mueller-Hinton plates were used to determine the MIC for E. Coli. A hot water extraction or an ethanol extraction method was used to determine the antimicrobial properties of commercially purchased tea bags. **Phase II** EGCG was combined with vancomycin, penicillin, trimethoprim, or ciprofloxacin to determine antimicrobial susceptibility. **CONCLUSION:** Data obtained suggests (1) EGCG, alone, was ineffective in killing *E. coli*. (2) EGCG in combination with Trimethoprim showed a synergistic effect by increasing the antibiotic's ability to kill E. Coli. (3) Our results indicate that the antibiotic Ciprofloxacin is a better drug of choice at inhibiting E. Coli alone, than in combination with EGCG.

P6.25

THE CASE OF THE DIRECT AND INDIRECT DISAGREEMENT

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A misdiagnosis based on instrument error could potentially exacerbate a patient's condition and further complicate therapeutic strategies. When a patient's lab results appear erroneous the results should be validated by reanalyzing the sample using a different test methodology. The kidneys maintain potassium homeostasis; therefore, renal failure could be a possible source of error that would have caused the patient's erroneous analyte concentrations.

HYPOTHESIS: Our hypothesis is that the variations seen between the results are due to an underlying renal disorder in conjunction with test methodology.

CASE DESCRIPTION: A patient's analyte levels were scrutinized by a nurse who believed initial testing resulted in false hypokalemia, as well as skewed sodium and chloride concentrations. In order to avoid infusing a normokalemic patient with potassium, a second test using ion-selective electrodes (ISE) was run for further analysis. Although the results of the follow up test indicated that the nurse's initial suspicions were valid, the patient's medical history suggested otherwise. Symptoms including malaise, lack of appetite, elevated antibody light chains, acute renal failure, and anemia/pancytopenia

DISCUSSION: The data suggests that the discrepancy observed between the initial laboratory results which were obtained using indirect ion selective electrodes and the results using Direct ion selective electrodes were due to both physical and analytical factors. The disagreement between the methods was attributed to the high plasma protein content caused by the patients having Multiple Myeloma. In patients with Multiple Myeloma the Direct ion select electrode method provides the most accurate results.

THURSDAY EVENING

Poster II

Authors should be available with their posters to answer questions 6:00-8:00 PM

P6.26

THE BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM AND GEOGRAPHIC INFORMATION SYSTEMS TO IDENTIFY ORAL HEALTH DISPARITIES IN APPALACHIA

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Appalachia is a rural region known to be economically disadvantaged. As with other health indicators, oral health exhibits disparities within the region.The objective of our study was to use existing data sources to geographically analyze suspected disparities in oral health status in the 420 counties of Appalachia, and to make sub-state comparisons within Appalachia and to the rest of the nation. Here we describe the methods used to overcome challenges associated with using limited oral health data to make inferences about oral health status.

Oral health data were obtained from the Behavioral Risk Factor Surveillance System (BRFSS). Because the BRFSS was designed for state-level analysis, there were inadequate number of responses to study Appalachia by county. We determined the smallest possible unit we could use, aggregating data to satisfy CDC minimum requirements. For sub-state comparisons, data were first aggregated to Appalachian and non-Appalachian regions within Appalachian states. Next, Beale codes were used to define metropolitan and non-metropolitan regions, forming four groups for analysis. This method smoothed the data, still revealing sub-state differences. Visualizing the data geographically throughout the process proved useful for determining an effective approach for the analysis.

Data to study oral health disparities on a regional or national level are difficult to obtain. The BRFSS is a possible source that can be adapted for this purpose. Novel techniques were introduced to use BRFSS data to study oral health disparities in Appalachia, which provided informative sub-state results, useful to health planners for targeting intervention strategies.

Funding: Appalachian Regional Commission

P6.27

THE EFFECTS OF BLACKSEED OIL, THYMOQUINONE, AND EGCG ON TRYPANOSOMA LEWISI INFECTED RATS

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Trypanosoma lewisi is a nonpathogenic blood parasite that is related to the causative agents of human African sleeping sickness. In this study blackseed oil; its active constituent, thymoquinone; and a catechin found in tea, EGCg; were used to determine their effect on levels of parasitemia. The rats were divided into four experimental groups and one control group. The experimental groups were given doses of the compounds every other day while parasitemia was monitored via microscope counts. ANOVA statistical analysis showed no significant differences between the groups though the combined treatment group of thymoquinone and EGCg showed the highest parasitemia while the thymoquinone group alone had the lowest parasitemia.

P6.28

GENETIC POPULATION STRUCTURE AND DISEASE MANIFESTATION OF TRICHOMONAS VAGINALIS

David Spencer, Isaiah Tolo
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Trichomoniasis is the most common non-viral sexually transmitted disease worldwide. It is associated with numerous pregnancy complications, such as tubal factor infertility, still birth, and pre-term birth, as well as causing increased susceptibility to other sexually transmitted diseases such as acquired immune deficiency syndrome (AIDS). The causative agent for Trichomoniasis is Trichomonas vaginalis, a parasitic protozoan that inhabits human vagina and urethra. This study sought to increase the data set for ongoing research into the impact of genetic population structure on disease manifestation and virulence. Sections of seven "housekeeping" genes were sequenced using multilocus sequence typing (MLST) and the results categorized on phylogenetic trees. Complete sequences of eighteen additional isolates were obtained from this work and added to the growing data set.

6.29

ADVANCED CT IMAGE ANALYSIS OF DIFFUSE LIVER DISEASE

Katherine Thaggard[1], Cody Branch[2], Daniel Carson[2], Haowei Zhang[2], Richard Hosch[2], Haley Clark[2], Seth Lirette[3], Michael Griswold[3], Andrew Smith[2]
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[2]*University of Mississippi Medical Center, Department of Radiology, Jackson, Mississippi, USA,*
[3]*University of Mississippi Medical Center, Center for Biostatistics and Bioinformatics, Jackson, Mississippi, USA*

Objective: Accurate staging of liver fibrosis requires a liver biopsy, which is invasive. Our goal is to develop new CT image analysis techniques to noninvasively stage hepatitis C virus (HCV) liver fibrosis/cirrhosis and follow response to therapy. The specific objective is to associate total and segmental liver volumes measured from CT images with the stage of HCV liver fibrosis/cirrhosis.

Methods: In this IRB-approved HIPAA-compliant retrospective pilot study, patients with various stages of HCV liver fibrosis/cirrhosis were included (N=87). Total and segmental liver volumes were measured using thick (3-5mm) and thin (0.6-2mm) slice liver CT images with Tera Recon Cloud (3D volumetric software) while blinded to the stage of liver disease. ANOVA-F test was used to assess differences in measurements across liver fibrosis stage. A Spearman Rank test was used to assess the correlation of thick versus thin slice measurements.

Results: Left lateral segment volume to total liver volume (LLSV:TLV) ratio was associated with the stage of liver fibrosis for measurements obtained from both thick and thin slice CT images (t-test, p=0.0019 and 0.0021, respectively). A higher LLSV:TLV ratio was associated with higher stage fibrosis/cirrhosis. TLV was not associated with the stage of liver fibrosis. There were high correlation coefficients between thick and thin slice images for measuring TLV (R=09921), LLSV (R=0.9435), and LLSV:TLV ratio (R=0.9487).

Conclusion: Volumetric liver measurements from CT images (specifically LLSV:TLV ratio) are associated with the stage of HCV liver fibrosis/cirrhosis. Both thin and thick slice CT images can be used to reliably quantify liver volume measurements.

P6.30

DYNAMIC MODELING FOR PREDICTIONS ON THE MISSISSIPPI PHYSICIAN WORKFORCE

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Background: Mississippi, ranked first or nearly so by the CDC in cardiovascular disease, obesity, teen births, poverty, diabetes, traffic fatalities, and other serious health concerns, suffers from a physician shortage. To assist state medical education and policy efforts, we developed a model for predicting state physician workforce changes by enrollment in University of Mississippi Medical Center (UMMC) School of Medicine and residencies.

Methods: With UMMC IRB approval, we obtained from program officers and examined in a parametric model 2002-2012 demographic data for 1,056 medical students and 1,599 residents, comparing impact of program type, size, graduation rate, retention rate, retirement, mortality, migration, and in- or out-of-state practice after training with current enrollment data to predict Mississippi's future physician workforce.

Results: In our 2002-2012 analysis, election to practice in Mississippi was positively correlated with primary care residencies (more females), originating from/family in Mississippi, dedication to primary care, and in-state undergraduate education. Those from other states tended to leave at program completion. More younger graduates left; more females remained. Race had no significant effect. Medical school graduation rates ranged from 79%-100%; primary care residencies showed higher retention rates. Our model predicted that increases in graduation rates, class size and residency programs would positively correlate with election to practice in Mississippi.

Conclusion: Our power model indicated that an increase in UMMC class and residency size would increase Mississippi's physician presence. Future applications could help identify effective class and post graduate training program sizes to meet the state's workforce needs.

P6.31

CHRONIC ETA RECEPTOR BLOCKADE PREVENTS THE PROGRESSION OF RENAL INJURY IN DIABETIC DAHL SALT-SENSITIVE RATS

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The endothelin (ET) system has been shown to play an important role in the development and progression of diabetic nephropathy (DN) via an ETA receptor mediated inflammatory response. Tumor necrosis factor-alpha (TNF-α) is inflammatory cytokine that has been used as a marker and predictor of chronic renal disease. Preliminary studies from our laboratory indicate that the induction of diabetes in Dahl salt-sensitive (SS) rats promotes the development DN similar to patients with diabetes that is associated with an increase in ET-1 excretion. Therefore, the present study examined whether chronic ETA blockade with ABT-627 prevents the progression of renal injury in diabetic SS rats with pre-existing renal disease by decreasing renal TNF-α levels. Nine week-old SS rats were treated with streptozotocin (STZ, 50 mg/kg, i.p.) to induce diabetes. After 3 weeks of STZ treatment, proteinuria increased to 375±74 mg/day. The rats were then separated into two groups: (1) vehicle (drinking water) and (2) ABT-627 (5mg/kg/day). After 6 weeks of ABT-627 treatment, proteinuria decreased by 22% in diabetic SS rats versus vehicle treated rats without any changes in arterial pressure (289±17 vs. 371±30 mg/day). The expression of the TNF-α signaling pathway in the renal cortex was significantly reduced in ABT-627-treated diabetic SS rats compared to the values observed in vehicle treated rats. These findings indicate that the prevention of progressive proteinuria with chronic ETA blockade is associated with a decrease in the renal TNF-α pathway.

P6.32

CARDIOVASCULAR RESPONSES FOLLOWING DIFFERENT TYPES OF BREATHING EXERCISES

Min Huang, Mark Weber, Jian-Wei Gu, Howe Liu, Neva Greenwald

Department of Physical Therapy, University of Mississippi Medical Center, Jackson, MS, USA

Purpose: The purpose of this study is to determine the effect of different types 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 successfully 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 pilot study indicates that 15 minutes of breathing exercises has no effect on BP and HR, but SB significantly increases respiration and CB significantly decreases RR. **Clinical relevance:** It has been shown that an increase in RR is associated with an increase in stress and a decrease in respiratory efficiency and endurance. Therefore, these pilot study results may suggest that CB breathing technique could be used to decrease RR, to relieve stress and to increase respiratory efficiency.

P6.33

AN EXPERIMENTAL COMBINED WITH THEORETICAL STUDY OF FORMATION MECHANISM AND CONFORMATION OF TRICLOCARBAN-HUMAN SERUM ALBUMIN COMPLEX

Wenjuan lv[1], Yonglei Chen[1], Dayong Li[1], Xingguo Chen[1], Jerzy Leszczynski[2]
[1]*Lanzhou University, Lanzhou, Gansu, China,*
[2]*Jackson State University, Jackson, MS, USA*

Triclocarban (3,4,4'-trichlorocarbanilide, TCC) is a commonly used anti-bacterial and anti-fungal substance in disinfectants, soaps and other household products, which has been widely spread in environment all over the world. Once entering human body, TCC could affect the conformation of Human serum albumin (HSA) by forming TCC-HSA complex and alter function of protein and endocrine in human body. To evaluate the potential toxicity of TCC at the protein level, the binding mechanism of HSA with TCC was investigated by UV-vis absorption, circular dichroism and Fourier transform infrared (FT-IR) spectroscopy. Binding constants, thermodynamic parameters, the binding forces and the specific binding site were studied in detail. The results showed that the interactions between TCC and HSA are typical hydrophobic forces. The effects of TCC on HSA conformation were also discussed. The binding distance (r=4.0 nm) for TCC-HSA system was provided by the efficiency of fluorescence resonance energy transfer. The visualized binding details were also exhibited clearly and exactly by molecular modeling method and the results could agree well with that from the experimental study.

P6.34

HEALTH EFFECT FOLLWOING A RADIOLOGICAL EMERGENCY IN FIRST RESPONDERS

Jadtrl Heard, Jermiah Billa
Alcorn State University, Alcorn State, MS, USA

The 9/11 disaster marked the beginning of an era of prevalence of threat involving radioactive material in any part of the world. As a result, in recent years, many studies were directed towards the impact of radiation on human body. Though there is well documented information related to emergency response, emergency preparedness, and emergency management, information related to health effects and follow up care provided to first responders affected by the incident is limited. The present research effort includes an extensive literature review on health effects manifested in first responders following a radiological emergency. The present discussion includes information gathered based upon past radiological incidents and the health and psychological effects observed in the first responders following an emergency. This particular research effort is an attempt to bring to the attention of the scientific world the importance of researching on the health effects and the aftercare needed to be given to first responders following a radiological emergency.

P6.35

EFFECT OF LONG-TERM PHYSICAL EXERCISE ON BLOOD PRESSURE IN AN AFRICAN AMERICAN SAMPLE

George Robinson, Valencia Proctor, Tylanna Marley, Anthony Jackson, Symone Cleaves, Ashley Lowery, Ashley Jones, Shaquitta Woods, Katharine McIntyre, Rosamary Hadley, Taunjah Bell
Jackson State University, Jackson, USA

Blood pressure (BP) is an indication of the force exerted against the arterial walls as the heart pumps blood through the body. Chronic elevated BP can lead to hypertension which is a potent risk factor for developing heart disease and considered one of the most preventable causes of premature death. Physical exercise has been shown to noticeably reduce BP and remarkably attenuate symptoms of hypertension over time. It is believed that long-term physical exercise induces these beneficial effects by increasing the

blood supply to the brain, enhancing the release of growth factors from the skeletal muscles into the bloodstream, facilitating the development of new nerve cells, stimulating the formation of new blood cells from pre-existing blood cells, and influencing endothelial cell proliferation and subsequent endothelial cell membrane permeability. A proposed mechanism by which physical exercise decreases BP and lowers hypertension risk is by elevating serum and plasma levels of blood-derived neurotrophic factor which appears to increase dramatically in BP-sensing baroreceptors during hypertension. The purpose of the present study was to determine whether a reduction in BP would occur over time. We hypothesized that a 12-week moderate intensity physical exercise program would significantly decrease BP in African Americans. The ANOVA results indicated that mean BP readings differed statistically significantly by week 12 ($F(1.173, 22.259)=21.034$, $p=.001$,). Post-hoc comparisons showed that BP readings obtained at week 12 had decreased by 2.26+0.52 mmHg from baseline. We found evidence to support the hypothesis tested and concluded that long-term physical exercise significantly reduced BP.

P6.36

RADIAL/LOW ENERGY EXTRACORPORAL SHOCK WAVE THERAPY EFFECTS IN THE TREATMENT OF ADULT PATIENTS WITH CHRONIC PLANTER FASCIITIS: A SYSTEMATIC REVIEW

K Martin, C Pyron, A Roberts, C McPhail, C Wade, T Pace, T Crosland, J Slaughter, F Adah

University of Mississippi medical Center, Jackson, MS, USA

Background and Significance: Chronic conditions, such as plantar fasciitis (PF), often result in delayed healing. The purpose of this study was to determine the efficacy of radial/low energy extracorporeal shock wave therapy in pain relief and quality of life (QOL) for patients with chronic PF.

Methods: Pubmed (1996- February 29, 2012) was searched in this study using the following search strategy: (heel pain OR plantar fascia OR PF) AND extracorporeal shock wave therapy. Articles selected were scored for internal validity using the 10 point PEDro scale, higher PEDro scores relate to superior internal validity. The Oxford Centre of Evidence Based Medicine 2011 ranks the level of evidence of studies based on study design and associated PEDro score on a 5 level scale; a lower CEBM score correlates to a higher level of evidence.

Results: A total of three articles met the inclusion/exclusion criteria. The average PEDro score was 9 with a range of 8-9. All articles were CEBM Level II.

Conclusion: Two of the three studies demonstrated a reduction in pain measures and an increase in QOL with radial/low energy extracorporeal shock wave therapy as compared to sham treatment. Available evidence for treatment of chronic plantar fasciitis with radial/low energy extracorporeal shockwave therapy is an A because the available studies were RCTs and were ranked with CEBM levels of II as well as PEDro scores of 8 or greater. In conclusion, radial/low energy extracorporeal shockwave therapy be used for chronic PF for pain relief and increase QOL.

HISTORY AND PHILOSOPHY OF SCIENCE

Chair: J.J. Sylvia, IV,
Itawamba Community College
Vice-chair: Trey Suttle,
Universityof Southern Mississippi

THURSDAY MORNING
Room 228

O7.01

8:30 THE EUSOCIAL TRANSITION: A REPLY TO BIRCH

Richard Gawne

Duke University, Durham, NC, USA

In a recent paper, Jonathan Birch (2012) sets out to determine whether inclusive fitness theory has the resources to explain the so-called 'fraternal transitions' (Queller, (1997)) from single to multi-cellular life, and solitary to eusocial lifestyles. He begins by outlining a series of obstacles which make it difficult to apply the theory to these episodes in a straight-forward manner, and then introduces a four-part mechanism which is intended to explain how inclusive fitness benefits, in conjunction with a coercive regime that punishes defectors, can overcome these impediments, and effect multicellularity and eusociality. Although worthy of discussion, Birch's thoughts on the origin of multicellular life are not treated in this paper. My sole objective is to determine whether the mechanism he identifies suffices as an account of the eusocial transition. I highlight two general difficulties with Birch's hypothesis which seem to call its validity into question. First, he incorrectly assumes that a mechanism capable of giving rise to eusociality in the Hymenoptera can be cited as an *explanans* of

eusociality in all species. Second, the mechanism Birch posits *presupposes* the existence of high levels of sociality, and thus fails to provide insight into the transition it is intended to explain.

O7.02

8:55 MACHINATIONS OVER MACHINES: LEIBNIZ AND SPINOZA ON HUMAN TECHNOLOGY

Pete Heath, Brian Glenney
Gordon College, Wenham, MA, USA

In his *Monadology*, Leibniz initiates a distinction between the mind and body and then addresses the question of how the human body is then distinct from human technology: "[T]he organic body of each living being is a kind of divine machine or natural automaton, which infinitely surpasses all artificial automata. For a machine made by the skill of man is not a machine in each of its parts. But the machines of nature, namely, living bodies, are still machines in their smallest parts ad infinitum (*Monadology:* 64)." Leibniz here argues that the inventions of man are always inferior to the inventions of God, the former lacking in complexity of complexities. One might expect that Leibniz, the inventor of perhaps the first computing machine, would attribute the maximum (yet low) value to human technology of all the philosophers in the early modern period. We disagree and argue that Spinoza, while also seeming to have held a low view of technology, complaining that the human hand is far superior than any machine at polishing optical lenses (Letter to Christiaan Huygens: 32), possessed a conception of human technology that might be understood as superior to that of Leibniz's, allowing for technology to have status akin to Leibniz's human body of complexities within complexities. In a word, Spinoza's monism can be viewed as the first coherent theoretical framework for how human technology may become infused with not just the human body, but the human mind, anticipating a contemporary view known popularly as Transhumanism.

O7.03

9:20 PERSONAL IDENTITY AND THE BRAIN

Chaz Burrows
The University of Southern Mississippi, Hattiesburg, MS, USA

Does personal identity lie in the physical or in the psychological? If someone's personality completely changes are they still the same person? I will argue that a person's identity consists in biological and not psychological continuity. Thus, my position is one of physcialism----I accept that mental states are nothing other than brain states. The case of Phineas Gage will be used to illustrate the competing views regarding personal identity. Gage had a pipe go through his head in a freak accident involving an explosion. After having the pipe and a large portion of his brain removed, amazingly he survived. However after the accident many people that knew him said that psychologically he had completely changed. His personality had become entirely different. Many would argue that Gage is a different person since his personality has changed. They are relying on a psychological criterion for personal identity. I argue that this view is mistaken. What guarantees personal identity is biological or physical continuity? The psychology of a person is consistently changing at a slow rate and in the case of Gage, an extremely fast rate. I argue that what many people are failing to take into account is change over time and that this notion is the key to understanding personal identity. The brain is always undergoing psychological change or changes to its wiring but the system as a whole remains constant. Overall, I conclude that personal identity lies in the physical brain or more specifically the life of the brain

O7.04

9:45 IMMANUEL KANT AND THE SPECIES PROBLEM

Georgia Rae Rainer
University of Southern Mississippi, Hattiesburg, MS, USA

Modern accounts of the species concept can be traced back to the eighteenth century to the writings of George Leclerc, Comte de Buffon. Buffon distinguished abstract species sensu Linnaeus based on arbitrary assemblages of characters from "real" species apprehended as ". . . the constant succession and uninterrupted renewal of these individuals. . .". He based species on lineage which was in opposition to the then growing consensus that species should be based on overall similarity. Buffon's paradoxical work Histoire Naturalle entered German taxonomic circles in the 1750s. Immanuel Kant accepted Buffon's distinction between abstract and real species, publishing in the 1750s and distinguishing abstract descriptions of nature (Naturbeschreibung) from historical (lineage-based) accounts (Naturgeschichte). As Kant's ideas about the forms of pure intuition, space and time, matured through the period of 1750s to 1780s (Critique of Pure Reason, 1781, 1787), he brought the abstract/historical species distinction to a strong epistemological grounding reflecting two modes of inquiry into nature. The abstract species was a theoretical view

developed under the guidance of the understanding; the historical species was a synthetic perspective grounded in the ideas of reason. Synthetic knowledge grounded in reason clearly had, for Kant, epistemological priority over the purely rational construct of the abstract species. The Kantian approach presented here to species as a homeostatic property cluster kind yields explanatory power to the interdependence between the property cluster (abstract species) and the lineage (historical species), while still giving epistemological priority to the history which is aligned with phylogenetic/taxonomic principles.

10:10 BREAK

O7.05

110:25 SPECIES AS NATURAL KINDS

Angela Quintana
The University of Southern Mississippi, Hattiesburg, MS, USA

Many definitions of "species" exist in the field of biology. They require that one or more of the following obtain: the ability of organisms to interbreed, a common evolutionary descent, shared phenotypic traits, and shared genotypes. The diversity of species definitions, or concepts, has given rise to much confusion over what a species is and what criteria is required for inclusion in one species rather than another. Given that a uniform conceptualization of a species definition within the field of biology has yet to be universally adopted, it is no wonder that the ontological status of species remains a topic of debate among both biologists and philosophers. Some parties contend that species are to be viewed as individuals, while others argue that they are natural kinds. It will be argued that species are to be regarded as natural kinds, focusing primarily on shared nonaccidental property clusters (phenotypic, genotypic, and historical properties) as a necessary condition for such a view.

O7.06

10:50 DARWINIAN EVOLUTION: GENESIS OF THE CONCEPT BETWEEN THE 1830S AND 1870S

Kenneth Curry, Ann Curry
University of Southern Mississippi, Hattiesburg, MS, USA

Richard Owen, said of the doctrine of transmutation of species that it was "... crushed in an instant when disrobed of the figurative expressions in which [it is] often enveloped; and examined by the light of a severe logic." Owen's attitude was prevalent among the conservative scientific constabulary of 1830s England. Charles Darwin, as a student in Cambridge, embraced William Paley's argument from design and believed in the fixity of species. This was the young Darwin who set out as a geologist and naturalist for a five-year voyage on HMS Beagle armed with Charles Lyell's Principles of Geology. Lyell accepted as fact the extinction of species, but he did not believe new species began by transmutation. Lyell was vague about the origin of new species, but somehow they were created as perfectly adapted to fill the vacancies formally held by the extinct species. Gradually during the course of his voyage Darwin encountered many instances that were better explained by transmutation than by perfect adaptation. Darwin was convinced by 1840s that natural selection was the mechanism of species transmutation, but his presentation would have to be made carefully to convince the old guard. Throughout Darwin's Origin of Species (published 1859) he apologizes for the absurdity of his theory while urging readers to be cautious about rejecting it. His approach was cautious, courteous, and firm. Darwin was able to win over many people, but some members of the old guard, like Charles Lyell and Richard Owen, never embraced the theory of evolution

O7.07

11:15 THE FUTURE OF CLASSIFICATION IN SYSTEMATICS

Mac Alford
University of Southern Mississippi, Hattiesburg, MS, USA

The three major components of biological systematics are (1) unit (species) delimitation, (2) nomenclature, and (3) relationships. Systematics currently focuses on relationships, in particular, phylogenetic or historical relationships. In other words, many units are already delimited and most systematists want to discover how they are related to other such units and then how to express those relationships. One hundred years ago, the best method for expressing relationships was a classification. However, given the complexity of biological organisms that we know today, classifications have been under intense pressure. Why? Because they don't represent biological reality very well. First, living things are the product of other living things, thereby producing a nested hierarchy, not a classification sensu stricto. Second, classifications cannot easily express the fine-scaled detail that is possible in today's systematics studies,

which often include hundreds or thousands of individuals. Third, classifications have intrinsic "side-effects," such as Gregg's Paradox, which result in redundant detail for some groups and not enough "space" for others. So, as proposed by de Queiroz and others, do we abandon classifications altogether? I argue no. Despite the disadvantages of classifications, they also have important benefits, namely as broad-scale memory aids and efficient means of communication/information storage. Instead of abandoning classifications, I argue that it is best to adapt classifications to our current needs. In particular, we do not need classifications for fine-scale phylogenies. Phylogenies themselves do that job rather well, and better yet, in a graphical way that is much easier and quicker to interpret.

O7.08

11:40 ONTIC STRUCTURAL REALISM AND INFORMATION

William Kallfelz
Mississippi State University, Starkville, MS/Southeast, USA

James Ladyman (1998, 2008, 2009) alone and in collaboration (French & Ladyman, 2003; Ladyman & Ross, 2007; Ladyman & Tomasz, 2010; Leitgib & Ladyman, 2008) have developed a unique notion of "ontic structural realism" (OSR), which they argue that "most physicists advocate" (Ladyman, 2009, 11). In particular Ladyman (2009) distinguishes seven different kinds of OSR in varying degrees of metaphysical strength. I will focus on their third and fourth cases (i.e., OSR-v3 and OSR-v4, the respective claims that individual objects have no intrinsic natures, and the notion that though there are individual entities, nevertheless they lack irreducibly intrinsic properties) and subject them to closer scrutiny in the light of their presentation of quantum information theory (QIT) (Ladyman & Ross, 2007, 183-189). I critique their claims that QIT (articulated by OSR-v3 and OSR-v4) can be adequately embedded in their ontological characterizations of "information-theoretic structural realism" (ITSR), which comprises part of their overall effort of deriving a principled distinction between fundamental physics and the special sciences. I conclude that for such a characterization of QIT to follow consistently from their assumptions, at least two different modal distinctions must be invoked (namely, logical versus nomological), which is a distinction they repudiate in their overall naturalistic stance. I argue that this suggests a place for analytic metaphysics within their version of OSR which, *pace* their claims to the contrary, is metaphysically persuasive and consistent with fundamental physics.

LUNCH

O7.09

1:15 STRONG ARTIFICIAL INTELLIGENCE: AN ONTOLOGICAL APPROACH TO SEMANTICS FROM SYNTAX

William Suttle
University of Southern Mississippi, Hattiesburg, MS, USA

John Searle's Chinese room argument (1980) is intended to demonstrate that no non-biological machine can achieve strong artificial intelligence. While there is no agreed upon definition of strong artificial intelligence, the general idea is a non-biological computer that does not merely simulate intelligent behavior, but is genuinely intelligent, e.g. a dog does not simulate problem solving when trying to find the food bowl, but Excel does when calculating averages. The essence of the Chinese room argument is the claim that non-biological machines will only ever be able to simulate intelligence because such machines are limited to the manipulation of meaningless symbols (syntax), while genuine intelligence requires meaning and understanding (semantics). The focus of my presentation will be a general conceptual framework for how embedded ontologies can contribute to the emergence of genuine intelligence from the manipulation of meaningless symbols in non-biological machines. An ontology is a taxonomy of the sorts of things there are and their relations to one another. A foundational thesis of my argument is that semantics (meaning, understanding) for humans is largely contingent on information resulting from naturally embedded ontologies. For humans, these ontologies are implemented in nervous systems. Contra Searle, I propose that implementing a sufficiently sophisticated ontology in a non-biological machine, in conjunction with other factors required for intelligence, e.g. representation of internal and external states of the world, might satisfy minimal constraints for strong artificial intelligence.

O7.10

1:40 HAPPINESS AND THE GOOD LIFE: THE INTERSECTION OF SCIENCE AND PHILOSOPHY

J.J. Sylvia IV
Itawamba Community College, Raleigh, NC, USA

The rising prominence of positive psychology has increased focus on the scientific study of happiness, ranging from social science to neuroscience and leading to a voluminous variety of publications explaining how to increase happiness. Only recently has this idea of the scientific study of happiness been challenged, most notably through works such as *Against Happiness* by Eric Wilson and *The Antidote: Happiness for People Who Can't Stand Positive Thinking* by Oliver Burkeman. Although differing in thesis, both books sound the common alarm that the Western focus on happiness has become excessive to the point of being detrimental.

I argue that these contradictory positions can be reconciled by introducing philosophic reflection. This presentation will consider how the aim of positive psychology could be improved by broadening the concept of happiness to the good life. Much of the research of positive psychology seems to imply that the achievement of happiness simply is the good life. Considered philosophically, particularly through the lens of Aristotelian virtue ethics, happiness, though important, is only a portion of the good life. The combination of the scientific study of happiness and the philosophic pursuit of the good life can lead to a richer understanding of modern life and the quest for happiness and the good life.

O7.11

2:05 THE ENTOMOLOGICAL ETHICS OF BUG SQUASHING

Leonora Bateman
North Carolina State University, Raleigh, NC, USA

Insects are the most abundant animal on the planet; over 50% of all living animals are insects. They outweigh humans in biomass, occupy almost every ecological niche and impact human lives in unappreciated (and unprecedented) ways. Insects also incite a great amount of fear in humans, so much so that we feel little attachment to them; entire professions are devoted to eliminating insects from our lives while the unwelcome guests are stomped out of our homes without a second thought.

Why do we lack empathy when it comes to insects? I will explore the philosophical reasons behind our inability to associate insects with having life, our perceptions of insects, their perceptions of us and why we so easily draw a line between what is ok to kill and what is not.

2:30 BUSINESS MEETING

O7.12

2:50 ON THE NEUROBIOLOGY OF TRUTH

Ron Bombardi
Middle Tennessee State University, Murfreesboro, Tennessee, USA

The concept of truth arises from puzzling over distinctions between the real and the apparent, while the origin of these distinctions lies in the neurobiology of mammalian cerebral lateralization, that is, in the evolution of brains that can address the world both indicatively and subjunctively; brains that represent the world both categorically and hypothetically. After some 2500 years of thinking about it, the Western philosophical tradition has come up with three major theories of truth: correspondence, coherence, and pragmatist. Traditional philosophy has nevertheless failed to arbitrate much among these views; certainly no clear winner has emerged. I argue, however, that contemporary neuroscience provides adequate theoretical grounds for a unified theory of truth. More specifically, I contend that the correspondence, the coherence, and the pragmatic utility of symbols are each biological features of our neurophysiological information processing systems-that is to say, our brains. On my view, the traditional trifurcation of philosophical accounts of the predicate, "is true," stems from a trifurcation of focus on the information latent in sensory, motor, and somatosensory cortices of the human brain.

O7.13

3:15 IS A SCIENTIFIC IDEA OF HOPE POSSIBLE? HOW DOES IT RELATE TO OUR IDEAS ABOUT THE PHILOSOPHY OF RELIGION?

Andrew Harrell
YHWH School of Christianity, Vicksburg,MS, USA

John Calvin and the Dutch Bishop Jansen believed that Hope comes about against all odds. But, the French Theologian Blaise Pascal was trying to defend Jansen against criticism from the Jesuits and the Church that they were not consistent with St. Augustine's teachings. To do this had to try and explain what "Hope with the odds" might mean. Along the way the foundations were laid for our modern understanding of what mathematical "probability" means. Do you agree with how Pascal defines probability? And what type of Hope do you believe in (against all odds or with the odds).

My talk in the MAS mathematics/statistics/computer science section will concentrate on the mathematical details of how Pascal's laid the foundations for modern axiomatic probability theory. While my talk in this section will concentrate on the theology and philosophy of Pascal's theories of scientific defintion and his idea of how "hope" and "mathematical expectation" might be understood using these maxims (rules of investigative thought) and methods of definition.

O7.14

3:40 NO PHILOSOPHER LEFT BEHIND: CRITICAL THINKING MAKES A COMEBACK IN THE SCIENCE CLASSROOM

J.J. Sylvia IV[1], Leonora Bateman[2]
[1]*Itawamaba Community College, Raleigh, NC, USA*
[2]*North Carolina State University, Raleigh, NC, USA*

Historically, science education has been inquiry-based, focusing on learning through questioning and experimenting. This emphasis on inquiry-based science was seen in the rise of Western philosophy through the Pre-Socratics such as Thales and emphasized in the work of later polymaths such as Gottfried Leibniz and Francis Bacon. Modern American science education, particularly since the passing of No Child Left Behind, has been focused instead on fact-based education. From an educational perspective, the fields of both science and philosophy have faced criticism as the U.S. falls behind in world education, particularly in the STEM (Science, Technology, Engineering, Mathematics) areas.

The authors of this presentation argue that science and philosophy education are both at an important juncture where innovation is needed, and improvements could be made by allowing each to learn from the strengths of the other. The next generation of science standards being released offer a step in the right direction, featuring 8 main ideas based heavily on inquiry. Through a consideration of these standards and a historical understanding of science and philosophy, we suggest a path forward for both scientific and philosophical education.

O7.15

4:05 SELF-PLAGIARISM AND TEXTUAL RECYCLING

Samuel Bruton
The University of Southern Mississippi, Hattiesburg, MS, USA

While plagiarism has long been recognized to be a serious academic "sin," the ethical status of what is often called "self-plagiarism" has remained somewhat more controversial. Some scholars continue to seem puzzled by its very notion or deride it as an oxymoron. Others question whether originality in scientific writing is that important. Adding fuel to these doubts is the fact that neither the Office of Research Integrity (ORI) nor the National Science Foundation (NSF) takes action against researchers who plagiarize their own material. Moreover, the ethical status of a specific kind of self-plagiarism known as textual recycling is particularly a "gray area". I examine what may be considered a borderline case of textual recycling and argue that even in this case - where the amount of verbatim overlap is fairly small and occurs in the introductions of the two papers - the material should have been re-written because self-plagiarism violates the principle of originality.

O7.16

4:30 BIOLOGICAL INDIVIDUALS, TIME, AND PERSISTENCE: THE PERDURANTIST FOUNDATIONS OF THE SPECIES-AS-INDIVIDUALS THESIS

Malachi Martin
Independent Scholar

The species-as-individuals (SAI) thesis accentuates issues of time and persistence in the ontology of biological individuals in virtue of its grounding in a perdurantist view of persistence and further assumptions that it makes about other biological entities such as cells and organisms. Perdurantism holds that entities, biological and otherwise, possess temporal parts and not just spatial parts. The opposing view of persistence is endurantism, which holds that entities are whole and complete at each moment they exist and possess only spatial parts. Thus, the SAI thesis views species as four-dimensional entities (or more informally, as "spacetime worms"), spread out in three dimensions of space and one dimension of time. What is more, the SAI thesis holds that the kind of individuality that species exhibit is also possessed by all other biological entities; thus, the view of persistence underlying the SAI view of species is extended to the whole of biological ontology. This claim was initially made by David Hull (1978), explicitly drawing on a perdurantist notion of the biological individual advanced by T. H. Huxley (1852), who held that an "individual animal is the sum of the phenomena presented by a single life". This notion has been carried forward by other SAI theorists, such as Horvath (1997). Purchasing the SAI thesis entails accepting a perdurantist view of all biological entities, events and processes, and therefore an ontology that I maintain is not already accepted by most biologists.

MARINE AND ATMOSPHERIC
Chair: Dr. Kevin Dillon
University of Southern Mississippi
Vice-Chair: Scott Milroy
University of Southern Mississippi

February 21, 2013
Thursday Evening
Poster Session Following Dodgen Lecture

POSTER SESSION

P8.01

ENVIRONMENTAL MODELING AND PREDICTION FOR CLIMATE FLUCTUATIONS OVER GRAND BAY OF GULF OF MEXICO

Remata Reddy[1], Paulinus Chigbu[2], Duanjun Lu[1], Paul Tchounwou[1]
[1]Jackson State University, Jackson, MS, USA, [2]University of Maryland Eastern Shore, Princess Anne, MD, USA

The Gulf of Mexico region is prone to severe weather events throughout the year and is affected due to environmental changes over the coastal regions (ex. flooding and sea breeze circulations, tropical cyclones/hurricanes, ENSO etc.). Understanding, modeling and predicting weather/climate dynamics and meteorological coastal processes for the Gulf region is important for agriculture, fisheries and forestry management as this region is of interest for the country's economy and social aspects. Our goal is to investigate the seasonal patterns of meteorological parameters in order to predict their impacts on ecosystem and fish populations over the Grand Bay National Estuarine Research Reserve (GBNER) area using the Penn State/NCAR Mesoscale Model (MM5). In the present study, the MM5 version 3 Weather/Environmental model was run using data assimilation techniques where non-conventional data from various sources are fed into the model as initial and lateral boundary conditions to simulate seasonal variations of surface features and precipitation. Other simulation parameters include sea surface temperature, sea level pressure and surface wind magnitude. The climatic and seasonal fluctuations of these parameters have important implications for the GBNERR ecosystem.

P8.02

APPLICATION OF MICROSATELLITE MARKERS TOPEDIGREES RECONSTRUCTION AND GENETIC STUDIES OF LIFE HISTORY TRAITS IN THE ATLANTIC CROAKER

Jordan Reed[1], Adrienne Norrell[2], Eric Saillant[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College – Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautic and Space Administration, Gautier, MS, USA, [2]and the University Southern Mississippi, Department of Coastal Sciences, Gulf Coast Research Laboratory, Ocean Springs, MS, USA

The Atlantic croaker (*Micropogonias undulatus*) is a popular model species to investigate the impacts of ecological disruptions in natural habitats or to develop technologies for the control of captive reproduction. The purpose of this research was to develop the tools to study the genetic basis of phenotypic traits of captive bred Atlantic croaker using common garden experiments. Ten heterologous microsatellites previously shown to be suitable for parentage studies in Atlantic croaker are optimized for multiplex genotyping in order to allow efficient high throughput assay of large numbers of samples. The multiplex panels were used to determine the parentage of Atlantic croaker samples from groups of families raised mixed in the same tanks beginning a few hours post-fertilization according to the ‘common garden' experimental design. The families were generated during the fall of 2012 using broodfish held at the Thad Cochran Marine Aquaculture Center of The University of Southern Mississippi. Individual crosses were obtained via in-vitro fertilization of the eggs from females with the sperm of males following hormonal induction of gamete maturation with a Luthenizing Hormone Releasing Hormone analog. The obtained families were mixed 15 hours post fertilization and subsequently raised in the same tanks. Parents and offspring were genotyped at the microsatellite markers and the obtained genotypes were used to match offspring to parental pairs. The method was employed to study the differential survival of crosses and genetic variation at various phenotypic characters in the species.

February 22, 2013
Friday Morning
Room 231

O8.01

9:00 DEVELOPMENT OF A DYNAMIC DIGITAL ELEVATION MODEL FOR THE COASTAL SHELF REGIONS OF

Stephan J. O'Brien, David Dodd, James Davis, Jerry D. Wiggert

University of Southern Mississippi, Stennis Space Center, MS, USA

The goal of this study is the development of a Bathymetric Dynamic Digital Elevation Model (DDEM) across Alabama, Mississippi and Louisiana to support three dimensional wind-wave, and storm surge modeling systems for the Northern Gulf Coastal Hazards Collaboratory. The 3 arc-second Coastal Relief Model (CRM) is the first high-quality, high-resolution elevation model produced by the National Geophysical Data Center (NGDC) that covers the United States land/sea coastal zone. This model is chosen as the basis upon which to construct the dynamic elevation model. A method is established using the National Oceanic and Atmospheric Administration Vertical Datum Transformation software and the Generic Mapping Tools to produce the DDEM with freely available software. The bathymetry is updated with the NGDC's 1 arc-second Northern Gulf and 1/3 arc-second Mobile, Biloxi, New Orleans and Southern Louisiana digital elevation models. Additional sources of bathymetric data included in the update are 58 bathymetric surveys conducted in Alabama, Mississippi and Louisiana from 2001 to 2010. The targeted final product is a 1/3 arc-second DDEM covering the Northern Gulf of Mexico updated through May 2010. The completed DDEM will be available as a web-accessible resource. Software tools will be provided to users interested in: 1) obtaining data from the completed product or 2) updating the DDEM as additional bathymetric survey data becomes available.

O8.02

9:15 PRELIMINARY FINDINGS ON THE DEVELOPMENT AND DESTRUCTION OF PHYSICAL STRATIFICATION IN THE MISSISSIPPI SOUND AND BIGHT: A DRIVER OF HYPOXIA

Andreas Moshogianis, Scott Milroy

University of Southern Mississippi, Stennis Space Center, MS, USA

Seasonal hypoxia, or decrease in dissolved oxygen, is certainly common over the Louisiana-Texas (LaTex) shelf, but over the last several years summer hypoxia has also been discovered east of the Mississippi River in the Mississippi Bight and deeper reaches of the Mississippi Sound. Hypoxia most commonly occurs during times of significant vertical stratification of the water column, caused by the complimentary effects of seasonal heating and freshwater discharge. These discharges, when laden with organic and inorganic nutrients, further exacerbate the geographic extent of these hypoxic water masses. While the causative agents of coastal hypoxia within northern Gulf of Mexico (nGoM) waters have been well-described, the synergies between physical stratification and the ventilation of near-bottom hypoxic water masses within the Mississippi Sound/Bight are less well-known. Over the 2010 late-spring through late-summer season (01 APR - 05 AUG), vertical profiles from thirty repeat stations within a highly resolved (25 km2) grid were analyzed monthly for in-situ salinity, water temperature, pressure, dissolved oxygen, and density. Air temperature, wind, and discharge data were gathered from local NDBC and USGS weather and water information stations. Preliminary results from this study indicate that physical (thermo- and salino-haline) stratification, in sync with the seasonal trend of relatively low wind velocities, are a major driver in the development of hypoxia, while increases in wind velocity lead to the destruction of bottom hypoxic water masses.

08.03

9:30 DETERMINING A CORRELATION BETWEEN SEA LEVEL ANOMALY AND CHLOROPHYLL-A IN THE GULF OF MEXICO

Katharine Woodard, Jerry Wiggert

University of Southern Mississippi, Stennis Space Center, MS, USA

Correlations between sea level anomaly (SLA) and chlorophyll (Chl) have been studied numerous times in different parts of the ocean. Usually negative (positive) SLA will correspond with heightened (depressed) Chl concentrations. This is due to eddy pumping. Cyclonic eddies cause upwelling within the eddy, bringing nutrients toward the surface and stimulating phytoplankton growth in the euphotic zone. Another mechanism that affects chlorophyll distribution patterns is advection around eddies of either rotation. In the Gulf of Mexico (GOM) correlation studies have performed that, and

reported on how chlorophyll distributions were affected by anticyclone-cyclone eddy pairs along the western coast of the GOM, and over the Campeche Canyon. However, these studies are focused along the coast in more confined study areas and physical-biological interactions associated with eddies and other influences over the broader GOM domain are lacking. Basin wide correlations of SLA and Chl anomaly are the main objective of this study. The area of study is the GOM north of 18˚. SLA data will be taken from AVISO (Archiving, Validation and Interpretation of Satellite Oceanographic Data). This data set is available from October 1992 in weekly increments. Chl data will be collected in 8-day increments, from SeaWiFs and MODISA satellite data holdings of the Goddard DAAC. The correlation effort in this study will range from 1998-2012. Preliminary results show an overall pattern of high surface chlorophyll in the winter months (November-April) and low in the summer months (April-October). Interannual variability within springtime months will be the focus of the presentation.

08.04

09:45 USING AUTONOMOUS UNDERSEA VEHICLES IN SUPPORT OF OIL SPILL RESEARCH IN THE GULF OF MEXICO

Arne-Roland Diercks[1], Max Woolsey[1], Roy Jarnagin[1], Clayton Dike[1], Marco d'Emidio[2], Steven Tidwell[2], Vernon Asper[1]
[1]University of Southern Mississippi, Hattiesburg, MS, USA, [2]University of Mississippi, Oxford,MS, USA

The National Institute for Undersea Science and Technology, a collaboration between the University of Southern Mississippi and the University of Mississippi, owns and operates two Autonomous Undersea Vehicles (AUVs). The ISE built Explorer class 5m long Eagle Ray AUV and the WHOI built SeaBED class Mola Mola, a double hulled AUV, have two completely different operational tasks and requirements based on their physical shape and method of propulsion. The AUV work provides deep-sea site reconnaissance for instrument deployments and sampling sites for the ECOGIG research consortium, one of 8 funded consortia to study the effect of the 2010 oil spill in the Gulf of Mexico. Eagle Ray operates <50 meters off the seafloor, collecting acoustic data from a multi beam echo sounder and a sub bottom profiler. Mola Mola is used for close-up subsea photographic site investigation, using slow flight to collect high resolution digital photography of the target areas. Both vehicles are rated to 2200m depth. The combined use of these AUV's provides a unique tool to study seafloor morphology, sub bottom structure and provide high resolution imagery of targets of interest. Results of the combined work of these two AUV's from their most recent cruise in the Gulf of Mexico in support of the ECOGIG research consortium will be presented at the meeting.

O8.05

10:00 PARTICLE FLUX AND REDISTRIBUTION NEAR THE MACONDO WELL IN THE GULF OF MEXICO

Vernon Asper[1], Arne Diercks[1], Uta Passow[2], Clayton Dike[1]
[1]University of Southern Mississippi, Stennis Space Center, MS, USA, [2]University of California, Santa Barbara, CA, USA

During visits to the Macondo site during the spill, numerous aggregates of oil and organic matter were observed both near the surface and throughout the upper water column. To investigate the role of these "marine snow" aggregates in the transport and ongoing dynamics of the oil, we used a profiling camera system to determine their vertical distribution at several sites in the vicinity. To monitor the long term fate of this material, we later deployed a series of moorings at three sites in the Gulf of Mexico, including one just 4km from the well head and another at a natural seep at GC600. These moorings include time series sediment traps, ADCP current meters, and novel trap/camera systems that will measure the in situ sinking speeds of aggregates settling into a quiescent chamber. These data will be used to track resuspension events and the possible vertical and lateral transport and redistribution of oiled sediments. Initial results show a remarkably dynamic environment with currents shifting regularly we recorded one interesting "snow storm" of sinking particles that may have resulted from a resuspension event in nearby, shallower water.

10:15 BREAK

08.06

10:45 SYNERGISTIC INTERACTIONS AMONG SALT MARSH BACTERIA IN THE DEGRADATION OF LIGNOCELLULOSE

Yijie Daniel Deng, Shiao Y. Wang

University of Southern Mississippi, Hattiesburg, USA

Microbial degradation of lignocelluloses is important in the process of plant litter decomposition, and is a key component in salt marsh carbon cycling, driving the detrital food pathway. The details of the mechanism by which microbes degrade lignocelluloses is largely unknown. Because lignocelluloses in marsh detritus are recalcitrant and difficult to break down, we hypothesize that synergistic interactions among bacteria facilitate lignocellulose degradation. To study such interactions, we compared bacterial growth among single cultures and three-species mixed cultures using nine lignocellulolytic bacteria belonging to seven genera. All bacterial cultures were grown in 96-well plates with artificial lignocellulose medium containing carboxymethyl cellulose, xylan and lignin as sole carbon source. Results showed that bacterial synergy was common in lignocellulose degradation, independent of bacterial phylogeny. Most bacterial mixtures grew better than single cultures. At 48 hr, 24 of 27 mixed cultures showed enhanced growth (OD_{595} of 0.13-0.29) compared to growth of single-species cultures (OD_{595} of 0.06-0.23). No negative interaction was observed. Bacteria synergy also promoted specific growth rates in 15 out of 27 mixed cultures, ranging from 0.32 to 0.71 hr^{-1} for mixed cultures compared with 0.34 to 0.51 hr^{-1} for single cultures. We also found that many mixed cultures contained greater lignocellulolytic enzyme activities. The results suggest that bacteria populations on marsh detritus form consortia that facilitate their abilities to break down refractory lignocelluloses. Currently we are studying possible underlying mechanisms by which bacterial synergy occurs during lignocellulose degradation.

08.07

11:00 PERSISTENCE OF ENTEROCOCCI IN COASTAL WATERS

Kimberley Lewis, Shiao Wang

University of Southern Mississippi, Hattiesburg, MS, USA

Enterococcus is a fecal indicator bacteria used to monitor marine recreation water quality. High levels of enterococci at beaches with no known sources of pollution have lead some to question their reliability as indicators of pollution events. There have been multiple laboratory studies on enterococci survival but few under natural environmental conditions. In this study, we investigated how long enterococci survive in the environment and the affect of predation on enterococci abundance. Sewage samples were diluted 1:1 with natural beach water (NBW) or filter-sterilized beach water (FSBW) and placed in microcosms that were then deployed at two sites along the Mississippi coast. Samples were analyzed for eight days using membrane filtration to enumerate viable enterococci, and qPCR to quantify enterococcal DNA. Viable enterococci in FSBW and NBW decrease by 2 and 2.5, respectively, after four days. By day eight, viable enterococci decreased to 0.06% and 0.15% of the initial concentration while target sequence declined to 5.68% and 4.68% for FSBW and NBW samples, respectively. Our results suggest that there may be two phenotypic populations of enterococci: environmental vs. gut associated. While assessing recreational water quality, it may be useful to consider the duration of high enterococci counts. While high counts of brief duration may indicate sewage pollution, persistent high count with no known sewage leaks may be due to re-growth of environmental isolates. Currently, we are studying the genetic diversity of environmental and sewage isolates.

O8.08

11:15 ANALYSIS OF NITROGEN SPECIES IN RAIN AND STORMWATER ALONG THE MISSISSIPPI GULF COAST USING A LANDSCAPE APPROACH

Joshua M. Allen, Kevin S. Dillon

University of Southern Mississippi, Ocean Springs MS, USA

Rainwater and stormwater nitrogen species are being analyzed from three landscape types along the Mississippi Gulf Coast: residential, hardened, and pristine. Nitrogen content from three integrated stormwater drainage pipes that drain directly to the Mississippi Sound is also being examined. Rainwater ammonium (NH4) concentrations sampled in 2011 ranged from below detection to 39uM. The nitrogen stable isotope (^{15}N) values were isotopically light (-5 to -1 per mil). Nitrate (NO3) concentrations ranged from below detection to 30uM with ^{15}N values that ranged from -5 to +6 per mil. Dissolved organic nitrogen (DON) within the rainwater samples showed similar concentrations to that of NH4 and NO3. Stormwater samples from the residential and hardened sites were similar in NH4 and NO3 concentration (0 to 85uM). The ^{15}N values for NH4 from these sites ranged from -7.5 to +17.3 per mil

while the NO3 values were much lighter isotopically (-19.1 to +1.4 per mil). The pristine site had low concentrations of NH4 (0 to 13uM) and relatively high concentrations of NO3 (0 to 71uM). ^{15}N-NH4 isotopic values at the pristine sites were heavier than rainwater (-1.7 to 7.5 per mil), and the ^{15}N-NO3 values were unusually light (-23.8 to -2.8 per mil). DON in stormwater was generally higher than that of rainwater. Nutrient and isotopic analysis of the integrated stormwater sites showed similar values to the residential and hardened sites. Results indicate that sources of NH4 and NO3 vary spatially and temporally as they flow across different landscape types along the Mississippi Gulf Coast.

11:30 LUNCH

FRIDAY AFTERNOON

O8.09

1:00 RAPID DETERMINATION OF METHANE AND CARBON DIOXIDE CONCENTRATIONS IN SEAWATER

Hannah Roberts, Alan Shiller
University of Southern Mississippi, Stennis Space Center, MS, USA

A new method for the analysis of methane and carbon dioxide concentrations in seawater was developed. Both gases are known for greenhouse gas behavior in the atmosphere. Estimations of sources and sinks in the earth system are currently highly variable, including estimations of release or uptake from marine systems. The method developed is both time and cost effective. Additionally, minimal resources are consumed and a high level of precision is maintained. Samples are equilibrated with a headspace of zero air within a 140 mL plastic syringe. Samples are then mixed using a shaker table for approximately one hour and the headspace then transferred to a dry, clean syringe. The sample is injected into a Picarro CRDS (cavity ring down spectroscopy) Analyzer. The data are then corrected for methane and carbon dioxide that remain in the water. Relative difference between samples of varying concentrations was found to be less than 10% and dominantly less than 5%.

O8.10

1:15 EFFECTS OF SELECTIVE GRAZING BY MICROZOOPLANKTON ON PHYTOPLANKTON COMPOSITION IN THE BAY OF ST. LOUIS

Amanda McGehee, Donald Redalje
University of Southern Mississippi, Stennis Space Center, MS, USA

The Bay of St. Louis (BSL) is a small, well-mixed microtidal estuary on the Mississippi gulf coast with an average depth of approximately 1.5 m. Two rivers provide freshwater input into the BSL: the Jourdan River in the west and the Wolf River in the east. While the taxonomic composition of the phytoplankton population has been compared to environmental parameters previously, there is no data on microzooplankton grazing in the bay. As part of a zooplankton grazing study, we wanted to determine how selective grazing by microzooplankton affects the phytoplankton composition in the bay. The dilution technique for microzooplankton grazing rate determination was coupled with high pressure liquid chromatography (HPLC) to examine the dynamics between pigment-based phytoplankton taxonomy and grazing. The pigment-based taxonomy program CHEMTAX was used before and after incubation to look for changes in phytoplankton composition caused by selective grazing. We hypothesize that grazers will selectively feed on the phytoplankton (marker pigments) with the highest growth rates and that this will be reflected in taxonomic differences between sample taxonomy based on CHEMTAX analysis before and after incubation.

O8.11

1:30 A SURVEY OF FISH PARASITES COLLECTED FROM LOCATIONS IN THE MISSISSIPPI SOUND

Isaiah Tolo, Andrew Sinclair, David Spencer
Belhaven University, Jackson, USA

Several factors have led to the need for parasitologtical studies in the Gulf of Mexico. Economic factors such as the increasing demand for seafood globally, and the increasing percentage of seafood provided through marine aquaculture are most important. Ecological factors within aquaculture systems have also contributed to the need for these studies. Disease has become the largest single cause of economic losses in aquaculture. Spread of parasites in overcrowded holding tanks can be devastating to stock populations as well as to wild communities if infected stocks manage to escape. Samples of fish were collected from the Pascagoula River Audubon Center (salinity <1ppt), Davis Bayou (15ppt),and Biloxi Bay (27-33ppt). These samples were examined and dissected for an

analysis of the parasites infecting these fish. Of the 107 fish dissected, 72% were found to have parasites. A total of 1356 parasites were found, including leeches, nematodes, acanthocephalans, monogeneans, and copepods. The study found monogeneans in all locations except for in the Pascagoula River. Intestinal nematodes increased as the samples were taken closer to the open gulf, while acanthocephalans were most common in the sample groups taken from the Pascagoula River and GCRL. Leeches and nematodes were the only parasites found in all four locations. This study serves as a pilot study for further research into parasites infecting fish along the Mississippi Gulf Coast.

1:45 Divisional Meeting

MATHEMATICS, COMPUTER SCIENCE AND STATISTICS
Chair: Dr. Elegenaid Hamadain, University of Mississippi Medical Center
Vice Chair: Dr. Natarajan Meghanathan, Jackson State University

Thursday, February 21, 2013

Thursday Evening

Poster Sesion Following Dodgen's Lecture

P9.01
APPLYING COMMON CORE STANDARDS IN GRADES 4TH-10TH USING LEGO ROBOTICS

Darnell Johnson[0], Derrick Jones[0], Dezerae Little[0]
[1]Elizabeth City State University, USA, [2]Mississippi Valley State University, USA

Common Core Standards includes critical content for all students in American education. Forty-eight of the fifty states have adopted the standards as of 2012. Previously, every state had its own set of academic standards and students in each state were learning at different levels. In the new global economy, all students must be prepared to compete with students from around the world. Students are expected to develop a deeper mastery of content and demonstrate what they know through writing and other projects. Changes to curriculum and instruction are more student-centered with greater focus on skills, abilities, and a shift towards more performance assessments. This research was designed to apply mathematical processes of the Common Core Standard in a lesson plan for fourth through tenth grade students. The REU Mathematics team used NXT LEGO® Robotics to teach various scientific, mathematical, and design concepts, through designing, building, and programming the robots at each level. The students' received hands on experience with physics, mathematics, motion, environmental factors, and used problem solving in a collaborative group setting. The data was collected through observations.

P9.02
ANALYSIS OF BREAST CANCER CELLS USING PARALLEL PROGRAMMING MODEL

Brandi Smith[2], Bingjing Zhang[1], Judy Qiu[1]
[1]Indiana University, USA, [2]Mississippi Valley State University, USA

Twister Iterative Map-Reduce Programming Model is used to generate large data sets over a cluster of computers (parallel programming) in reasonable time. The data is split into a number of tasks; once those tasks are distributed by the map function, the data is then generated together again by the reduce function to give the final output. Kmeans Clustering algorithm is used to find center points of data. Studying breast cancer cells and their characteristics is important in detecting whether cancer is benign or malignant in the cell. The use of parallel programming: generates the characteristics quickly, and thereby help to classify the cells as benign or malignant based on the center of the cluster.

P9.03
UTILIZING ARCGIS IN EDUCATION TO MAP A GLACIER AND ITS CHANGES OVER TIME

Erica Petersen[1], Cheri Hamilton[2], Brandon Gillette[2]
[1]Mississippi Valley State University, USA, [2]University of Kansas, USA

Glaciers are shrinking at a more rapid pace than predicted in previous years. The cause of this is glacial retreat which happens when ice or snow is removed from glaciers through ablation. Ablation is the occurrence of melting, sublimation, wind erosion, or calving. The melting of ice caused by glacial retreat adds water to oceans which can eventually

lead to rising sea levels. Glaciers hold about 69% of the world's fresh water supply. The melting of this land ice can affect sea level rise by 70 meters in the next century. This study focused on how the Jakobshavn Glacier has change over the years and includes a development of a high school education module. Using imagery collected from Landsat 1-7 and Google Earth, students will be able to utilize GIS software to visualize and analyze these changes over time in relation to future sea level rise.

P9.04
ACQUISTION OF RIGHT OF WAY IN MISSISSIPPI: IN-HOUSE VS. CONSULTANTS

Imad Aleithawe
Research Division, Mississippi Department of Transportation, USA

Acquiring the Right of Way in a timely manner is often the key element in moving a highway construction project forward to prevent further delays to the construction phase. The use of consultants' services by most, if not all, government agencies has increasingly become a part of the usual process, often without considering when it is better to use in-house staff of DOT's for acquiring private property either directly or in an advisory role. The question remains, does hiring consultant service instead of using in-house agents benefit the ROW acquisition process? Do consultants have an impact on the acquisition duration of the ROW? Thirty four completed projects, with 1445 parcels, acquired by the Mississippi Department of Transportation (MDOT) were randomly selected for analysis, using Statistica7 software with t-test analysis and A 2x2 table to test the Null Hypothesis (Ho, meaning the variable does not affect the result) significance. In the first 60 days or less 60% of parcels were acquired by in-house staff while 40% acquired by consultants. The findings in this paper support the use of private consultants' services for larger projects with high number of parcels to be acquired.

February 22, 2013

FRIDAY MORNING
COCHRAN 226

8:30 Welcome

O9.01
8:35 BIFURCATION ANALYSIS OF A FINANCIAL SYSTEM WITH DELAYED CONTROL

Narmarta Kumar, Chartese Jones, Xiaoqin Wu
Mississippi Valley State University, USA

In this presentation, complete analysis is presented to study codimension-2 bifurcations for a financial system with delayed control. Complete analysis will be give to obtain sufficient conditions that the characteristic equation at the equilibrium point has a pair of purely imaginary roots, a double zero root, and a zero root and a pair of imaginary roots. The normal forms will be computed for their corresponding bifurcations, namely, Hopf, Bogdanov-Takens (BT), fold-Hopf bifurcations. Hence bifurcation diagrams such as Hopf, homoclinc, and double limit cycle bifurcations are obtained. Some examples will be given to confirm the theoretical results.

O9.02
8:50 IS A SCIENTIFIC IDEA OF HOPE POSSIBLE? HOW DOES IT RELATE TO THE MATHEMATICS OF PROBABILITY?

Andrew Harrell
YHWH School of Christianity, USA

John Calvin and the Dutch Bishop Jansen believed that Hope comes about against all odds. But, the French Theologian Blaise Pascal was trying to defend Jansen against criticism from the Jesuits and the Church that they were not consistent with St. Augustine's teachings. To do this he had to try and explain what "Hope with the odds" might mean. Along the way the foundations were laid for our modern understanding of what mathematical "probability" means. Do you agree with how Pascal defines probability? And what type of Hope do you believe in (against all odds or with the odds). The talk in this MAS section will concentrate on the details of how Pascal laid the foundations for modern

axiomatic probability theory in order to solve the problem in gambling of a "game of points". Along the way he proved some fascinating theorems on the properties of the binomial coefficients that occur in his "arithmetic triangle" and are used today to create combinatorial statistical testing designs for experiments, fractal computer images, and much more.

09.03

9:05 OPTIMIZING SATELLITE-BASED MARINE DEBRIS DETECTION

Alexanderia Lacy[1], Davida Streett [2]
[1]Mississippi Valley State University, USA, [2]National Oceanic Atmosperic Administration, USA

Objective(s): The purpose of this research project is to locate and positively identify marine debris in the Pacific Ocean from the March 2011 Japanese tsunami using ENVI (Environment for Visualizing Images). Subsequently, NOAA will be able to inform both scientist and the general public about the upcoming threat to marine ecosystems, island nations, and US coastal communities. Methods(s): First, high-resolution multispectral satellite imagery was atmospherically and radiometrically corrected in order to obtain the most accurate surface radiance. Imagery was visually enhanced using the pansharpening techniques. Second, multiple target detection algorithms were employed too identify anomalous features in the image. Results: Images were analyzed both near the Japan coast just days after the tsunami and out over the open ocean one year later. We were able to determine that objects exist in the satellite imagery that has fundamentally different spectral curves than water. Conclusion: We found spectral distribution different from those known to be white caps or clouds. However, it will require further analysis to determine if the objects are actually debris from Japan.

09.04

9:20 GRAPHICAL 2D WEBPAGE

Cornelius Myles
Mississippi Valley State University, USA

The goal of this project is to construct a feel of a Graphical 2D Webpage that will help students or other individuals who are interested 2D graphics. This webpage is to convey a solid foundation of mathematical calculations and the programming skills required to create the graphics. It will entice users' attention and make them understand 2D graphics (such as triangles, circles, fractals, and trees) easily. Since 2D graphics are very beautiful and it is easy to attract viewers' attention, unless users have background on programming languages and basic knowledge of computer graphics, 2D graphics seems complicated to them because it involves lots of mathematics and Java programming. This project is to be designed to serve as a starting point for beginners to understand Java and create 2-Dimmensional graphics. The Webpage will provide sample Java code for the various shapes and explanation of mathematics used in the code.

O9.05

9:35 ATTACK TREES FOR THREAT/RISK ANALYSIS OF SOFTWARE SECURITY

Natarajan Meghanathan
Jackson State University, USA

Attack trees represent attacks against a system in a tree structure, with the goal as the root node; an intermediate node becomes a sub goal, and its child nodes are ways to achieve that sub goal. Each path, called the attack path, tracing from the root node to a leaf node represents a unique way to achieve the attacker's goal. A node in an attack tree can be either an "AND" node or an "OR" node. The OR nodes contribute to a choice in the path sequence; whereas the AND nodes represent a combination of steps that must be successfully executed in order to achieve the goal. Once the basic attack tree is constructed, indicator values (to denote cost of the attack, probability of comprehension or technical ability) can be assigned to the leaf nodes. For a node having two or more AND nodes as children: the cost (technical ability) of the node is the sum of the cost (technical ability) of the child nodes, and the probability of a node is the maximum of the probability of apprehension of its child nodes. One can calculate the indicator values of each attack path and rank the paths in the order of the vulnerability (e.g., the shortest attack path, easiest attack, cheapest attack, the attack path that is the hardest to detect, and etc), defined based on the attacker's characteristics and constraints. Proper security controls can be then added along these vulnerable paths to decrease the chances of an attack.

10:00 BREAK

O9.06
10:15 REMOTE LABS: A DISTANCE EDUCATION CHALLENGE

Ali Abu El Humos[1], Bassem Alhalabi[2]
[1]Department of Comouter Science, Jackson State University, USA, [2]Department of Electrical and Computer Engineering and Computer Science, Florida Atlantic University, USA

In spite of the huge success in the development and marketing of distance learning and its broad future, one main challenge is still outstanding, leaving some specialized fields of education far from being ready to go online. In science and engineering programs where laboratory sessions are crucial, students would not be able to complete degree requirements without attending real campuses with real lab facilities. The main solution to this challenge has been so far is software simulation (SS). Remote Laboratory Environment (RLE) is proposed to complement distance education in the aforementioned fields so that students will not miss on campus laboratory experience. Remote Lab Environment is a complete self-contained environment, which allows users to perform lab experiments for on-line distance learning programs. It is a creative step that bridges the gap between Software Simulation and the real physical lab experience, which we will refer to as Campus Lab (CL). RLE is sought to combine the advantages of Software Simulation (in respect to the convenience of not being tied to a fixed physical space) and the authenticity of Campus Lab (in respect to dealing with the actual physical materials). RLE brings into play a diverse state of art technologies including but not limited to: single-chip web server/controller hardware technologies, Component Object Model (COM) software technologies, Instructional Design models and an embedded instructional cognitive subsystem (ICD), and in- house middleware applications. RLE's technology is systematically integrated into one unified computing system to help institute real experimentation environment online.

O9.07
10:30 WORKSHOP: INCORPORATING ASPECTS OF SYSTEMS AND SOFTWARE SECURITY IN SOFTWARE ENGINEERING PROJECTS

Natarajan Meghanathan
Jackson State University, USA

The objective of this workshop will be to introduce the participants about incorporating aspects of systems and software security in their software engineering projects. The workshop would be delivered in the form of modules and case studies. The module titled: *Security Design Principles and Models*, will focus on the various principles for secure software design and the commonly adopted models for designing secure systems. This module will also introduce participants to the notion of "misuse case diagrams" to capture the security requirements along with the traditional use case diagrams. The fist case study that would be presented is on *Source Code Analysis of a File Reader Program in Java*, wherein the speaker will introduce participants to the different security vulnerabilities that could be associated with software programs and discuss generic solutions (applicable to any programming language) as well as Java code snippets, to avoid or at least mitigate the different vulnerabilities. The second case study to be presented is a senior capstone project (conducted at Jackson State University) to illustrate the incorporation of security requirements in all phases of a software development lifecycle. Finally, the speaker will talk about the online resources available through his NSF-TUES funded (DUE-0941959) project website http://www.jsums.edu/cms/tues, and how participants (including faculty and students) can make use of these resources.

11:40 DIVISION BUSINESS MEETING

12:00 LUNCH BREAK

Friday Afternoon

O9.08
1:20 ELIMINATING HIDDEN TERMINAL PROBLEM IN COGNITIVE NETWORKS USING CLOUD - A SIMULATION BASED APPROACH

Stephen Ellis, Yenumula Reddy
Grambling State University, USA

We proposed a method to solve the hidden terminal problem through cloud computing. The idea is that the cloud can store the status of cognitive network, compute, reorganize, and make available the current state of cognitive networks for future decisions. The role of Hidden Terminal problem and solution using cloud was discussed in [1]. The cognitive radio networks (CRN) structure proposed by Reddy [1] was implemented through simulations. In our simulations, the interface was connected to CRN nodes and CRN cloud (CRNC) black board. The controller receives messages from CRN nodes, schedules messages, and executes needed actions. The hidden node problem and dynamic spectrum allocation are very important in cognitive radio networks. The hidden node problem is eliminated by using cloud, since CRNC board has current status of CRN nodes. Further, the changes will be triggered automatically using the blackboard structure. The simulations were conducted using 10 cognitive nodes and transferring the packets from one node to any other node. The simulations are visual. The status of each cognitive node and nodes at cloud are updated on real-time. The best path was calculated and appropriate paths were locked to transfer the packets. Since the actions are taken at cloud, the hidden terminal problem is eliminated automatically and clearly seen. The cloud simulation helps to eliminate IEEE RTS/CTS (request to send /clear to send) creation in IEEE 802.11 protocol. [1] Y. B. Reddy., "Solving Hidden Terminal Problem in Cognitive Networks Using Cloud", SENSORCOMM 2012, August 19 - 24, 2012.

O9.09
1:35 ROLE OF NANOCOMPUTING IN WIRELESS COMMUNICATIONS

Yenumula Reddy
Grambling State University, USA

Nanocomputing is an emerging technology that has great potential but has significant barriers and obstacles to overcome. Nanotechnology is a branch of science and engineering devoted to the design of extremely small electronic devices (in the scale of 0.1 to 100nm) and circuits built from individual atoms and molecules. Currently, nanotechnology can be integrated into computing products like a disk drive, memory chips and through software modules. The software applications include communication protocols, grids, and internet mechanisms. The future nano-based applications may need entirely new Microsoft Windows or a different operating system environment. The nano level programming helps to minimize the execution time. Further the nano level components forming the devices or electronic components lower the [power consumption. Currently, with available hardware in the market and Microsoft Visual Studio (version 8 or 10), we can use NVIDIA CUDA based programming (using NVIDIA GPU card) to increase the processing capabilities compared to conventional computer programming. In the current research, we explore the current state of nanocomputing and nanotechnology applications to wireless communications.

O9.10
1:50 CALCULUS ANIMATIONS

Tapan Tiwari, Chunmun Trivedy
Alcorn State University, USA

Computer graphics, integrated with traditional class lectures, have been found to be an effective instructional tool. Many scientific studies support this notion. This instructional approach assumes even more significance in calculus classes because of the dynamic nature of the subject. Simple mathematical animations, compared to still graphs, not only help re-enforce some of abstract calculus concepts students find difficult to digest but also excite them to explore more. In this short presentation, we are going to share three such animations: two created with freely available computer algebra system, Maxima, and the third one in Excel. With the capabilities of Maxima, these are easy to produce.

09.11
2:10 USING EXCEL IN HIGHER EDUCATION EFFICIENTLY AND EFFECTIVELY

Jamil Ibrahim
University of Mississippi Medical Center

Evidence-based decision making requires transforming raw data into useable information. Data analysts can convert data to vivid and interactive visualization in a timely manner without having sophisticated programming skills. One readily available and affordable tool is Excel. Everybody uses Excel, but not everyone uses it to its potential. As research questions become more and more complex, the presenter will introduce techniques for simplifying analytic results without losing data and without the need for a full written report. Excel is useful in describing data in different formats such as heat maps, geographic maps, and dashboards that go above and beyond the standard chart. Excel has become a tool essential for mastering the four data-driven tasks: data access, management, analysis and presentation. The demonstrator will address the advantages and disadvantages of using Excel to accomplish these functions.

PHYSICS AND ENGINEERING
Chair: Dr. James Stephens,
University of Southern Mississippi
Vice-Chair: Dr. Parthapratrim Biswas,
University of Southern Mississippi

Thursday, February 21, 2013

Thursday Morning
COCHRAN 231

O10.01
9:00 IMPORTANCE OF HIGGS BOSON-GOD PARTICLE DISCOVERY

Amin Haque
Alcorn State University, Alcorn State, MS, USA

The Standard Model of elementary particles explains best how the universe works. The model comprises 17 particles: 12 fermions- 6 Quarks and 6 Leptons; 4 gauge bosons - photon, gluon, w and z , which allow fermions to interact. Without the Higgs boson or "the God particle", there would be no mass, no stars, no planets, and no atoms, and no human beings. The Higgs mechanism sets up a field that interacts with particles to give them mass, and the Higgs boson is the particle associated with that field. Theory suggests the particle's own mass, which it gets by interacting with itself, should be large. So we needed an accelerator which could produce very high energy. In the Large Hadron Collider beams of protons accelerated in opposite directions collide head on at close to the speed of light. The collisions produce other particles, which then decay into yet more particles. What these decay particles are depends on what was created in the original collision. Physicists had to look across a broad range of possible masses by scanning thousands of trillions of collisions. Higgs bosons are so unstable that they can never be observed directly. ATLAS and CMS, which are located on opposite sides of the LHC's loop, are designed to detect patterns of observable particles that theory suggests the Higgs should break down into. Both Gianotti, using ATLAS and Incandela, using CMS, have found Higgs bosons at a mass of around 125 giga-electron-volts.

O10.02
9:15 FINDING THE PARTIAL WAVE COMPONENTS OF TENSOR INTERACTION IN MOMENTUM SPACE

Khagendra Adhikari, Khin Maung
The University of Southern Mississippi, Hattiesburg,MS, USA

Solving Schrodinger equation in position space is simple but it is hard if not impossible to incorporate special relativity because $E=\sqrt{(p^2+m^2)} \rightarrow \sqrt{((-i\hbar\nabla)^2+m^2)}$. But in momentum space **p** remains **p** and can be treated easily. Schrodinger equation in momentum space is an integral equation. And after the separation of angular part is performed, we need to find partial wave components of the Fourier transform of the position space potential. Here in this paper we performed this for the tensor interaction.

010.03
9:30 GRAVITY WITHIN THE STANDARD MODEL

George Smith
University of New Orleans, New Orleans, LA, USA

In this work it is shown that gravity can be viewed as an incidental result of gauge bosons pairing off

together, sharing spacetime histories. It treats gravity as the gauge field of the Lie group, SL(2,c), formed from the complex extension of a Lie group which is the product of either the $SU_c(2)$ subgroup of the color $SU_c(3)$ and another color $SU_c(2)$ or the weak $SU_w(2)$ and another weak $SU_w(2)$ already incorporated in any model (such as the Standard Model) based on $SU_c(3) \times SU_w(2) \times U(1)$. The transformation to the complex extension is accomplished by requiring hermiticity conditions on the generators that are different from the usual ones and compatible with the envisioned physical model. This construction may provide an explanation for the very successful *double-copy property* of gluons in which gravitons are seen as pairs of gluons.

O10.04
9:45 FINDING THE LIMITATIONS OF AN EXPANDED EQUIVALENT FLUID APPROXIMATION FOR SIMULATING ACOUSTIC INTERACTIONS WITH THE OCEAN BOTTOM

Steven Kirkup, Michael Vera
University of Southern Mississippi, Hattiesburg, MS, USA

Equivalent fluids use complex densities in place of realistic seafloor conditions to simplify simulations of acoustic interaction with the seafloor. This eliminates the computationally intensive attempts to simulate realistic seafloor interactions that include shear waves. A previous method used such equivalent fluids and was found to be accurate only for interaction with low grazing angles and low shear speeds. The current method expands by also parameterizing the speed of sound in the fluid, allowing higher grazing angles and shear speeds to be modeled with equivalent fluids. For a particular window of grazing angle, there are several approaches to determining the complex density and the fluid's speed of sound using this Expanded Equivalent Fluid. By calculating statistics and comparing acoustic simulation results, the approach that most accurately mimics the actual seafloor and the highest window of grazing angle at which the fluid yields respectable results are investigated.

O10.05
10:00 MODELING THE HORIZONTAL PROPAGATION OF SOUND FROM AN AIRGUN ARRAY IN THE OCEAN

Bharath Kumar Kandula, Michael Vera
University of Southern Mississippi, Hattiesburg, MS, USA

The oil industry has been extensively using air gun arrays for sub-bottom marine petroleum exploration. Energy from the bottom-reflected sound may have effects on marine mammals. Studies are underway to determine the impact of the air guns on the behavior and communication capacity of marine mammals. A previous study modeled the acoustic propagation of air gun array pulses by considering a simple spectrum and a sea bottom without any shear. In extending their work, shear in the bottom, a source spectrum and an array of air gun sources have been used to study the acoustic propagation in the horizontal direction. The process of modeling lower frequencies presents certain computational challenges. The development of suitable simulation methods will be discussed.

10:15 BREAK

O10.06
10:30 LEADING E1 AND M1 CONTRIBUTIONS TO RADIATIVE NEUTRON CAPTURE ON LITHIUM-7

Lakma Fernando[1], Renato Higa[2], Gautam Rupak[1]
[1]*Mississippi State University, Mississippi State, USA,*
[2]*Kernfysisch Versneller Instituut, GRONINGEN, The Netherlands*

We use halo effective field theory (EFT) to provide a model independent calculation for the radiative neutron capture on lithium-7 over an energy range where the contribution from the 3+ resonance becomes important.We describe how the EFT couplings in the Lagrangian are constrained from available data on low-lying bound and resonance states. We also present power counting arguments that establish a hierarchy for electromagnetic one- and two-body currents. In the present single-particle approximation, one finds that a satisfactory description of the capture reaction requires a resonance width about three times larger than the experimentally quoted value. Our results quantify the current uncertainties in nuclear theory in the single particle approximation.

O10.07
10:45 DIGITAL HOLOGRAPHY OF AEROSOL PARTICLES DUE TO BACKSCATTERED LIGHT

Nava R. Subedi, Matthew J. Berg
Mississippi State University, Starkville, MS, USA

This work suggests a new method for digital holographic microscopy. Since all the traditional techniques use forward scattered light to image the particle; we attempt to image the particle from back scattered light. In this technique the interference pattern produced by the superimposition of the unscattered reference light and back scattered light from the particles is recorded by a digital camera. This digitally recorded pattern constitutes a hologram from which an image of the particle is computationally reconstructed by using a fast Fourier transform. The image we obtained by the backscattering light is likely to provide us with much more information on the profile and surface of the object. This new technique can potentially be used to characterize the physical properties like shape, size and composition of aerosol particles.

11:00 BUSINESS MEETING

Thursday Afternoon
Room 214

INVITED TALK

O10.08

1:00 FLIGHT MECHANICS AND PUTATIVE AUDIO RECORDINGS OF THE IVORY-BILLED WOODPECKER (*CAMPEPHILUS PRINCIPALIS*)

Michael Collins
Fishcrow.com, Pearl River, Louisiana, USA

Independent reports have recently been published of multiple sightings and auditory detections of the Ivory-billed Woodpecker (*Campephilus principalis*) in Arkansas and Florida and along the Mississippi-Louisiana border. This talk will discuss three videos that were obtained during encounters with this critically endangered species. Based on historical accounts, the wings were thought to remain extended throughout the flap cycle. A video of a bird that was identified in the field as an Ivory-billed Woodpecker shows a radically different flap style, in which the wings are folded closed against the body in the middle of the upstroke, but an overlooked clue in a historical photo supports the hypothesis that there had been a misconception about the flap style. A takeoff into level flight with unusually rapid, deep, and powerful flaps is not consistent with any other species native to the region but is remarkably similar to a takeoff of the closely related (and possibly extinct) Imperial Woodpecker (*Campephilus imperialis*) in a recently discovered film from 1956. Calls that were recorded during one of the encounters are consistent with an alarm call that is described in the literature. A double knock, which is characteristic of the *Campephilus* genus, was recorded in a video that shows a two blows being struck by a woodpecker with characteristics consistent with Ivory-billed.

O10.09
2:00 GLUCOSE SENSING BY EVANESCENT FIELD-FIBER LOOP RINGDOWN TECHNIQUE

Malik Kaya, Chuji Wang

Mississippi State University, Starkville,MS, USA
Evanescent field-fiber loop ringdown (EF-FLRD) technique is a new technique to fabricate fiber optic sensors and sensor network. The EF-FLRD sensors have been developed to create various sensors for physical, chemical, and biological sensing. In present work, we report a new EF-FLRD glucose sensor. A small part of a single mode fiber is etched, which is called as sensor head, and glucose oxidize (GOD) is immobilized on the surface of the sensor head. When GOD is immersed into different glucose solutions, refractive index around the surface of the sensor head changes when gluconic acid is produced by GOD and glucose reaction. An evanescent field is diffused in the interface between the etched fiber surface and immobilized layer when a laser beam passes through the sensor head. Different optical losses were detected and different ringdown times were recorded based on index-based sensing. The sensor was tested in different glucose concentrations ranging from 0.1% to 10% with a detection sensitivity of 0.1%. Beside glucose, the sensor was tested in different concentrations of synthetic urine solutions with different glucose concentrations and a detection sensitivity of 0.1% is achieved. Sensor head fabrication, response behavior, reproducibility, and GOD coating's effects on the sensor performance are examined.

O10.10
2:15 WATER MONITORING IN CONCRETE AND GROUT STRUCTURE BY USING FIBER LOOP RINGDOWN TECHNIQUE

Malik Kaya, Peeyush Sahay, Chuji Wang
Mississippi State University, Starkville,MS, USA

A water sensor based on the evanescent field-fiber loop ringdown (EF-FLRD) technique is described. The plastic jacket of a small part of single mode fiber was removed and etched. This part is called as sensor head. After etching process, the sensor head was tested in DI water and air to check sensitivity. Thereafter, water was poured on the surface of a concrete bar after the sensor was embedded into the concrete bar. After drying out for 24 hours, changes in refractive index of the medium around the sensor head were monitored by recording ringdown time. Eight different EF-FLRD water sensor units were fabricated to detect water presence inside the concrete bars. Detection sensitivity of water sensor for a concrete bar of 30 cm x 5 cm x 5 cm dimensions was 10 ml. The EF-FLRD water sensor has advantageous features, such as high sensitivity, fast response, and high reversibility over its counterparts, e.g., polymer coated fiber Bragg grating water sensors which do not have reversible response when embedded in concrete. The EF-FLRD water sensor embedded in a concrete bar was tested for 43 hours to demonstrate reversibility and reproducibility. In addition, the EF-FLRD water sensor is independent of temperature change in the concrete. Therefore, this novel fiber optic water sensor is useful in civil engineering for long-term monitoring of vital structures such as bridges, buildings, dams, etc.

O10.11
2:30 MEASUREMENT OF ATMOSPHERIC WATER VAPOR CONCENTRATION USING NEAR-INFRARED CEAS (CAVITY ENHANCED ABSORPTION SPECTROSCOPY)

Ek Raj Adhikari, Maheshwar Ghimire, Christopher B. Winstead
The University of Southern Mississippi, Hattiesburg, Mississippi, USA

Water vapor plays an important role in both the physics and chemistry of the atmosphere. One well-known effect is the absorption by water vapor of selected wavelengths of infrared radiation approaching the earth's atmosphere from the sun and other stellar bodies. At near-infrared wavelengths water molecules are relatively weak absorbers, but due to the long optical path length through the atmosphere, such absorptions can be readily observed. The goal of the effort to be described here is to use a relatively inexpensive near-infrared laser in a laboratory measurement of atmospheric water vapor concentration. To achieve this goal, some method of increasing the optical path length of the laser light through the atmosphere must be employed. Cavity Enhanced Absorption Spectroscopy (CEAS) methods, namely Cavity Ring-down Spectroscopy (CRDS) and Integrated Cavity Output Spectroscopy (ICOS), are under development for this purpose. The CEAS experiment is based on an optical cavity constructed from two highly reflective curved mirrors. A near-infrared laser (940 nm) is used as a light source. An effective path length for the laser light of a few hundred to a few thousand meters is possible with the use of a 50 centimeter cavity tube, depending upon the mirror reflectivity. Measurement of water vapor concentration using CEAS requires knowledge of the absorption cross-section for water vapor at the laser wavelength. The experimental findings for radiation absorption by water vapor will be compared with literature values for the water absorption cross-section.

O10.12
2:45 ELECTROCHEMICAL DETERMINATION OF AERODYNAMIC PERFORMANCE OF ASTHMA DRUG PARTICLES GENERATED BY METERED DOSE INHALERS

Marina Ali[1], Beruh Dejene[2], Ieshia Hubbard[2], Mohammed Ali[2]
[1]St. Andrew's Episcopal School, Ridgeland, Mississippi, USA, [2]Jackson State University, Jackson, Mississippi, USA

Determination of the aerodynamic performance of medicinal aerosol particles upon generation from the asthma drug delivery devices e.g., pressurized metered dose inhalers (pMDIs) is very much functional to understand their effects on deposition while flowing through contiguous pulmonary airways. Aerosol can be defined as a suspension of solid or liquid particles in a gas. In this study we examined the physics of aerosol formation and aerodynamic properties (e.g., aerodynamic size, coagulation, particle velocity, sustainability) of therapeutic aerosols produced by five different commercially available pMDIs in real time. The pMDIs are Qvar™, Ventolin™, Flixotide™, Tilade™, and Intal Forte™. Experimental studies

using multi-stage Electrical Low Pressure Impactor and High-performance Liquid Chromatography reported that the aerosol particles fraction per unit size distribution can accurately represent the aerodynamic size property. The normalized count median aerodynamic diameter and mass median aerodynamic diameter were found 0.71±0.04 µm and 0.5±0.06 µm for Qvar, 1.6±0.10 µm and 1.46±0.11 µm for Ventolin, 1.78±0.05 µm and 1.82±0.05 µm for Flixotide, 1.78±0.19 µm and 3.72±0.17 µm for Tilade, 1.98±0.12 µm and 5.88±0.33 µm for Intal Forte, which were comparable with the results reported by other investigators. Variations in aerodynamic properties of the tested pMDIs can be explained due to the differences in tiny geometry of the spray orifice, drug propellant or carrier and ingredients electromechanical interaction. Our observation also showed that the aerosol clouds produced by pMDIs are very dynamic, and dramatic changes in both droplet size and velocity take place within the first few centimeters of the spray plume.

3:00 BREAK

O10.13
3:15 RELATION BETWEEN VIBRATIONAL MODES AND BONDING ENVIRONMENT OF HYDROGEN ATOMS IN ANPRPHOUS SILICON:A FIRST-PRINCIPLES STUDY

Parthapratim Biswas[1], Raymond Atta-Fynn[0]
[1]The University of Southern Mississippi, Hattiesburg, MS, USA, [2]The University of Texas at Arlington, Arlington, TX, USA

Recent vibrational-grating measurements using picosecond-infrared pulses from free electron lasers have demonstrated the presence of highly localized modes in high frequency (near 250 meV) bands of hydrogenated amorphous silicon with vibrational energy flow to the bending modes. Motivated by this observation, we address the problem from first-principles using model configurations of hydrogenated amorphous silicon. The vibrational modes are studied by calculating the inverse participation ratio of vibrational eigenstates. Our study confirms the presence of localized eigenstates near 250 meV. The nature of the vibrational modes associated with high (and low frequencies) has been discussed in this work. In agreement with eperimental observation, the high frequency modes are observed to be localized stretch modes, whereas the low frequency modes display the character oflocalized bending modes.

O10.14
3:30 BUILDING AND DESIGNING AN ROV; BRIGDING THE ACADEMIC AND CAREER TECHNICAL DIVIDE

Kevin McKone
Copiah-Lincoln Community College, Wesson, MS, USA

Copiah-Lincoln Community College is competing in its second year of the Marine Advanced Technical Education (MATE) International ROV competition. This competition features teams from as far away as Egypt, Hong Kong and Russia, along with local engineering schools such as Purdue and Georgia Tech. This year the theme of the competition is ocean monitoring. The ROV is designed and built by students majoring in disciplines from both the academic and career technical sides of campus. Disciplines are as varied as English, physics, precision machining, electronics, business and drafting. Instructors from each of these disciplines act as mentors during all stages of the design and building process. This interaction between multiple disciplines has fostered a strong bond between the academic and career technical students and instructors. The majority of the ROV's parts are designed in Autodesk Inventor and then milled out of aluminum, or printed in ABS plastic. The electronic part of the ROV is based on an Adruino Uno, with a Labview interface. All electronics must be carried on the ROV and tethered to a surface controller. This is adds a layer of complexity compared to surface driven robots. Students use Solidworks to simulate heat transfer, fluid flow, buoyancy, center of mass, pneumatic arm manipulation and pressure testing. This project has succeeded in not only bringing multiple disciplines together, but has attached the attention of industry. With the large growth of ROVs in the oil industry, multiple companies are looking to, and have hired, students from this program.

O10.15
3:45 BUILDING AN UNDERWATER ROV FOR INTERNATIONAL COMPETITION

Brandon Boyd
Copiah-Lincoln Community College, Wesson, MS, USA

In this presentation, information will be presented on our efforts as a community college toward competing in the International MATE Underwater R.O.V.

Competition. Discuss challenges faced and learned from the first year of competition leading into the second year. Discuss interactions between the Drafting & Design department, Precision Machining shop, and Electronics department. Showing steps through the design process using Autodesk AutoCAD 2013 and Inventor 2013. Give reasoning for changing to a triangular prism design over a cubical design. Present instruction on how Center of Buoyancy and Center of Mass were calculated using Autodesk Inventor 2013. Show design flaws that resulted in changes to the design. Present challenges on limitations of machine shop and use of outside sources for further machining. Show interactions between the college and outside companies to produce parts not possible for production with our current facilities. Use of 3D printing technologies for mounting various parts difficult to produce in a machine shop. Discuss challenges with electronics pertaining to Explorer class R.O.V. for International Competition. All electronics must go down in the ROV meaning everything must be watertight in order to function further complicating the design. Also discuss use of SolidWorks 2012 to show breaking points under extreme pressures and forces, thermal analysis, and flow analysis of every part before machining.

O10.16
4:00 SIMPLE APPROACH TO THE DYNAMICS OF BUBBLE MOTION

James Stephens
University of Southern Mississippi, Hattiesburg, Mississippi, USA

Various forms of the differential equation governing the oscillation of a gas bubble in a liquid have been employed for many years. The various forms of the equation are usually derived by considering the fluid dynamics of the liquid and work performed by the gas bubble upon it (and vice versa) and examining boundary conditions at the bubble wall and infinity. In this paper the starting point is taken to be the internal energy contained in the gas, and the kinetic and potential energies in the surrounding liquid. Simple analytic techniques familiar to any physicist are then used to derive the bubble motion in a transparent fashion.

POSTER SESSION
THURSDAY EVENING
FOLLOWING THE DODGEN LECTURE

P10.01
PARTICLE ASSISTED SOLAR CONCENTRATION

Jehan Seneviratne, Matthew Berg
Department of Physics and Astronomy, Mississippi State University, Mississippi State, USA

In this work, scattering due to the presence of particles is investigated in the near field. The scattering patterns occur due to various particle shapes are studied to be applied in solar concentration in Photovoltaics (PV) to achieve high concentration ratios. The results, computational results for scattering patterns of different particle shapes, are illustrated with the proposed models of 'particle assisted solar concentrators'. Our work may have an impact on solar harvesting methodologies in solar energy applications.

P10.02
QUALITATIVE ANALYSIS OF RADIOISOTOPES IN WATER AND SLUDGE SAMPLES COLLECTED FROM WATER TREATMENT FACILITY

J. Heard, J. Billa, S. Aceil, S. Adzanu
Alcorn State University, Department of Advanced Technologies, Lorman, Mississippi, USA

Certain rocks consist of naturally occurring isotopes of Uranium, Thorium, and Potassium, commonly known as Naturally Occurring Radioactive Materials (NORM). The radionuclide concentration of the NORM isotopes vary based on the location, type of rock, and other factors. When the NORM isotopes get in contact with water (ground water and surface water), they tend to build up in water. Drinking of NORM accumulated water may pose health hazards to individuals. Alcorn State University (ASU) is located in rural Mississippi area and groundwater is the primary source of drinking water. A pilot study was performed to understand the presence of various NORM isotopes in drinking water and sludge samples collected from the ASU water treatment facility. A gross Alpha-Beta activity analysis of water samples entering and leaving the filtering system is performed using an alpha-beta proportional counter. Furthermore, the gross Alpha-Beta activity values in two different sets of samples (water entering and leaving the filtering system) are compared. In

addition, sludge samples from the water treatment facility are analyzed to understand the radionuclide concentration of gamma emitting isotopes using a High Purity Germanium (HP Ge) detector. The presented data consist of a comparison of measured gross Alpha-Beta activity levels in drinking water and measured radioisotopes in sludge samples with the Environmental Protection Agency (EPA)'s standards.

P10.03
RADIOACTIVITY STUDIES ON LOCALLY RAISED CHICKEN AND CHICKEN FEED

C. Franklin, J. Billa, S. Aceil, S. Adzanu
Alcorn State University, Department of Advanced Technologies, Lorman, Mississippi, USA

The poultry industry is one of the major contributors to Mississippi economy averaging more than $2 billion per year. The state of Mississippi is home to the largest egg processor in the world. Because of its prominence in the field of agriculture, a study is performed to understand the presence (if there is any) of radionuclide concentration in locally raised chicken in the state of Mississippi. It is a known fact that meat and poultry products contain significant amounts of naturally occurring isotopes like Potassium-40, in reference to this idea; chicken samples from a privately owned poultry farm are collected and analyzed. Documented literature indicates that chicken feed consists of 68% corn and 26% soybeans that come from the locally grown agriculture products. Due to the fact that the chicken raised in this region consume feed originated from locally produced products, feed samples are collected and analyzed to understand if the chicken feed has any impact on the measured radionuclide concentration. The presented data include radionuclide concentration values in both chicken and feed samples.

P10.04
RADIOMETRIC ANALYSIS OF MILK SAMPLES COLLECTED FROM DAIRY FARMS LOCATED IN THE VICINITY OF A NUCLEAR POWER PLANT

M. Carradine, J. Billa, S. Adzanu
Alcorn State University, Department of Advanced Technologies, Lorman, Mississippi, USA

Analysis of milk samples for some of the isotopes of concern (I-131, Cs-137, Cs-134) is one of the commonly employed procedures to understand any possible radionuclide contamination in the vicinity of nuclear plants. A study is performed to understand any radionuclide contamination in milk samples collected from dairy farms located within five mile and twelve mile zones away of a power plant. The sample collection locations consisted of family farms located approximately 5 miles away from the power plant and Alcorn State University's Agriculture department research farm dairy located twelve miles away from the power plant. For a better understanding of the source of the radioisotopes (if present), grass samples are simultaneously collected with the milk samples. The gathered samples are analyzed using a High Purity Germanium (HP Ge) detector for the isotopes of concern. The presented data include comparison of radioactivity values of measured isotopes in both sample sets (dairy farms located within 5 mile and 12 mile radius from nuclear plant). Finally, the obtained radionuclide concentration levels are compared with Food and Drug Administration's (FDA) approved concentration levels.

P10.05
RADIOLOGICAL EVALUATION OF WATER, SEDIMENT, AND FISH SAMPLES COLLECTED FROM ALCORN STATE UNIVERSITY RESEARCH POND

I. Tsorxe, J. Billa, D. Quaye, S. Nwaneri, S. Adzanu
Alcorn State University, Department of Advanced Technologies, Lorman, Mississippi, USA

Alcorn State University Research Pond (ASURP) is one of the lakes located on ASU campus and is maintained by the department of Agriculture for various departmental research activities. The pond is located twelve miles away from a nuclear power plant in the south-western Mississippi area. A radiological assessment study is performed on water, fish, and sediments gathered from the lake to see if there is any impact of the power plant. As part of this study, ten samples (water, sediment, and fish) of each are collected and analyzed. Measurements of total gross Alpha-Beta activity and gamma spectroscopy are performed on water samples. The samples of fish and sediment are analyzed for gamma emitting (mainly Cs-137) using a High Purity Germanium (HP Ge) with a relative efficiency of 35%. The final results include data related to identified/measured isotopes in water, sediment, and fish samples collected in the ASURP.

P10.06
EVALUATION OF NATURAL RADIOACTIVITY LEVELS IN BRICKS COLLECTED FROM A LOCAL BRICK MANUFACTURING FACILITY

G. Osei, J. Billa, K. Agyepong, S. Adzanu
Alcorn State University, Department of Advanced Technologies, Lorman, Mississippi, USA

Bricks are one of the prominent raw materials used in the construction and building industries. Clay is the commonly used ingredient in brick manufacturing and primarily comes from soil/ earth's crust, so there is always a possibility of presence of Naturally Occurring Radioactive Material (NORM) in bricks. In this context, a research study is performed on brick samples to measure the NORM isotopes, primarily Ra-226, Th-232, and K-40. This research effort primarily promulgates on measurement of the NORM isotopes in brick samples collected from a brick manufacturing facility located in Jackson, Mississippi. Radioactivity measurements are performed via gamma spectroscopic techniques using a germanium detector. Based on the obtained activity values the gamma doses resulting from the isotopes present in bricks are calculated. The data presented will include information related to the presence and concentration of various naturally occurring radioactive materials in bricks and resultant gamma dose.

PHYCHOLOGY AND SOCIAL SCIENCES

Chair: Sheree Watson, University of Southern Mississippi

Co- Chair: Gary Chong, Tougaloo College

THURSDAY MORNING
Room 218A

O11.01
10:00 WHAT IT MEANS TO KNOW: A HISTORICAL LOOK AT EXPECTATIONS FOR LEARNING IN MATHEMATICS EDUCATION

Lecretia Buckley, William Bradford, Darius Harris, Adriann Howard, Sirak Mekonen, Rashaad Riley, Mariah Coleman
Jackson State University, Jackson, MS, USA

Expectations for student understanding continue to change as the field of mathematics education undergoes development in light of the current atmosphere of accountability that results from the No Child Left Behind Act coupled with the newly adopted Common Core State Standards for Mathematics. This presentation will provide a historical perspective on what it means to know in mathematics and opportunities for attendees to assess mathematical understanding. The presenters examine classic research studies as well as state and national standards as they consider changing expectations for learning. This exploration begins with the classic research study by S.H. Erlwanger (1973) in which he examine student understanding through computer-based instruction and continues to current research on technology's impact on mathematics education.

Specifically, research questions are analyzed in relation to varying theories of what it means to know and how students are expected to demonstrate their understanding. Consequently, we further examine specifications for assessing knowledge as we consider procedural and conceptual understanding. Finally, we juxtapose what it means to know with national and state standards including the 1989 and 2000 standards published by the National Council of Teachers of Mathematics, the 2007 Mississippi Curriculum Framework, and the 2011 Common Core State Standards.

O11.02
10:15 FROM PREACHING TO PRACTICE: CAN STUDENTS USE INFORMATION FROM CLASSES?

Kristen Gamble, Tiffany Baker, April Talley, Andrea Wesley, Sheree Watson
University of Southern Mississippi, Hattiesburg, MS, USA

The ability of undergraduates to think critically is of great concern to faculty. This is especially problematic in disciplines like Psychology or Social Work, because issues in these areas rarely have clear right/wrong solutions. Students from senior level Psychology classes (n=36) were assigned a standard chapter from an Introductory Psychology textbook. They were then asked to answer 20 questions presented in multiple-choice format. Ten of the questions were fact-based or “memory” type items whereas the other 10 questions required application of critical thinking strategies. A validation pre-test verified that the students did read the material as assigned. Students correctly answered significantly more memory items (mean 7.9) than critical thinking questions (mean 5.2, $t_{(34)}=8.45$, $p<0.001$). These

results suggest the need for enhancement of critical thinking skills in our classrooms. Strategies for helping students develop critical thinking skills will be discussed.

O11.03
10:30 EFFECTS OF FORAGING ENRICHMENT STRATEGIES ON FOOD INTAKE IN BUSHBABIES

Tiffany Baker[1], Jen Christopher[1], Kyle Edens[1], Stuart Leonard[2], Sheree Watson[1]
[1]University of Southern Mississippi, Hattiesburg, MS, USA, [2]William Carey University, Hattiesburg, MS, USA

Use of food items as environmental enrichment sometimes presents a dilemma in the husbandry of captive nonhuman primates. Nonhuman primates enjoy sweet treats, but there is concern that providing such treats might interfere with consumption of more nutritious food substances. To determine whether access to foods with high sugar content resulted in decreased consumption of the animals' basic diet, we examined intake of monkey chow, grape juice, and apple juice in a group of captive Garnett's bushbabies. Five female bushbabies were given access to *ad libitum* water, *ad libitum* monkey chow and either *ad libitum* grape or apple juice in a two-phase experiment. During Phase 1, type of juice was counterbalanced such that two animals received grape juice and three received apple juice for a period of three days. Following a three-day wash out period, Phase 2 began and the animals were offered *ad libitum* access to the alternative juice flavor for three days. The apple juice contained 0.125 g of sugar/ml whereas the grape juice contained 0.34 g or sugar/ml. Results indicated that the presence of the juice resulted in a marked decrease in water consumption ($t_{(4)=}3.3$, $p<0.05$). There was no preference for either juice type ($t_{(4)}=1.6$, n.s.) despite the higher sugar content of the grape juice. Juice consumption did not influence the rate of chow consumption over the course of the study ($t_{(4)}=1.4$, n.s.). The implications of these findings for enrichment strategies will be discussed.

10:45 BREAK

O11.04
11:00 THE ROLE OF FEEDING STRATEGIES IN DOMINANCE HIERARCHIES

Jen Christopher[1], Kyle Edens[1], Tiffany Baker[1], Kylie Trigg[1], Stuart Leonard[2], Sheree Watson[1]
[1]University of Southern Mississippi, Hattiesburg, MS, USA, [2]William Carey University, Hattiesburg, MS, USA

Social dominance hierarchies are frequently defined by individual access to food resources. Social animals often develop distinct feeding strategies to increase access to food and minimize food related agonistic interactions. We examined the feeding behaviors of five female bushbabies (*Otolemur garnettii*) during seven days of group housing. Four distinct feeding strategies were observed: food guarding, food stealing, "sneaky" feeding, and solitary feeding. To determine whether any strategy was optimally effective, we compared the amount of time that individuals spent consuming monkey chow. Results indicated that there was a tendency for solitary feeders to spend more time eating than bushbabies utilizing the other strategies ($t_{(4)-}2.91$, $p=0.06$). This finding suggests that group formation may depend on the interaction of multiple behavioral strategies. The implications for development of dominance hierarchies will be discussed.

O11.05
11:15 CONSISTENCY BETWEEN CARETAKER RATINGS AND BEHAVIORAL MEASURES OF PERSONALITY IN BUSHBABIES

Kim McKissack, Tiffany Baker, Jen Christopher, Sheree Watson
University of Southern Mississippi, Hattiesburg, MS, USA

There is renewed interest in the study of personality in nonhuman animals, especially nonhuman primates. However, reliable measures of personality characteristics have been difficult to obtain. The inconsistencies are due, in part, to use of different types of assessment instruments, which sometimes yield conflicting results. Caregiver ratings require caregivers to make judgments about the extent to which animals exhibit specific personality traits. Behavioral coding measures link personality characteristics to specific behaviors. Caregivers then indicate the extent to which the animals exhibit the behaviors. In this study, two caregivers familiar with animals resident in a permanent captive colony of Garnett's bushbaby (*Otolemur garnettii*) used both assessment instruments to assess the degree of consistency between the measures. Results indicated that the

caregivers' rating assessments did not differ from the behaviorally coded measures ($p > 0.05$). Moreover, there was a high level of inter-rater reliability between the two caregivers ($p > 0.05$) on both type of assessment. These results indicate that experienced caregivers who are familiar with the animals can reliably use both assessment techniques.

O11.06

11:30 EFFECTS OF SOCIAL REJECTION ON SUBSEQUENT GROUP MEMBERSHIP

[1]Kelly Lott, [1]Donald F. Sacco, [2]Michael J. Bernstein
[1] University of Southern Mississippi, [2] Pennsylvania State University

Group living is integral to our species' survival and reproduction, and humans have evolved a fundamental need to maintain stable and positive social group memberships (Baumeister & Leary, 1995). Indeed, people experience social rejection in much the same way they respond to physical pain (MacDonald & Leary, 2005), a response which evolved to motivate socially rejected persons to seek out subsequent affiliative opportunity. The current study tested the hypothesis that individuals primed with social rejection would show a potentially adaptive criterion shift by lowering their standards for acceptable group membership, thereby increasing their probability of 'successful' reaffiliation. On a between-subjects basis, 54 participants (35 women) completed a writing prompt task to activate feelings of rejection or acceptance (see Sacco et al., 2011; 2012 for similar procedures). All participants listed a positive and negative group to which they belonged, and completed a modified version of the Collective Self-esteem Scale (CSES; Luhtanen & Crocker, 1992) to assess the extent to which they valued each group membership. Overall, individuals valued positive group memberships ($M=5.97$) more than negative group memberships ($M=3.76$; $p<.01$). However, type of group interacted with rejection/acceptance experience ($p<.05$). Follow-up comparisons indicated that although rejection ($M=5.90$)- and acceptance ($M=6.04$)-primed participants valued positive groups equivalently ($p=.42$), individuals primed with rejection ($M=4.13$) valued negative group memberships to a greater extent than acceptance-primed participants ($M=3.40$; $p=.03$) These results suggest that rejected individuals may lower their criterion of acceptable group membership, specifically by valuing negative group memberships to a greater degree than individuals primed with acceptance.

11:45 LUNCH BREAK

2:45 BUSINESS MEETINGS

THURSDAY EVENING

POSTER SESSION

Following Dodgen Lecture (6:00-8:00)

P11.01

UNDERSTANDING THE LINK BETWEEN REWARD AND OBESITY

Maria Muhammad, Kevin Freeman
UMMC, Jackson, MS, USA

Research suggests that obese individuals are more sensitive to the rewarding effects of food. This experiment was done to understand the difference in reward an obese individual has verses a lean individual for a quantity of corn oil. It was hypothesized that obese rats would work harder and thus value corn oil more than lean rats would. Genetically obese and lean Zucker rats were used in this experiment to test this hypothesis. Rats were tested in a behavioral economics assay, which relates the cost of a reward (number of lever presses required for the reward) to its intake. As the number of lever presses required for corn oil increased, the obese rats maintained their consumption of the reward in spite of higher pricing unlike their lean counterparts. From these results, this experiment confirmed the hypothesis that obese rats would work harder and thus value corn oil more than lean rats would. This also suggests that obesity may be enabled by a heightened sense of value assigned to foods high in fat.

P11.02

THE EFFECTS OF MUSIC ON WORKING MEMORY

Chris DeRojas, Leighann Harris, Katie Odom, Devin Turner
Millsaps College, Jackson, MS, USA

Previous studies on the effect of music on working memory have provided varied conclusions. The majority have found that noise adversely influences working memory performance. The purpose of this study was to expand on these findings. We hypothesized that music, both lyrical and instrumental, will have a significantly negative effect on working memory performance, specifically the phonological loop. Participants were placed in a room with either lyrical music, instrumental music, or no music and asked to complete a two-back working

memory task, modified through e-prime, on a computer. The results indicate that our hypothesis was supported, however some interesting patterns emerged. Lyrical music was also found to inhibit performance significantly more than instrumental music. This study supports prior research findings that suggest music significantly impairs performance on cognitive tasks which require the phonological loop aspect of working memory. This disadvantage should be taken into account in situations where greatest phonological loop capacity is necessary for maximum success.

P11.03

MULTITASKING AND MEMORY: DOES DIVIDED ATTENTION DECREASE A STUDENT'S ABILITY TO REMEMBER MATERIAL?

Jeremy McLemore, Megan Porter, Flora Ziliak
Millsaps College, Jackson, MS, USA

Multitasking is a rare skill. In fact, studies have shown that divided attention tasks lessen a person's accuracy when it comes to memory as opposed to the results obtained under a full attention test (Craik & Troyer, 2000). Using an original dichotic listening task, we hypothesized that multitasking would decrease a student's ability to remember material. 62 undergraduate participants were tested in a setting similar to a classroom. The participants had to focus on memorizing a set of words, as well as a distracting conversation being held by the experimenters. Participants in the control group were instructed to remember facts from the conversation as well as the word list, while the experimental group was unaware of the importance of the conversation. Results show that those students who were primed to know that they must remember facts from the conversation scored higher on the memory test; however, there was not a significant difference between the two groups. Implications of these findings are especially relevant for students who choose to study in crowded areas like coffee shops, the cafeteria, or dorm common rooms. Further research could address other scenarios in which multitasking could be detrimental to performance, such as talking on the phone while driving.

Keywords: *dichotic listening, memory, multitasking, studying*

P11.04

THE EFFECTS THAT COLOR AND FREQUENCY IN THE CONTEXT OF A TV ADVERTISEMENT HAVE ON MEASURES OF LIKABILITY AND MEMORY

Adam Tilly, Melissa Lea
Millsaps College, Jackson, MS, USA

We are interested in the effects that color and frequency of product in a TV advertisement have on memory and likability of the product. To test this, we used a car television advertisement and changed the color of the car from yellow to red, and brown. Using these three color manipulated commercials, the volunteers participated in three trials, in which they were subjected to five commercials each visit. We also manipulated the number of times they viewed the commercial, either once or three times. We hypothesize that the car will be remembered and liked more if it is viewed in red compared to the colors brown, or yellow when seen three times as compared to one time. Our results support our hypothesis. These findings give evidence to the functional aspects of color, which has not received much attention in the literature.

P11.05

CATEGORIZATION AND THE FALSE MEMORY EFFECT: A TEST OF WORD RECOGNITION

Swadeep Patel, Audrey Sheppard, Sophie DeHaan
Millsaps College, Jackson, MS, USA

Working memory is crucial for many higher-level cognitive functions, including categorization. During exposure, the brain categorizes words, grouping them with others of similar semantics. This study measures the effect of categorization, and the false memory effect, on working memory. To test this, participants distinguished exposed words from a word bank of exposed and distractor words. Participants were exposed to fifteen words from the same category (e.g., "sleep" words include "bed," "blanket," etc.), followed by a simple math task of twenty elementary-level problems. After the math task, participants recognized the exposure words from a word bank. The experimental word bank included semantically similar distractors ("sleep" words not included in the original exposure, e.g. "nightlight," etc.). The control word bank included semantically different distractors (e.g., "run," etc.). The independent variable is the type of distractor present in the word bank. The dependent variable is the number of errors made in the recognition task. Errors included a) an exposure word not correctly recognized; and b) a distractor word incorrectly recognized. Using a one-tailed T-test, preliminary results are as follows: n=20, df=18, t=1.902, critical value=1.73 with $p < .05$. The experimental group

scored significantly more errors than the control group, indicating that the false memory effect did have influence in the preliminary data collection. Semantically similar words can create the false memory effect. Implications for these findings include further understanding of the effect of categorization and the false memory effect on working memory, particularly in a short-term verbal recognition task.

P11.06

THE RELATIONSHIP OF COLLEGE READINESS AND WORK READINESS IN HIGH SCHOOL STUDENTS

Kandace Shavers, Gary Chong
Tougaloo College, Jackson, MS, USA

Every year about one million students do not graduate from high school, placing them at a greater risk for lower incomes and limited opportunities (Forster & Green, 2003). In the United States, schools seek to retain African American and Hispanic students who tend to obtain lower scores on comprehensive exams (Forster & Green, 2003). Many high school students are not adequately prepared with "college-ready" levels of knowledge and skills that would enable them to attend a four-year university or college. The purpose of this study is to examine the relationship of academic performance to work readiness and college readiness in high school students. It is hypothesized that lower academic performance will predict lower college and work readiness. The independent variable will be academic performance, and the dependent variables are college-readiness and work readiness. A structural questionnaire on skills, study habits, and literary skills will be utilized. Data will be collected on 80 participants. Statistical analysis of the data will be conducted using t-test.

P11.07

IMPACT OF MUSIC ON ANXIETY, DEPRESSION, AND BLOOD PRESSURE IN AFRICAN AMERICANS

Anthony Jackson, Valencia Proctor, Ashley Lowery, George Robinson, Tylanna Marley, Symone Cleaves, Shaquitta Woods, Ashley Jones, Katharine McIntyre, Taunjah Bell
Jackson State University, Jackson, USA

Psychological disorders such as anxiety and depression are important public health problems that are often associated with chronic medical conditions including hypertension and heart disease. Hypertension is a potent risk factor for heart disease and a preventable cause of premature death. Results of numerous published studies suggested a vital link between anxiety, depression, hypertension, and heart disease. Previous findings suggested that patients suffering from major depression have an increased risk for developing hypertension. Similarly, anxiety elevated BP and HR, lead to hypertension, and contributed to the development of heart disease. Anxiety produces a stress response which is associated with activation of the hypothalamic-pituitary-adrenal axis and secretion of stress hormones such as corticotropin-releasing hormone, adrenocorticotropic hormone, and cortisol. In the United States, patients suffering from anxiety, depression, hypertension, or heart disease usually undergo traditional therapeutic interventions. Few Americans receive music therapy, which is defined as the controlled use of music, its elements, and its influences to produce changes in physiology, behavior, thoughts, and emotions during treatment. The purpose of the present study was to examine the impact of music on anxiety, depression, and BP in African Americans. We hypothesized that classical music would significantly decrease anxiety, depression, and BP. MANOVA results indicated that music significantly lowers post-test results ($F_{(6, 58)}$=3.124, p=.013 ; Lambda=.367, partial eta squared=.428). Follow-up ANOVAs revealed that classical music significantly impacts anxiety (p=.008), depression (p=.012), and BP (4.18+1.78 mmHg; p=.019). We found evidence to support the hypothesis tested and concluded that our results are consistent with previous findings.

P11.08

MEDITATION DOES AFFECT BLOOD PRESSURE, HEART RATE, AND COGNITION IN A MINORITY SAMPLE

Tylanna Marley, Symone Cleaves, George Robinson, Valencia Proctor, Anthony Jackson, Ashley Lowery, Shaquitta Woods, Ashley Jones, Rosamary Hadley, Taunjah Bell
Jackson State University, Jackson, USA

While people derive therapeutic benefits from antihypertensive and psychiatric medications, drug treatment alone appears to be limited. This factor contributes to excess risk for morbidity and mortality, is a major public health concern, and produces a huge economic burden on the United States. An alternative approach for reducing symptoms of hypertension and managing symptoms of psychiatric disorders is mindfulness meditation. The concept of mindfulness has roots in Buddhist and other contemplative traditions where conscious attention and awareness

are actively cultivated. According to the results of several published studies involving predominantly Caucasian samples, mindfulness meditation significantly reduced blood pressure (BP), heart rate (HR), stress, anxiety, and depression, which can indirectly and positively affect cognition. The purpose of the present study was to determine whether meditation affects BP, HR, and cognition, specifically attention and awareness, in African Americans. We predicted that mindfulness meditation would decrease BP and HR as well as improve attention and increase awareness as measured by the results of post-tests. The MANOVA results indicated that there was a statistically significant effect of mindfulness meditation on BP, HR, and cognition combined ($F_{(6, 66.155)}$ =1.824, p=.013 ; Lambda=.285, partial eta squared=.496). Follow-up ANOVAs revealed that meditation significantly affected BP (p=.008), HR (p=.017), and cognition (p=.026). Post-hoc comparisons revealed that mindfulness mediation significantly decreased BP (2.43+0.98 mmHg; p=.012) and HR (5+2.0 bpm; p=.032) and significantly enhanced cognition (p=.007). Because evidence supported the hypothesis tested, we concluded that mindfulness meditation significantly improves cognition as well as significantly reduces BP and HR.

11.09

THE ROLE OF PERSONALITY ON ALCOHOL USE AND RISKY SEXUAL BEHAVIOR AMONG AFRICAN AMERICAN COLLEGE STUDNETS

Adrienne Pugh* and Dr. Shaila Khan,
Tougaloo College, Tougaloo, MS

The purpose of the study was to examine the role of personality on alcohol use and risky sexual behavior among African American college students. Personality influences whether students engage or refrain from a large spectrum of health-damaging behaviors (Vollrath and Torgersen, 2008). Risky sexual behaviors such as using drugs or alcohol prior to sex, multiple sex partners, engaging in casual sex and using condoms inconsistently are a serious problem on college campuses in the United States (Pluhar, Fongiollo, Stycos, & Dempster-McClain, 2003). According to Student Statistics on Alcohol Assumption and Abuse, 400,000 students between the ages 18 and 24 have unprotected sex and more than 100,000 students between the ages of 18 and 24 report been to intoxicated to know if they consented to having sex. It was hypothesized that risky sexual behavior is associated with increase alcohol use, and alcohol problem. Also personality will play a role in the amount of alcohol consumed. Result showed that those who drank less showed safer sexual behavior (t=2.206 (78), p=.030). There was also a significant difference between personality and alcohol use. Emotional stability was low for those who were heavy drinkers (t= 2.187 (78) p=.032) and more agreeable participants drank less (t=-1.948, p=.05). Result also showed that there was a significant negative correlation between alcohol problems and risky sexual behavior (r=-202, p=.070). Finally a positive correlation was found between alcohol problems and personality with two components of big five locator: openness to experience (r-.497, p=.000) and extroversion (r=.250, p=.025).

P11.10

THE EFFECTS OF PARENTAL ATTACHMENT ON ADOLESCEBT"S AGGRESSION

Coneshia Turner* and Dr. Shaila Khan,
Tougaloo College, Tougaloo, MS

This study examines the effectiveness of parental-attachment on adolescent aggression. Frequency of physical aggression in children stands out around the age of 12-13 and that parent attachment does play a significant role in their child's aggression. Some things that may make children aggressive is the physical fear of others, learning, neurological or conduct/behavior disorders, exposure to violence on television, film or other media sources and above all family difficulties, which includes the attachment of parents. (McElliskem, 2004). Aggression and anger in high school students has become a major issue in the United States (Lamb, 2003). A large survey of nearly 11,000 high school students came to the conclusion that about a third of U.S. girls and half of boys surveyed having been in a physical altercation within the last year and a third of the boys reported carrying a weapon within the past month (Brokenbrough et al.,2002). The present study focuses on the effects of parent-child attachment on adolescent's aggression. The hypothesis was that children who show more attachment with their parents will have less aggressive. It was also hypothesized that there will be a gender difference between aggression score. The data was collected from eighty high school student. The result showed that there was a negative correlation between parental attachment and total aggression score (r=-.227, p=.043), physical aggression score (r=-.236,p=.035) and verbal aggression score (r= -.274, p=.014). A

significant gender difference was also found between hostility with males having higher hostility score than females, t=- 2.73(78), p=.008.

P11.11

GENDER SELF-ESTEEM AND GENDER DIFFERENCES IN ATTITUDES TOWARDS GAY MEN AND LESBIANS AMONG AFRICAN AMERICANS

Lacee Satcher* and Dr. Shaila Khan,
Tougaloo College, Tougaloo, MS

The topic of the present research is sexual prejudice, which involves negative/hostile attitudes on sexual preference directed at a social group and its members. Sexual prejudice, especially towards homosexuality, has become increasingly perpetuated in society, i.e. widespread lack of legal protection from antigay discrimination and hostility to lesbian/gay committed relationships (Herek 2000). Recent research suggests gender self-esteem as an influence on sexual prejudice, which involves one's confidence as a man or woman and belonging to that social group. The purpose was to compare men and women's negative attitudes toward gay men and lesbians and the correlation of negative attitudes with gender self-esteem. Eighty participants completed a series of surveys. The result indicated that females showed more negative attitudes toward lesbians compared to males, t= 2.362(78), p= .021; females also had more negative views towards lesbians in the "neutral morality" and "contact" subscales of components of attitudes toward lesbians, t=-2.402 (78) p=.012 and t=-4.471 (78) p=.0 , respectively. Females also had more negative views towards gays in the "neutral morality" subscale t=-2.147(78) p=.03.There was a significant positive correlation between self esteem and negative attitudes towards lesbians (r=.288, p=.009). Males who had high public collective self esteem had less negative attitudes towards gays (r= -.365, p=.021). Females who had high private collective self esteem had more negative attitudes toward gays (r= .385, p=.014). Finally, females who had high private and public collective self esteem had more negative attitudes toward lesbians (r= 377, p=.016.and r=.466, p=.002 respectively)

FRIDAY, FEBRUARY 22, 2013

FRIDAY MORNING
Room 218A

O11.07

9:15 RISING CONSCIOUSNESS: TRACING MAN'S JOURNEY THROUGH CAVE ART

Madhu Singh
Tougaloo College, Tougaloo, MS, USA

Psychologists like Wundt, Freud and Jung have explored symbols in totems, dreams and art to develop an insight into mankind's development of higher levels of cognitive thought processes. Whereas music and literature is orally transmitted through ballads and myths, cave art provides archaeological evidence and carbon analysis and has survived world-wide. To some extent, the work can be dated. Sandstone escarpments and granite boulders were favorite living abode for the stone-age hunters. Tumuli, or cup marks, seen in Europe and as far as India, probably are records of nomadic races that left central Asia and travelled in different directions retreating from advancing, more civilized races. Neanderthal man was capable of fine art as early as 30,000 BCE as evidenced in Altamira, N. Spain. The cave art of Franco-Contrabic peninsula and the Ural Mountains, open boulder engravings of the Alpine Valleys in Italy and Austria, the mesa of Australia with their pictographs and petrogliphs, the Saharan cliffs and the African Rock shelters trace not only the travel routes of pre-historic man in the upper paleolithic (c. 25,000 BP) and Mesolithic period (c. 10,000 to 4,000 BP), but also increasing sophistication. Motra (1923) found paintings of kangaroos (now only in Australia), mammoths, men in masks, dancers in red pigments in India. Focusing on cave art, cutting across traditional academic boundaries, this paper seeks to connect pre-historic cultures of Europe and Asia tracing similarities in themes and styles to understand man's developing consciousness.

O11.08

9:30 RELATIONSHIP BETWEEN ANXIETY, WORKING MEMORY, AND MATH PERFORMANCE

Jasmine Thompson, Madhu Singh
T*ougaloo College, Tougaloo,MS, USA*

A large number of African American students are failing in math courses and according to the National Assessment of Educational Progress (2011) those from Mississippi had a lower average scale score in Mathematics than any other race in the nation. In order to understand some possible factors related to this, the present study investigated the effects of anxiety, if any, on working memory and math performance. It was conducted on eighty undergraduate students, between the ages of 18-25 with grade point averages ranging from 2.0 to 4.0. Approximately 94 percent of the conveniently selected population is African American with Mathematics as one of their subjects. It was

hypothesized that anxiety levels would negatively impact both working memory and math performance. As expected there was a negative correlation between anxiety and working memory (r= -.223, p <.05) and math performance (r=--.219, p <.05). It was also hypothesized that females would have higher anxiety levels and better working memory than males, but the latter would perform better in math. Based on t-test analyses, anxiety levels of females were higher (t= 1.637(78), p=.022) and females had higher working memory than males (t= 2.754 (78), p=.032). However, no differences in mathematical performance were seen in this sample, perhaps as they were all enrolled in a mathematics class. Reducing general anxiety may help better math performance and working memory for all grade levels in schools everywhere in Mississippi.

O11.09

9:45 EFFECTS OF LOCUS OF CONTROL AND PERCEIVED PARENTAL ACCEPTANCE ON PSYCHOLOGICAL MALADJUSTMENT OF BANGLADESHI STUDENTS

Shaila Khan

Tougaloo College, Mississippi, USA

This study investigated the effects of locus of control and perceptions of parental acceptance/rejection on psychological adjustments of university students in Bangladesh. Adult versions of Parental Acceptance-Rejection Questionnaire (PARQ), Personality Assessment Questionnaire (PAQ), the Personal Information Form (PIF) (Rohner, 2005), and short form of Nowicki-Strickland Locus of Control Questionnaire (1973) were administered to 107 university students (30 males and 77 females) who ranged in age from 20 through 41 years. No significant difference was found in locus of control, psychological adjustment and perceived maternal (but not paternal) rejection between males and females. Results of simple bivariate correlations suggested that the psychological maladjustment of Bangladeshi adults was positively associated with their perceptions of both paternal rejection (r=.414, p<.001) and maternal rejection (r=.467, p<.001), as well as with total scores of locus of control (r=.565, p<.001). A higher total score for locus of control implies external control. Hierarchical regression (linear) analyses showed that locus of control (b=.459, t=5.82, p<.01), and maternal rejection (b=.247, t=2.53, p<.05), contributed significantly to psychological maladjustment of adults. It was also found that individual effects of these variables are important even when effects of the other variables were removed. Paternal rejection (b=.188, t=1.79, p<.05), however, was not found to have significant contribution to psychological maladjustment (b=.147, t=1.52, p=.13). It may be concluded that both locus of control and maternal acceptance/rejection have significant impact on psychological maladjustment of Bangladeshi adults. Students whose life events are controlled externally tended to be more psychologically maladjusted, and perceive more parental rejection

10:00 BREAK

O11.10

10:15 PERCEIVED PARENTAL ACCEPTANCE, SELF-MONITORING TRAIT, AND PSYCHOLOGICAL MALADJUSTMENT OF BANGLADESHI STUDENTS

Shaila Khan

Tougaloo College, Mississippi, USA

Relationships among self-monitoring trait, perceptions of parental acceptance/rejection and psychological adjustment of university students in Bangladesh were investigated. Adult versions of Parental Acceptance-Rejection Questionnaire (PARQ), Personality Assessment Questionnaire (PAQ), the Personal Information Form (PIF) (Rohner, 2005), and short form of Self-Monitoring Questionnaire (Snyder and Gangestad,1986) were administered to 107 university students (30 males and 77 females) between age 20 through 41 years. No significant gender difference was found in self-monitoring, psychological adjustment and perceived maternal rejection. Results of simple bivariate correlations suggested that the self-monitoring of Bangladeshi adults was negatively associated with their perceptions of maternal rejection (r=-.336, p<.001) and psychological adjustment (r=-.225, p<.005), but not with perceived paternal rejection. Linear regression analysis found that self-monitoring contributes significantly on psychological adjustment. However, when the effect of perceived parental rejection were removed, self-monitoring (b=-.084, t=-.904, p=.37) and paternal rejection (b=.207, t=1.86, p=.07) were found to have no significant contribution to psychological adjustment of adults. Only, maternal rejection (b=.311, t=2.67, p<.05) contributed significantly to psychological adjustment. Also, linear regression analysis was done to explore the impact of perceived parental rejection on self-monitoring trait. It was found that maternal rejection (b=-.367, t=-3.05, p<.05) contributes

significantly to self-monitoring. Paternal rejection was not found to have significant contribution to self-monitoring trait. It may be concluded that both self-monitoring and maternal acceptance/rejection have significant impact on psychological adjustment of Bangladeshi adults. Students with higher self-monitoring skills tended to be more psychologically adjusted. Perception of maternal rejection tended to develop less self-monitoring skills.

O11.11

10:30 ANALYSIS OF FEMORAL 10:30 HIV SEXUAL RISK BEHAVIORS AND BARRIERS TO HIV TESTING AMONG GAY-IDENTIFIED AND NONGAY-IDENTIFIED AFRICAN AMERICAN MEN WHO HAVE SEX WITH MEN LIVING IN JACKSON, MISSISSIPPI

Nhan Truong, Wynette Williams
Tougaloo College, Tougaloo, MS, USA

African American men who have sex with men (MSM) are disproportionately affected by HIV and AIDS in the US. Few studies of HIV risk in African American MSM have addressed variation in sexual identities and sociocultural factors important to understanding why people engage in high-risk sexual activities. The present study examines differences in self-identification of sexual orientation, gay-identified versus nongay-identified, among African American MSM on HIV sexual risk and testing behaviors. It is hypothesized that nongay-identified African American MSM will be more likely to engage in unprotected anal intercourse and other HIV sexual risk behaviors, and less likely to get tested for HIVcompared to gay-identified African American MSM. The study will use an online survey, which includes demographic questions, and well-established brief measures of racism and homophobia, medical mistrust, depression, substance use, HIV sexual risk behaviors, and HIV testing behaviors. Fifty African American MSM living in Jackson, Mississippi (25 gay-identified and 25 nongay-identified African American MSM) will complete the online survey. Independent samples t-tests will be conducted to examine differences between gay-identified and nongay-identified African American MSM on HIV risk factors and HIV testing behaviors. The study has implications for developing effective HIV intervention programs that will incorporate these factors to prevent HIV transmission and infection in the African American MSM population.

10:45 BREAK

O11.12

11:00 NATURAL DISASTER: EMOTIONAL REACTIONS, STRESS, AND AFTER THOUGHTS AMONG VICTIMS

Jasmine Moore, Gary Johnson, Alexanderia Franklin, Shaila Khan
Tougaloo College, Mississippi, USA

This study examines a gender difference on general information of natural disasters, how men and women affected by the natural disaster prepare themselves for emotional reactions, manage their stress and anxiety stress and what are their after-thoughts due to natural disasters. The questionnaire was administered to 90 African American college students of all ages. Chi-square statistic was used to test the hypothesis. Four of the items in the questionnaire showed a significant gender difference. Those items were (a) the females reported having more trouble concentrating or remembering things (χ^2= 3.307; p=.069), (b) males reported talking and sharing their feelings with other people to help overcome the natural disaster (χ^2= 3.878; p=.049, (c) males agreed that enough was being done to help prevent natural disasters (χ^2= 4.152; p=.042), (d) and males agreed that enough procedures are put into place for disaster management (χ^2= 4.498; p=.034).The results also showed majority of the participants were exposed to a natural disaster before, and they experienced damages to their houses more than to their cars and other properties. For most of the participants natural disaster did not cause much negative emotional reactions For participants as a means for managing stress and anxiety, most reported that they would try to educate themselves about health hazards and safety information as well as try to stay busy and share their feelings with others to cope with it. Regarding after thoughts majority reported that they are willing to do more to help inform others on natural disaster.

O11.13

11:15 GENDER SELF-ESTEEM AND GENDER DIFFERENCES IN ATTITUDES TOWARDS GAY MEN AND LESBIANS AMONG AFRICAN AMERICANS

Lacee Satcher, Shaila Khan
Tougaloo College, Mississippi, USA

The topic of the research is sexual prejudice, which involves negative/hostile attitudes on sexual preference directed at a social group and its members. Sexual prejudice, especially towards homosexuality, has become increasingly perpetuated in society. There is widespread lack of legal protection from antigay discrimination and hostility towards

lesbian/gay committed relationships (Herek, 2000). Recent research suggests gender self-esteem as an influence on sexual prejudice, which involves one's confidence as a man or woman and belonging to that social group. The purpose was to compare men and women's negative attitudes toward gay men and lesbians and the correlation of negative attitudes with gender self-esteem. The independent variables were gender/ gender self-esteem, measured by the gender self-esteem (GSE) scale and gender-specific collective self-esteem (GS-CSE) scale. The negative views towards homosexuality, measured by the attitudes towards lesbians/gays (ATLG) scale and components of attitudes towards gays/lesbians scale. Eighty participants completed a series of surveys based on the IV and DV. The hypothesis was that there will be a significant gender difference in negative attitudes, males would express more negative attitudes towards homosexuality compared to women, and males would express more intense negative attitudes toward gay men compared to lesbians. It was also hypothesized that the negative attitudes for both males and females would have a positive correlation with gender self-esteem. The data will be analyzed using t-test and correlation. This research may help educate of black men and women on the effects of gender self-esteem and also foster less sexual prejudice.

11:30 LUNCH BREAK

FRIDAY AFTERNOON
Room 218A

O11.14
1:30 PSYCHOLOGICAL BARRIERS TO INTENTIONS TO USE AND USE OF HEALTH CARE SERVICES AMONG AFRICAN AMERICAN COLLEGE STUDENTS AT AN HISTORICALLY BLACK COLLEGE AND UNIVERSITY

Melissa Burton, Nhan Truong
Tougaloo College, Tougaloo, MS, USA

Advances have been made to facilitate health and prevent diseases. However, statistical data continue to suggest that the overall health rate in relation to racial and ethnic minorities is poorer than for Caucasian Americans. The present study examined the relationship between trust toward healthcare providers, and utilization of and intent to utilize healthcare services in African American college students at an Historically Black College/University. It was hypothesized that the greater the mistrust African American college students have toward healthcare providers, the less likely they are to use healthcare services, and the less likely they are to intend to use healthcare services. This research was a survey study, which included established measures on mistrust towards healthcare providers, intentions to use and use of healthcare services, and demographic questions. Eighty African American college students at Tougaloo College completed the survey. Three separate regression analyses revealed that there was no significant relationship between mistrust toward healthcare providers and use of healthcare services ($p > .05$). One regression analysis revealed that mistrust toward healthcare providers significantly predicted intentions to use healthcare services ($B = -.495$, $p < .001$), in the direction of the hypothesis. This study has implications for increasing cultural competence among healthcare providers to reduce African American patients' mistrust toward healthcare providers.

O11.15
1:45 THE EFFECTS OF PARENTAL ATTACHMENT ON ADOLESCENT AGGRESSION

Coneshia Turner, Shaila Khan
Tougaloo College, Mississippi, USA

This study examines the effectiveness of parental-attachment on adolescent aggression. Studies have shown that the frequency of physical aggression in children stands out around the age of 12-13 and that parent attachment does play a significant role in their child's aggression. Some factors that may make children aggressive are the physical fear of others, learning, neurological or conduct/behavior disorders, exposure to violence on television, film or other media sources and, above all, family difficulties, which includes the attachment of parents (McElliskem, 2004). Aggression and anger in high school students has become a major issue in the United States (Lamb, 2003). A large survey of nearly 11,000 high school students came to the conclusion that about a third of U.S. girls and half of boys surveyed having been in a physical altercation within the last year and a third of the boys reported carrying a weapon within the past month (Brokenbrough et al., 2002). The present study focuses on the effects of parent-child attachment on adolescent's aggression. The hypothesis of the present study is that children who show more attachment to their parents will have less aggressive behavior compared to children who show less attachment. The study will be done on

eighty high school student. The participants will complete three short surveys: demographic questionnaire, aggression questionnaire, and a parental attachment questionnaire. A correlation will be conducted to determine these effects. The findings of this research will inform parents, teachers, and students on helping to reduce adolescent's aggression.

2:15 Break

O11.16
2:30 AGGRESSION: A COMPARISON OF MALE ATHLETES AND MALE NON-ATHLETES

Ashley Lewis
Tougaloo College, Tougaloo, Ms, USA

Aggression is a term that refers to an overt or suppressed hostile state. The state is either innate or an erosion from frustration that can be directed toward another object or to oneself. An athlete is defined as an individual who is trained or skilled in exercises, sports, or games requiring physical strength, agility, or stamina. Comparing aggression levels in athletes and non-athletes was the purpose of this study. The participants for this study included 40 male athletes and 40 male non-athletes from local colleges and universities in the metro Jackson, MS area. They were classified as freshmen, sophomores, juniors, and seniors. Their ages ranged from 18-22. It was expected that the male athletes would be more aggressive than male non-athletes. Data and analysis will be forthcoming.

O11.17
2:45 THE EFFECTS OF RECENT LIFE EXPERIENCES ON PRECIEVED STRESS AND HEALTH AMONG COLLEGE STUDENTS

Jasmine Moore, Madhu Singh
Tougaloo College, Tougaloo, Ms, USA

Stress is unavoidable in modern day life. It can be of variety of kinds: emotional, physical, and mental. The perception of an event differs from person-to-person and may determine their response to stress and long-term health. The bio-psychological model (Engel 1977) considers thoughts, social factors, behaviors, and emotions all to play a primary role in human functioning in the conditions of illness or disease. The African American population according to the US Department of health experiences more health issues such as diabetes, high blood pressure, and heart diseases. As the pathways to disease are formed early in life, studying this relationship is important because college is a period of transition. Living away from home, work, and interpersonal relationships are stressors. This research looks at the effects of recent life experiences on stress levels of 80 African Americans college students between the ages of 18-20 years. It was hypothesized that there would be a positive correlation between recent life experiences and perceived stress. Females were expected to have higher stress levels than their male counterparts. As predicted a positive correlation ($r=.289$ $p<.01$) was found between recent life experiences and perceived stress. The females ($t_{(78)} = 2.87$, $p>.015$ have more stress. This result suggests ways of reducing stress to both the students and college counseling services.

SCIENCE EDUCATION
Chair: Dr. Sherry Herron,
University of Southern Mississippi
Vice-Chair: Dr. Renee Clary,
Mississippi State University

THURSDAY MORNING
COCHRAN 214

O12.01
ABC'S OF A HEALTHIER YOU BULLETIN BOARD

Chris Aguirre, Matthew Knight, Casandra Baumgartner, Donald Coffer, Christian Dowell
MGCCC JD Campus, Gulfport, MS, USA

The project was part of a Service Learning/Mentoring Project in Honors Biology I at Mississippi Gulf Coast Community College Jeff Davis Campus sponsored by The University of Southern Mississippi Center for Community and Civic Engagement. The objective of the ‘ABC's of a Healthier You' Bulletin board project was to illustrate through the use of graphics and to reinforce principles of a healthy lifestyle. This complemented the school wide 'ABC'S of a Healthier You' campaign. Two bulletin boards were displayed showing tips on healthy living; each was on display for a two week period. These bulletin boards were centered around a letter from the alphabet or a theme with a phrase referencing a healthier lifestyle.

The information was based on research using the Common Core Curriculum, Bloom's Taxonomy Revised Edition, and research conducted to determine the various healthy habits topics covered in this campaign. Nutritional research states that healthy students are better equipped to learn. The school nurse assisted in the implementation of this campaign to help improve the students' health. The result of this

service learning project was that the bulletin board is a good way to reach students and make them aware of the various topics covered in this health campaign.

O12.02
8:45 PRE/POST - HEALTHIER YOU SURVEY

Chase Vizzini, Kyle Watros, Robert Buntyn, Jared Gloria, Mary Kirkham, Mason Landry, Nicholas Wood
MGCCC-JD, MS, USA

The project was part of a Service Learning/Mentor Project in Honors Biology I at Mississippi Gulf Coast Community College Jeff Davis Campus sponsored by The University of Southern Mississippi Center for Community and Civic Engagement. A school wide health campaign was launched beginning in October 2012, sponsored through the school nurse at a local Gulf Coast elementary school. The objective of this project was to develop a series of grade level pre- and post- surveys on certain health topics to measure the improvement, if any, in students' awareness of the topics covered in the health campaign. The purpose of the pre-survey for the "ABC's of a Healthier You" campaign was to determine the level of basic health knowledge of the elementary students. The teachers at the local Gulf Coast School administered these pre and post surveys, data was returned and analyzed. The qualitative and quantitative data was collected to determine the effects of the full activities in the campaign on student's perception of ‘good' habits. The results obtain showed minor improvement in student understanding of what healthy habits constitute.

O12.03
9:00 THE ABC's OF HEALTHY LIVING ACTIVITY WORKBOOKS

Hunter Garcia, Megan Hines, R-Reonnia James, Nick Mathews, Kaleigh Vicknair, Dylan Schroeder, Iris Nguyen
MGCCC-JD, Gulfport, MS, USA

The project was part of a Service Learning Project in Honors Biology I at Mississippi Gulf Coast Community College Jefferson Davis Campus sponsored by The University of Southern Mississippi Center for Community and Civic Engagement. The objective of this project was to develop a series of grade level workbooks that reinforce principles of a healthy lifestyle. A school wide health campaign was launched beginning in October 2012. These workbooks were designed to enhance other activities the students participated in through the ‘ABC's of a Healthier You' Campaign. Each workbook was tailored to students' respective grade level (Kindergarten-6th Grade). This was based on research using the Common Core Curriculum and Bloom's Taxonomy Revised Edition. The research shows that healthy students are better equipped to learn, and resulted in the compilation of age appropriate activities, which were then distributed to a local Gulf Coast elementary school. The school nurse assisted in implementation of this campaign to help improve the students' health. The result of this service learning project was that the workbooks did assist the students' awareness of various topics covered in this health campaign.

O12.04
9:15 A COMPARISON OF THE BIOMASS OF LONG LEAF PINE AND MIXED HARDWOOD FORESTS

Sherry Herron
University of Southern Mississippi, Hattiesburg, MS, United State

*St*udents at the University of Southern Mississippi calculated the biomass of two 30x30 square meter study sites using the program provided by the University of New Hampshire's GLOBE^{TM} project, "Investigating the Carbon Cycle in Terrestrial Ecosystems". For this purpose, biomass is a measure of the amount of carbon stored in trees, and is determined by measuring tree circumference and using species-specific coefficients as reported by Jenkins et al. (2003) for calculations. One study site was located in a controlled burn area of a long leaf preserve and the other was located in a bottom land mixed hardwood forest at the Lake Thoreau Environmental Center. GLOBE^{TM} (Global Learning and Observations to Benefit the Environment) is an interagency program funded by NASA, NOAA, NSF, and supported by the U.S. Department of State. Over 100 countries manage and support this program. The reporting of student-collected data supports Landsat data for scientific analysis. In the original land cover investigations, students submit the following data: tree identification, tree height, tree circumference at breast height, percent canopy cover, and percent ground cover. In the long leaf pine site, a total biomass of 8,714 grams per square meter was calculated; 4,357 of which was carbon: 250 in foliage, 3399 in stems, 708 in branches, and 928 in roots. In the mixed hardwoods site, a total biomass of 16,963 grams per square meter was calculated; 8,481 of which was carbon: 385 in foliage, 6,441 in stems, 1,655 in branches, and 1,735 in roots. Procedures and conclusions will be described.

O12.05

9:30 A CONTENT ANALYSIS OF SIR DAVID ATTENBOROUGH'S BOTANY TEACHING STRATEGY

James Wandersee[1], Renee Clary[2]
[1]*Louisiana State University, Baton Rouge, LA, USA,* [2]*Mississippi State University, Mississippi State, MS, USA*

Sir David Attenborough of the BBC received critical acclaim for his contribution to the improvement of public understanding of plants. His notable six-video series entitled *The Private Life of Plants* is widely recognized as one of the most influential and captivating plant science television programs ever made. Our research investigation asked: Can a computer-based text-and-visual analysis of the harvested content of that entire video series allow us to derive a descriptive and implementable model of Attenborough's botany teaching strategy? Our systematic, mixed methods study involved (a) coding, transcribing, and categorizing; (b) qualitative-quantitative comparison; and (c) careful description of Attenborough's use of language and visual-expository practices within this botanical video series. Our analysis has characterized and quantified how Attenborough selects words, constructs and delivers sentences, uses the active and passive voice, integrates concepts across lessons, employs metaphors, creates compelling visual examples to teach science informally, and enhances the public's aesthetic appreciation of plants. Our model also reflects the opportunity (albeit brief) that we had to speak with Attenborough in November, 2007, in London about the making of this series and its subsequent success. The result is a model teaching strategy we think any botany instructor could emulate

O12.06

9:45 KRAKATOA ERUPTS! USING CURIOUSITY STARTER READINGS AND SENSORY PRIMING ACTIVITIES TO INITIATE STUDENT-LED INQUIRY

Renee Clary[1], James Wandersee[2]
[1]*Mississippi State University, Mississippi State, MS, USA* [2]*Louisiana State University, Baton Rouge, LA, USA,*

The volcano Krakatoa's 1883 eruption provides an historical portal for the integration of biology and geology in the science classroom. For a classroom introduction, we utilized authentic, period Curiosity Starter readings of Krakatoa, and paired these with Sensory Priming activities to engage all five senses of our students. Following classroom introduction activities, the classroom laboratory stage was set for student-generated inquiry investigations. Students identified research questions, planned investigations, and implemented scientific experimentation for a more authentic research approach in the science classroom. This "Scientific Wandering" research and experimentation then became the basis for alternative assessment strategies. Our interdisciplinary geology-biology approach, with teacher-directed activities only at the beginning of the Krakatoa unit, provided a more authentic view of science to our students. Krakatoa exposes students to the history of science, and the nature, culture, and society in which the eruption-and subsequent scientific investigations-took place. We encourage teachers to implement our Krakatoa unit, or a similarly structured unit, into their classrooms to usher in a new level of scientific inquiry for students. This research, published in *The Science Teacher*, was honored in 2012 with the Gold EXCEL Award by Association Media & Publishing as an outstanding feature contribution.

9:45 – 10:00 BREAK

O12.07

10:00 TEACHER ACADEMY IN THE NATURAL SCIENCES (TANS): SUCCESSFUL TEACHER PROFESSIONAL DEVELOPMENT IN CHEMISTRY, GEOSCIENCES, AND PHYSICS

Renee Clary[1], James Dunne[1], Debbie Beard[1], Anastasia Elder[1], Svein Saebo[1], Deborah Tucker[2], Charles Wax[1], Josh Winter[1]
[1]*Mississippi State University, Mississippi State, MS, USA,* [2]*Independent Science Educational Consultant, Napa, CA, USA*

The Teacher Academy in the Natural Sciences (TANS) is a professional development program that targets Mississippi middle school teachers of science (grades 6-8) for intensive, hands-on, inquiry-based science content instruction. Our goal is to ultimately improve the scientific knowledge of Mississippi school students, and encourage them to consider scientific disciplines as a career path, via a professional development program that produces knowledgeable and confident TANS teachers who will be more effective science teachers in their own middle school classrooms. TANS teachers receive instruction in one of three content areas (chemistry, geosciences, physics) through a 10 day Summer Academy, 3 academic professional development days, and extended online learning modules. Performance assessment was also introduced and utilized throughout the academy. In order to receive effective, in depth instruction, TANS teachers participate in only one content discipline per year, and rotate through other science disciplines in

subsequent years. In addition to content instruction, university faculty co-teach with TANS teachers in their middle school classrooms, and TANS teachers provide professional development for their non-TANS peers for extended impact. The researchers utilized multiple pre- and post-assessment tools, including faculty-constructed content tests, online content surveys, and teacher efficacy surveys. Data revealed significant improvement ($p < 0.001$, repeated t-test) with medium to large effect sizes (Cohen's $d>0.8$) for science content pre/posttests. Thus far, all data analyzed indicate the TANS model is effective for science professional development.

O12.08

BACTERIAL *Vibrio* POLYCYCLIC AROMATIC HYDROCARBON DEGRADATION

Samantha Allen[2], Hang Nguyen[3], Adrieene R. Flowers[1], Kimberly J. Griffitt[1], Marcia L. Pendleton[1], Jay Grimes[1]

[1]University of Southern Mississippi, Ocean Springs, MS, USA, [2]MGCCC-JD, Gulfport, MS, USA, [3]William Carey University, Hattiesburg, MS, USA

This project was made possible through the support of Mississippi IDeA Network of Biomedical Research Excellence. The purpose of this study was to pursue experimental data on *Vibrio*, to determine if they are able to metabolize carbon from PAH (Polycyclic Aromatic Hydrocarbons). PCR Genomic DNA Extraction was performed on eight *Vibrio* strains. Gel electrophoresis performed on annealed samples gave negative results for the targeted 78bp region. A mineral salts agar made with Phenanthrene/Naphthalene was developed to isolate the carbon source and innoculated with bacteria. Results of bacterial growth from this experiment were confirmed using a staining process and photographic microscopy. Additionally over a five consecutive day period, Photospectrometry measured the concentration of bacteria in a liquid medium using Phenanthrene/Naphthalene as the sole carbon source. The plate/liquid results concluded that there is evidence to continue PCR on the *Vibrio* strains. It has been shown that, *Vibrio* population increases when there is an abundance of hydrocarbon in the environment. Bioremediation of carbon removal will help reduce the use of chemicals that are currently employed for that purpose. This study indicates that with further research, *Vibrio* might prove to be an effective mechanism for the reduction of unwanted carbon in the environment, such as those from man-made oil spills.

O12.09

10:30 GUIDE OF PLANTS FOUND ON SHIP ISLAND

Kishana Mcknight

Mississippi Gulf Coast Community College, Gulfport, Ms., USA

This project was part of a Service Learning/Mentoring Project sponsored by University of Southern Mississippi Center for Community and Civic Engagement in Honors Biology I at Mississippi Gulf Coast Community College Jefferson Davis Campus with the Institute for Marine Mammal Studies and Center for Marine Education and Research (IMMS).The purpose of this project was to prepare a guide of plants found on Ship Island to be used as an educational tool for IMMS summer camp students aged six to fourteen. This guide provides students with a hands-on resource to use while exploring the local coastal habitats. The guide includes information based on research of various endemic plants commonly found on Mississippi's coastal islands. The information gathered includes the scientific and common names, the appearance, growth patterns, and other interesting facts to help recognize the various plants found. This project was designed to help inform and educate visitors to the IMMS on specific plants found along Mississippi's coastal islands.This guide was provided to the Institute for Marine Mammal Studies to be utilized as a tool to help guide and educate visitors of Ship Island.

O12.10

10:45 BEACH COMBING GUIDES

Bethany Cuevas, Jamie Hanna, Courtney Kirkham

MGCCC-JD, Gulfport, MS, United States Minor Outlying Islands

This project was part of a Service Learning/Mentor Project sponsored by University of Southern Mississippi Center for Community and Civic Engagement in Honors Biology I at Mississippi Gulf Coast Community College Jefferson Davis Campus with the Institute for Marine Mammal Studies and Center for Marine Education and Research (IMMS). This project designed to help inform and educate visitors to the IMMS on specific invertebrates found along the beaches of Mississippi. The objective of this project was to research the invertebrates, gather information on them, and create educational guides so that visitors to the Institute for Marine Mammal Studies could easily identify these animals. The guides contain a picture of an animal, its scientific and common names, typical size range, habitat, and a few interesting facts. The educational guides were

provided to IMMS to be used at their facilities in Gulfport, MS.

O12.11
11:00 LOCAL IDENTIFICATION GUIDE OF SHIP ISLAND EXPLORATION

Murakami Carpenter, Courtney Cuevas, Kaitlynn Dumal, Elizabeth Helmert
MGCCC JD, BIloxi, Mississippi, United States Minor Outlying Islands

The project was part of a Service Learning/Mentoring Project in Honors Biology I at Mississippi Gulf Coast Community College Jeff Davis Campus sponsored by The University of Southern Mississippi Center for Community and Civic Engagement and Institute for Marine Mammal Sutdies (IMMS) and the Center for Marine Education and Research. The purpose of this project is to prepare a local identification guide to be used as an educational tool in the IMMS summer camp program for students aged six to fourteen. This guide will provide students with hands-on experiences while exploring the local coastal habitats. The guide identifies twenty vertebrates and twelve inverterbrates commonly found on Ship Island through the use of sampling techniques of seines and sieves. The guide contains information on scientific and common names, pictures, habitat range, size and other interesting facts on each species.

O12.12
11:15 BOOST PROGRAM

WITHDRWAN

11:15 – 1:00 LUNCH BREAK AND BUSINESS MEETING

THURSDAY AFTERNOON
COCHRAN 214

O12.13
1:00 THE USE OF HISTORICAL EVENTS IN THE BIOLOGICAL SCIENCES TO ENHANCE STUDENT INTERESTS

Johnny Mattox
Blue Mountain College, Blue Mountain, MS, USA

Incorporation of significant historical events into college biology classes can be used to enhance student interests and appreciation for the advances that have been made through the years. I use this approach in the college microbiology course that I teach as well as classes in general biology, anatomy and physiology, ecology, and others. The class in microbiology begins with an introductory chapter that includes major historical highlights of the science. In addition, I supply the students with a detailed guide of historical events in the history of the science. This document is up-dated regularly to include more recent discoveries and developments as well as microbiologists that have received the Nobel Prize. The students are usually fascinated by how far and how fast the science of microbiology has advanced through the years as well as the number of developments that have been due simply to accident. Using this approach also gives the students a more complete appreciation of the discipline as a whole.

O12.14
1:15 COMPARISON OF THE TREATMENT OF DISEASES IN THE 1960s AND NOW

C'aria Dilworth[1], Amanda Goodwin[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration,, Gautier, MS, USA, [2]Magnolia Park Elementary School, Ocean Springs, MS, USA

The purpose of this project was to teach 3rd grade students in the Connections Program at Magnolia Park Elementary School, located in Ocean Springs, MS, about the treatments of diseases in the 1960s compared to how they are treated today. The method used to teach this topic was the use of a pretest on the different systems of the body, diseases of each system, and the treatment for the diseases. Then, the students chose a system and disease of that system and subsequently researched the treatment of the disease. The students then had to present their findings on a poster or a power point and write a concluding paper on the comparison of the treatment of the disease in the 1960s and now. Afterward, the students had to present their findings in a formal setting with their poster or power point and paper. To test whether or not the students learned from the project, they posttested in the project to illustrate any knowledge that may have been gained.

O12.15
1:30 ROBOTICS EDUCATIONAL ACTIVITIES ON PEDAGOGICAL PRINCIPLES AND SYSTEMS

Francis Tuluri, John Colonias, Desmond Vance, Maurice White, Antonio Edwards, Deremy Campbell, George Moore
Jackson State University, Jackson, USA

Lack of interest by most of the undergraduate

students of Science and Engineering disciplines in passive traditional teaching method is detrimental to student learning. The disinterest in learning eventually leads to failure to keep up with the grades expected of them or even can lead to changing their majors. In traditional methods of teaching science and engineering has more emphasis on the delivery of instruction and students are not engaged to apply physical principles to real time applications as required in these disciplines of study. To overcome this dilemma, we present an interactive, novel, and inexpensive learning platform utilizing the capabilities of Robotic Educational Module to enhance understanding behavior of physical systems. We describe the method of Robotics-based educational tool with reference to a case study - a moving cart rolling down an inclined plane under the influence of acceleration due to gravity. The details of the tool to integrate various stages of study - designing and building a robo-based physical system, programming the robo for data collection, analyzing data, calculating and interpreting results are given. The case study is part of the work carried out by five undergraduate students that participated in a project funded by JSU Center for Undergraduate Research (HBCU-SAFRA TITLE-III GRANT PROJECT funded by Title III HBCU/SERP project). The Robotics-based educational tool can be used for teaching or for learning and can be extended to several other areas of science and engineering.

O12.16
1:45 REVISION OF IMMS EDUCATIONAL PACKET

Cory Martin[1], Sharon Walker[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College-Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration,, Gautier, MS, USA, [2]Institute for Marine Mammal Studies, Gulfport, MS, USA

The IMMS educational packet is an important tool for teachers to be aware of the rules and objectives of the IMMS tour and interpretation of research being conducted and the subsequent relevance of those data. This educational packet may be used for future students to learn more about marine mammals, sea turtles, and the Gulf of Mexico in general, before they take a field trip to the IMMS Center for Marine Education and Research. The primary objective was to create and update a packet that illustrates the learning atmosphere and experiential activities the students will enjoy. It also includes learning worksheets for teachers to distribute to students for further knowledge of marine mammal and sea turtle studies. This packet may also be accessed by teachers electronically to ensure receipt of this information.

2:00 - 2:15 BREAK

O12.17
2:15 THE MARY C. O'KEEFE CENTER PROJECT

Olivia Drawdy[1], Bryant Whelan[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautic and Space Administration, , Gautier, MS, USA, [2]The Mary C. O'Keefe Cultural Center, Ocean Springs, MS, Ocean Springs, MS, USA

The student researched selected activities pertaining to and involving the Mary C. O' Keefe Center in which the community could participate. The Intern and Mentor determined a mechanism that would bind the two together. The purpose of this project was to show the city of Ocean Springs that recycling is a virtue and hopefully raise the awareness of the city's littering issue. The Intern went into the community and to the beaches, collecting trash and debris. The collected materials were brought to the Mary C where local artisans turned the debris into art. The handmade art was made available for sale. In 1997 Charles Moore was sailing in the Pacific Ocean and noticed that he could look nowhere without seeing floating debris. This intern's project branched from this original study and will hopefully inform the Ocean Springs community about this growing litter problem.

O12.18
2:30 HOW ANIMATION CAN STIMULATE LEARNING ENVIRONMENTS

Sarah E. Rhea, James Baggett
Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration, Gautier, MS, USA

The purpose of this project was to explore the different ways to stimulate learning environments with the aid of animated gifs (animation). This project executed different styles of animated gifs of the digestive system, which were incorporated into an everyday lecture, taught in Dr. Baggett's Anatomy and Physiology class. Overall, after the students had been tested on the digestive system, most had passed

on a higher grading level than compared to the previous year's grades. Then, after the test runs were implemented, the data were recorded to determine if the animated gifs had enhanced the learning environment for students. The results of this project have been recorded as successful.

O12.19

2:45 DEVELOPMENT OF EDUCATIONAL PROGRAMS, EXHIBITS AND TOOL BOX LOANS ON MARINE LIFE

Tina G. Nguyen[1], Chris Breazeale[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration,, Gautier, MS, USA, [2]the Institute for Marine Mammal Studies, Gulfport, MS, USA

The motive of this project was to develop and enhance education programs, exhibits, and teaching tools on marine life. One project was to assemble educational "tool boxes" for local teachers to obtain on "loan" from the Institute for Marine Mammals Studies (IMMS). These bins are filled with materials and are used as exciting teaching aids in the classroom, otherwise teachers may not be able to obtain such unique collaborations of material. The tool boxes were accumulated on the following topics: habitats, endangered species, effects of oil spills on marine life, and marine mammals. A wealth of information, lesson plans, artifacts, models, and activities were packed in each tool box according to the topic to be taught. In addition tool boxes were developed on grade level appropriateness, i.e., grades K-2, 3-5, middle school, and high school. A second project was developed to increase visitors' experience in the IMMS museum through creating and updating inquiry-based programs and enhancing exhibits which embody the IMMS mission of rescuing sick or injured marine life.

O12.20

3:00 TEACHING SECOND GRADERS ABOUT THE ANIMALS OF THE PASCAGOULA RIVER WATERSHED

Nathalie Gault[1], Caroline Knight[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College-Jackson County Campus Biological Science Students, Gautier, Mississippi 39553; the National Aeronautics Space Administra, Gautier, MS, USA, [2]Oak Park Elementary School, Ocean Springs, MS, USA

The purpose of this project was to educate second grade, gifted students at Oak Park Elementary School about the animals of the Pascagoula River Watershed. Various methods were utilized in accomplishing this task, such as assisting students with research about chosen animals, guiding art projects, snacking on edible owl "food chain" pellets, and presenting a production about the animals of the watershed to the school. The students had little or no prior knowledge about various animals living in the Pascagoula River Basin. Reading books, discussing their field trip to the Pascagoula Audubon Center and River Tour, and using technology sources assisted in helping them gain a better understanding of their animal and how they are all connected. The students performed a play to demonstrate their knowledge.

O12.21

3:15 A BOX FULL OF TOOLS!

Ashley Blanton[1], Chris Breazeale[2]
[1]Cooperative Intern Program Mississippi Gulf Coast Community College - Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration, Stennis S, Gautier, MS, USA, [2]the Institute for Marine Mammals Studies, Gulfport, MS, USA

The purpose of this project was to give educators a way to easily access materials and lesson plans that correspond to certain areas of studies. These study areas include: habitats, oil spills, endangered animals, and marine mammals. The tool boxes that contain lesson plans and materials were developed on grade level appropriateness, i.e., grades K-2, 3-5, middle school, and high school, for instructors to use in their classrooms. These containers are available for a one week period free of charge. This project was achieved by searching pre-made educational activities on the World Wide Web that corresponded with the topics, as well as placing them into similar formats for consistency. Another necessary task was to prepare the materials that were required in each lesson plan and ordering materials if needed. Each lesson plan and its corresponding materials were then placed into hampers called tool boxes that made for easy "check-out" by any educator who desired to use these resources. An additional project was completed by enhancing the exhibits at the IMMS Museum, so the learning experience could be enriched for visitors of all ages. Formal and Informal Educators can now use the enhanced exhibitory and the newly created tool boxes to provide more experiential learning experiences in the classroom and within the IMMS Museum.

3:30 – 3:45 BREAK

O12.22

3:45 INCREASING COMMUNITY INPUT AND PARTICIPATION AND LEARNING AT THE WALTER ANDERSON MUSEUM OF ART

Katelyn Nguyen[1], Melissa Johnson[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration,, Gautier, MS, USA, [2]the Walter Anderson Museum of Art, Ocean Springs, MS, USA

The purpose of the project was to increase community awareness and involvement in the Walter Anderson Museum of Art. The Walter Anderson Museum of Art, a non-profit organization is located in Ocean Springs, MS. The intern developed methods of informing the community about upcoming events, fundraisers, and promotions. Additionally, social media marketing and public relations strategies were organized. The project required writing, editing, and graphic design expertise as well as knowledge Microsoft Word, Excel, and Razor's Edge system. The intern organized a list of all media and press resources combined with contact information into a spreadsheet. Anderson's works dealt heavily in the beauty of plants and animals of the Gulf Coast region. The database will increase the capabilities of science instructors to bring his work into the "classroom." This project resulted in the intern becoming familiar with the entire musuem's marketing department and increased her knowledge of public relation initiatives.

O12.23

4:00 CHEMISTRY PERFORMED BY ELEMENTARY STUDENTS

Kristin Sheppard[1], R. Flowers[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration,, Gautier, MS, USA, [2]Oak Park School, Ocean Springs, MS, USA

The purpose of this project was to teach the students the basics of chemistry. Every week, the advanced students were taught a lecture and then performed a laboratory exercises on the subject they were taught that day. All of the students were placed into three groups, comprised of two or three students per group. Each group worked together to complete its experiments for the day. The labs were very basic and on appropriate grade level for each of the students to understand the science objectives. Each experiential lab was interesting and fun for the students, which intrigued them and made them want to discover more about chemistry. The students fully understood their assignments and received outstanding feedback from them. At the conclusion of the project, the students had a better understanding and greater passion for chemistry than they had prior to the implementation of this project.

O12.24

4:15 UPDATING A TUTORIAL VIDEO CONCERNING THE PARTS AND FUNCTIONS OF A MICROSCOPE

Mitchell Farkas, Jason Poirier, Lena Melton
Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration, Gautier, MS, USA

The purpose if this project was to produce an updated tutorial video for use in Biology I and Biology II classes. The video was designed to introduce students to the microscope and provide a mode of review if needed. The parts of the microscope were clearly marked and defined. Detailed information explaining the proper care and handling techniques were illustrated. After viewing prior student films, further research was conducted resulting in a usable script and storyboard. An extensive editing process was undertaken to produce a newly updated product.

012.25

4:30 TEACHING THIRD GRADERS ABOUT THE HUMAN BODY SYSTEMS

Kelly Slater[1], Latoya Fortenberry[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration,, Gautier, MS, USA, [2]the Jackson Elementary School, Pascagoula, MS, USA

The purpose of the project was to educate a class of third grade students about the human body systems with emphases placed on the skeleton, muscular, nervous, and digestive systems. The information was taught through lectures, videos, class discussions, and graphic organization by the Intern concerning each system. To reinforce the material being taught, the students assembled into small groups and "drew and cut out" a human body. They then glued and labeled the parts of each system to the human body paper

cutout. Pretests and posttests were given to assess what the students already knew about the topic and what they had learned. The students gained a level of appreciation and knowledge of their body systems and how they keep these systems healthy every day.

O12.26

4:45 TEACHING THE IMPORTANCE OF HAND WASHING TO CHILDREN AND FOOD PRESERVATION TO HOUSEWIVES

Aliesha Barlow[1], Barakat S. M. Mahmoud[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration,, Gautier, MS, USA, [2]the Mississippi State University, Pascagoula, MS, USA

The purpose of this project was to teach the importance of hand-washing to segments of the public. The intern created workshops that explained the importance of hand-washing to kindergarten students of Moss Point Elementary and Pascagoula Elementary. Initially, the children were asked to rub their hands in a lotion type substance that "glowed in the dark" and then to wash their hands in the normal way. These workshops not only explained the importance of hand-washing to the children but demonstrated a proper way to accomplish their goal. Additionally, the intern developed a poster describing the importance of proper food preservation. This aspect of the project was designed to occur in the homes of housewives or in a more formal setting.

Division Poster Session
Following Dodgen Lecture

P12.01

JAMES "JIM" FRANKS AND HIS CONTRIBUTIONS TO GULF OF MEXICO SCIENCE

Christina Adams[1], Joyce M. Shaw[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration,, Gautier, MS, USA, [2]The University of Southern Mississippi—Gulf Coast Research Laboratory, Gunter Library, Ocean Springs, MS, USA

Archive materials are an important special collection at the Gunter Library of the Gulf Coast Research Laboratory (GCRL). Within the archival collection are numerous publications, articles, photographs, and newspaper clippings by and about Jim Franks, Senior Research Scientist in the Center for Fisheries Research at GCRL. The purpose of this project was to document Mr. Jim Franks' contributions to the Gulf of Mexico science by organizing materials relating to his career as a long-time fisheries biologist at GCRL. Articles, reprints, and other materials were sorted, organized, and if necessary, photocopied or digitized to preserve the original document. Articles published by Mr. Franks were added to a bibliographic database. A poster highlighting Mr. Franks' career and contributions was created for the 2013 Mississippi Academy of Sciences annual meeting.

P12.02

PROJECT RESTORATION: REORGANIZING THE NOAA SCIENTIFIC LIBRARY

Eric Suddeth[1], Cody Thompson[1], Lagena Fantroy[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration,, Gautier, MS, USA, [2]the National Oceanic and Atmospheric Administration-National Marine Fisheries Service Library, Pascagoula, MS, USA

The purpose of this project was designed to maintain a special library collection of data sheets and research material that support NOAA National Marine Fisheries, Mississippi Laboratories field office staff in Pascagoula. This is a scientific collection filled with fisheries-related documents that are designed to serve scientists nationally as marine research is continued. The books, media, data sheets and related documents are housed at the facility to support Marine Biologists who research to protect and preserve the nation's living marine resources by conducting scientific research that relates to the Gulf of Mexico. Methods and procedures were referenced to catalog this material for in-house and public use. The Library of Congress and online collection management software was referenced to strategically place material accordingly. The project concluded with all available material being properly sorted and placed according to general library standards.

P12.03

ACTIVITY TEACHINGS AND OBSERVATIONS OF UPPER ELEMENTARY CONNECTIONS STUDENTS LEARNING MEDICINE OF THE CIVIL WAR

Tave' Henry[1], Linda Foster[2]
[1]Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration, Stennis Space Center, MS 39522; and th, Gautier, MS, USA, [2]the Ocean Springs School District, Ocean Springs, USA

The purpose of this project was to educate Connections students at Ocean Springs Upper Elementary School about Medicine of the Civil War. A variety of methods was used in accomplishing this task, such as hands on activities, multiple, different power points and small at-home projects. The power point lessons consisted of discussions that encouraged students to use their critical thinking skills. Additionally, the students were quizzed on the scope of knowledge present before and acquired after each new lesson. The students developed and shared presentations illustrating the knowledge newly acquired knowledge.

P12.04

RESEARCH OF FIFTH GRADERS' STUDIES ON CIVIL WAR INFECTIONS AND DISEASES

Paige Fayard[1], Linda Foster[2]
[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration,, Gautier, MS, USA, [2]Ocean Springs School District, Ocean Springs, MS, USA

The purpose of this project was to teach the fifth grade students at Ocean Springs Upper Elementary about contagious diseases and infections during the Civil War (1861-1865) era. The students were asked questions before the lesson to test their knowledge on the subject matter. The class was then taught a lesson that included diseases from which the soldiers suffered and how improper sanitation, poor hygiene, contaminated water, and an unhealthy diet contributed to the spread of the diseases. The students also learned about infections to wounds and what a problem this was for doctors and patients. The class was then split into groups and asked to make a poster or give a demonstration on how important sanitation is and how the doctors could have better prevented the spread of disease and infections.

P12.05

ESCAPE POLYMER ISLAND: DESIGNING A LEARNING BASED GAME

Alexzondra Hurns[0], Hua Shu[0], Shea Brown[0]
[1]Bowie State University, Bowie, MD, USA, [2]University of Maryland, Baltimore County, Baltimore, MD, USA

With the expansion of technology, "traditional instruction" has received much criticism. Many experts are considering "traditional instruction" a downfall in the educational system and possible contribution to the loss of student interest in the classroom (Banathy, 1994; Reigeluth, 1994). In the past, there has been some investigation into the effectiveness of games used as educational tools, as well as, the struggles faced by game-based learning. Studies have shown that there is great educational potential in game based learning. The purpose of this study is to design an interactive educational game titled *Escape From Polymer Island (EPI)*. *EPI* is structured to educate high school students about polymer science. Design of the game focuses most on the features of the game, educational content, and engaging methods. Players navigate, solve problems, and defeat enemies in order to learn more about polymers. While a complete level of gameplay wasn't finished, a detailed script and demo of the level was produced as a blueprint for the level and way of contextualizing the ideas and strategies incorporated into the learning based game.

P12.06

AN ASSESSMENT OF 6TH -12TH GRADE CLIMATE AND ENERGY STANDARDS IN THE SOUTHEAST UNITED STATES

Jonathon Geroux, Karen McNeal
Mississippi State University Department of Geosciences, Starkville, MS, USA

Climate and energy education is often overlooked in state science standards. However, given the environmental, human, and economic impacts that are associated with these issues, which will only become more critical in the future, they should be an integrated focus in educational standards refinement and revision. Climate and energy concepts should be, at minimum, introduced in the 6th grade and have a strong presence by the 12th grade. Students leaving high school, after having exposure to a robust climate and energy science curriculum, will be well prepared to tackle the issue of climate and energy that the country faces. Eleven states in the Southeastern US (Texas, Louisiana, Mississippi, Arkansas, Tennessee, Kentucky, Alabama, Georgia, Florida, South Carolina, and North Carolina) were

reviewed. Standards from earth and space science and environmental curriculums were inventoried and examined for the presence and depth of climate and energy concepts. The individual states were compared to the climate and energy principals and each state was compared against the other southeastern US states. Recommendations for improvement of each of the eleven state science standards are discussed.

P12.07

CONSERVATION OF MOMENTUM AT BASSFIELD HIGH SCHOOL

Christopher Sirola[1], Joel Hoxie[2], Amanda Palchak[1]
[1]University of Southern Mississippi, Hattiesburg, MS, USA, [2]Bassfield High School, Bassfield, MS, USA

Bassfield High School introduced a new physics course in the fall of 2012. We secured a mini-grant from the American Physical Society to purchase much-needed laboratory equipment, which was then used to teach lessons regarding conservation of momentum. We also brought the students, many of whom had never before been on a college campus, to visit the University of Southern Mississippi, tour physics research labs, and attend an introductory college-level physics lecture. We discuss the results of the instruction, using pre- and post-tests and observations; the implementation of the new high school physics course; and the effects of exposure to the college environment to students of a high-needs school.

ZOOLOGY

Chair: Julius Ikenga, Mississippi Valley State University
Vice-chair: Alex Alcholonu**,** Alcorn State University

Thursday, February 21, 2013

Thursday MORNING

O13.01

9:00 POLYCHEATE WORM TUBES FROM THE UPPER CRETACEOUS AND BASAL PALEOCENE OF THE MISSISSIPPI EMBAYMENT

George Phillips
Museum of Natural Science, Jackson, USA

In spite of their very small size, the tentaculate, plume-like filter-feeding organs of sedentary polychaete worms are among the most strikingly colorful biological structures in the oceans. Members of the Family Serpulidae dwell in hard, calcareous, tubular dwellings built with glandular secretory products; the same is true of the sabellid *Glomerula* and one or two other sedentary genera. Most other tube-dwelling polychaetes build flexible domiciles, some using secretions to bind particles from the environment. These latter dwellings seldom preserve in the fossil record. However, the sturdier, biomineralized calcareous tubes, such as those of serpulids and other filter-feeders, are commonly preserved in calcareous marine sediments, including those in the Mississippi Embayment of Late Cretaceous and Early Paleocene age. Tubiculous polychaetes encrust hard objects on the seafloor, as in *Neomicrorbis*, or live unattached on the seafloor, like *Pyrgopolon* (*Hamulus*), and some do both. Encrusting forms are commonly found attached to oysters, echinoids, and phosphatic nodules. The long sinuous tubes of *Glomerula* and short, coiled tubes of *Spirorbis* are examples. Non-encrusting tubiculous polychaetes rest freely on the seafloor either singly or in compact clusters of several individuals. The tubes of these free-lying forms occur in a variety of shapes, namely planispiral (e.g. *Rotularia*), trochospiral (e.g. *Conorca*), hook-shaped (e.g. *Hamulus*), spaghetti-like knots (e.g. *Glomerula*), or bundles of short, overlapping tubes (e.g. *Pyrgopolon*). The last of these growth habits are essentially ‘colonies' of multiple, conjoined tubes that begin their attachment to, and

eventually overgrow, some other object, such as a mollusk shell.

O13.02

9:15 PRELIMINARY STUDIES ON HELMINTH PARASIRES OF GASTROINTESTINAL TRACT OF CAT FISH (*ICTALURUS PUNCTATUS*) AND BUFFALO FISH (*ICTIOBUS CYPRINELLUS*) FROM LOWER MISSISSIPPI RIVER

Alex Acholonu, Rosie Hopkins, Demetriea Payne
Alcorn State University, Alcorn State, MS, USA

Catfish are named for their whisker-like structures called barbells on their face which they use to decect food in the water. It is one of the most consumed fish of Mississippians. They are known as bottom dwellers. Buffalo fish has a large oblique and terminal mouth. They are said to dwell in large rivers and lakes and considered to be omivores. The purpose of this study is to know the helminth parasites prevalent in this fish that is the favorite of people from Mississippi and buffalo fish also consumed a lot by the Mississippi people. The next purpose is to find out which of the two species of fish that harbors more helminth parasites than the other.In the months of July and October, the two species were obtained from a fish market located in Port Gibson, Mississippi as they become available. They were taken to the laboratory and autopsied. The parasites they harbored were removed, put in pitri dishes, killed, fixed and preserved in 10% formalin. They were next grossly identified with the use of the necked eye as they are macroscopic or with a dissecting microscope. The results were recorded. All the catfish so far autopsied were 100% infected with helminths. The kinds of helminths found were cestodes, trematodes, nematodes and acantho-cephalans. With respect to the buffalo fish, 50% were infected with acanthocephalans. Thsi is a preliminary report. Work on this study is continuing.

O13.03

9:30 ROLE OF SEX HORMONES IN THE PROGRESSION OF DIABETES & RENAL INJURY IN FEMALE T2DN RATS

Kaniesha Baker[1], Tiffani Slaughter[2], Lateia Taylor[2], Richard Roman[2], Jan Williams[2]
[1]*Department of Natural Science & Environmental Health, Mississippi Valley State University, Itta Bena, MS, USA,* [2]*2Department of Pharmacology and Toxicology, University of Mississippi Medical Center, Jackson, MS., USA*

Preliminary studies from our laboratory indicate that male Type-2 diabetic nephropathy (T2DN) rats develop progressive renal injury while the female rats do not. We recently observed that fasting glucose levels in female T2DN rats were in the normal range. The current study examined whether sex hormones participate in the regulation of glucose levels and protein excretion in female T2DN rats and if we increased the glucose levels in the females similar to the males, would the females develop renal disease. Nine month-old female T2DN rats were divided into 5 groups: (1) control, (2) dihydrotestosterone (DHT, 0.75mg/day, s.c.), (3) ovariectomy (OVRX), (4) OVRX+DHT and (5) streptozotocin (STZ, 50 mg/kg, i.p.). A group of male T2DN rats were ran simultaneously to compare to the female rats. At the end of the study, fasting glucose levels were significantly elevated in the STZ-treated group compared to the other female groups (450±91 vs. 112±13 mg/dL, respectively). Alterations in sex hormones had no influence on the development of proteinuria. In contrast, elevating glucose levels with STZ significantly increased protein excretion to 112±23 mg/day compared to the other female groups (15±4 mg/day). However, the degree of proteinuria in STZ-treated female rats was still significantly less than maleT2DN rats (208±34 mg/day). These data indicate that sex hormones are not responsible for the difference in glucose levels and protein excretion in female T2DN rats, but increasing glucose levels in female T2DN rats to that of the males cause mild proteinuria.

O13.04
9:45 ANTIOXIDANT, ANTIINFLAMMATORY AND IMMUNE-MODULATING PROPERTIES OF JOBELYN COMPOSED OF A SOUTHWESTERN NIGERIAN SORGHUM BICOLOR LEAF SHEATHS

Patrick Erah[0], KF Benson[0], JL Beaman[0], Boxin Ou[0], Ademola Okubena[0], Olajuwon Okubena[0], GS Jensen[0], Alex Acholonu[0]

[1]University of Benin, Benin City, Edo, Nigeria, [2]NIS Labs, Klamath Falls, Oregon, USA, [3]Dover Sciences, Franklin Maryland, USA, [4]Health Forever Products, Lagos, Lagos State, Nigeria, [5]Alcorn State University, Alcorn State, MS, USA

Sorghum from southwestern Nigeria has attracted the interest of many researchers because of its known health benefits. As cellular oxidation and chronic inflammatory conditions have substantial impact on immune function, simultaneous application of anti-inflmmatory and immune modulating modalities has potential for reducing inflammation-induced immune suppression. The objective of this study was to investigate the antioxidant, anti-inflammatory and immune modulating modalities of Jobelyn. The total oxygen radical absorbance capacity(ORAC) values of samples of Jobelyn were determined by using standard procedure and compared with those of 326 selected foods in United States Department of Agriculture(USDA) database. Selected anti-inflammatory and immune-modulating properties of Jobelyn were then examined *in vitro* in the absence and presence of its aqueous and ethanol extracts using freshly isolated primary human polymorphonuclear and mononuclear cell subsets. The crude extracts had a mean ORAC value 12.04 times that of raw bran sumac that had the highest ORAC value in the USDA database. Both aqueous and non-aqueous compounds present in the leaf sheaths contributed to reduced ROS formation by inflammatory polymorphonuclear cells and reduced the migration of these cells. Distinct effects were seen on lymphocyte and monocyte subsets in cultures of peripheral mononuclear cells. While the aqueous extract of Jobelyn triggered robust up-regulation of CD69 activation marker on CD3-CD56+ natural killer(NK) cells, the ethanol extract triggered siimlar up-regulation of CD69 on CD3+CD56+NKT cells, CD3+ T lymphocytes and monocytes. Jobelyn possesses high antioxidant property. Both the aqueous and non-aqueous compounds present in it, contribute to anti-infmammatory effects .

O13.05
10:00 QUANTIFICATION OF CYANOBACTERIAL BLOOMS AND CYANO-TOXINS IN FOUR LARGE MISSISSIPPI LAKES

Padmanava Dash[1], Wellington Ayensu[1], Julius Ikenga[2], James Pinckney[3]
[1]Dept. of Biology, Jackson State University, Jackson, Mississippi, USA, [2]Department of Natural Science and Environmental Health, Mississippi Valley State University, Itta Bena, Mississippi, USA, [3]Marine Science Program and Department of Biological Sciences, University of South Carolina, Columbia, South Carolina, USA

Cyanobacteria are the major algal group in fresh water and undesirable for several reasons including the fact that some cyanobacterial species produce potent toxins. Recently, a procedure was developed to estimate cyanobacterial concentrations by quantifying chlorophyll a and the primary cyanobacterial pigment phycocyanin using OCM satellite data over a small lake in Louisiana. Empirical inversion algorithms were developed to convert the OCM Rrs at bands centered at 510.6 and 556.4 nm to concentrations of phycocyanin. Similarly, empirical algorithms to estimate chlorophyll a concentrations were developed using OCM bands centered at 556.4 and 669 nm. The results demonstrated the preliminary success of using OCM satellite data to map cyanobacterial blooms in a small lake in Louisiana. In the summer of 2012, five field campaigns were undertaken to four large Mississippi lakes, Lake Sardis, Lake Enid, Lake Grenada, and the Ross Barnett reservoir in order to obtain a database of photosynthetic pigment, phytoplankton composition and toxin concentrations. The objective of this project is to combine multiple satellite data from several sensors and the developed techniques to quantify cyanobacteria in these four large Mississippi lakes and make the mapped images available through a website for use by water quality managers and general public to rapidly obtain synoptic information on cyanobacterial blooms. Time-series of true color satellite images clearly show the presence of algal blooms. Preliminary analyses of the field data analyzed thus far demonstrate the presence of numerous toxic species of cyanobacteria in these lakes. Preliminary results from this project will be presented.

10:15 BREAK

O13.06

10:30 POLLUTION STUDIES OF THE LOWER PASCAGOULA RIVER

Alex Acholonu, Rosie Hopkins, Dominique Payne
Alcorn State University, Alcorn State,MS, USA

The Pascagoula River (also known as Singing River) is a freshwater body in southeastern Mississippi. It drains an area of 8,800 square miles(23,000 km2. and empties into the Mississippi Sound of the Gulf of Mexico. It is formed in northwestern George County by the confluence of the Leaf and Chickesawhay Rivers and flows generally southward through George and Jackson Counties. In its lower course, the river forms several channels and bayous. The main channel passes Escatawpa and Moss Point and flows into the Sound at Pascagoula. The purpose of this study was to find out if the Pascagoula River which empties into the Gulf of Mexico is polluted especially after the Gulf of Mexico oil spill. It is also to determine if the river meets the water quality criteria of the State of Mississippi. During the month of June 2012, water samples were collected at three different locations from the lower Pascagoula River in the vicinity of Moss Point. The samples were taken to the laboratory and tested according to the methods indicated in the LaMotte water pollution detection kits. Eleven parameters were tested and the average readings recorded. Analysis of the results show that the Pascagoula River met the Mississippi water quality criteria with the exception of alkalinity, carbon dioxide, water hardness and phosphorus. The biological profile however, showed that the river was polluted. The test for coliform bacteria was positive.

O13.07

10:45 ANALYZING HETEROTROPHIC MICROBES IN DIRECT ECOLOGICAL COMPETITION WITH HARMFUL ALGAL BLOOMS (HABS) IN MISSISSIPPI WATER WAYS

Wellington Ayensu[1], Padmanava Dash[1], Daniel Kibet[2], Winny Tanui[2], Joyce Chumo[2], Marlon Flowers[2], Julius Ikenga[2], James Pinckney[3]
[1]Department of Biology, Jackson State University, Jackson, MS, USA, [2]Dept. of Natural Science and Environmental Health, Mississippi Valley State University, Itta Bena, MS, USA, [3]Marine Science Program and Dept. of Biological Sciences, University of South Carolina, Columbia, SC, USA

Lakes Enid, Grenada, Sardis and the Ross Barnett Reservoir are among the main water sources that cater for the utility demands of over one million population of Mississippi State. These bodies of water essentially serve as house and recreational resources. Due to seasonal introduction of high nutrients from neighboring rivers and agricultural run-offs they face periodical challenges from invading groups of heterotrophic bacteria (HB) that accompany harmful algal blooms (HABs). This negatively impacts the aquatic ecosystem resulting invariably in undesirable environmental outcomes. Our objective was to elucidate the types and levels of harmful micro-organisms that can pose health hazard as well as environmental pollutant in these lakes. We seek to understand the source as well as any association between and within cyanobacterial algal blooms and their phycotoxins that are frequently seen in equilibrium niche with seasonal blooms of HB that pose health hazards for fish, animals and humans. Our findings from membrane filtration technique indicated the presence of total Coliforms, a mixture of fecal enterococci, Streptococci and Staphyloccoci. Regression analysis of levels of Coliforms versus physicochemical properties such as turbidity, pH, temperature, Dissolved Oxygen (DO), and salinity conditions revealed no significant correlation. An innate complex state of imbalanced equilibrium within the biomes seems to exist. These results affirm that employing multiple methods of bacteria source tracking "toolbox" can be one of the effective means of detecting environmental pollutants in water bodies.

11:00 BUSINESS MEETING

THURSDAY AFTERNOON

Poster session

P13.01

1:00 THE TOXICITY OF FLUOMETURON ON THE DEVELPOMENT OF THE JAPANESE MEDAKA (*ORYZIAS LATIPES*)

Samuel Martin, Hattie Spencer
Mississippi Valley State University, Department of Natural Sciences and Environmental Health, Itta Bena, MS, USA

Agricultural pesticides are heavily used in the Mississippi Delta to protect crops against unwanted pests and have become a source of exposure to human and the environment. Pesticides may have the potential to cause birth defect in both other animals and human. We evaluated acute toxicity of the herbicide Fluometuron ($C_{10}H_{11}F_3N_2O$), to determine sub-chronic and teratogenic effects on the embryonic development of Japanese medaka (*Oryzias laipes*). One-day old embryos were exposed under static renewal condition, to nominal concentrations (0, 50, 150, 200, and 240 mg/L) of fluometuron for 10 days. Prior to exposure, embryos were microscopically examined for fungal fertilization, fungal infection, stage development and death. Temperature was maintained at 25ºC, pH 7.5 and dissolved oxygen was kept at 5 mg/L. Time to hatching for untreated medaka embryo was 11 to 17 days. The endpoints that were evaluated were embryo viability, hatchability, and morphological abnormalities. At the highest concentration (240mg/L), egg and larval survival and hatchability were significantly reduced (23%). The lowest concentration (50mg/L) showed a higher percentage of hatching (80%). Fluometuron toxicity produced numerous developmental effects that included mild yolk sac edema, defects of the cardiovascular and circulatory systems, blood pooling, fin deformity, and premature hatching. The exposure to sublethal concentrations of fluometuron resulted in a reduction in hatching, as well as the development of morphological and physiological abnormalities in the Japanese medaka fry. Fluometuron appears to be teratogenic to the Japanese medaka embryo and could pose a serious threat to the ecological system and human health.

P13.02

1:15 DETECTION AND QUANTIFICATION OF HARMFUL CYANOBACTERIAL BLOOMS IN LAKE GRENADA, MISSISSIPPI, USING FIELD AND SATELLITE DATA

Daniel Kibet[1], Padmanava Dash[2], Wellington Ayensu[2], Julius Ikenga[1], James Pinckney[3]
[1]Department of Natural Science and Environmental Health, Mississippi Valley State University, Itta Bena, MS, USA, [2]Department of Biology, Jackson State University, Jackson, Mississippi, USA, [3]Marine Science Program and Department of Biological Sciences, University of South Carolina, Columbia, South Carolina, USA

Harmful algal blooms (HABs) are phytoplankton bloom events involving toxic or other HAB's negative impacts to other organisms. Main objective of this study was to quantify and analyze HABs in Lake Grenada, Mississippi, USA using field and satellite data. Time-series of satellite data from several satellite sensors were first processed to generate true color images of phytoplankton present in Lake Grenada. Medium Resolution imaging Spectrum (MERIS), Moderate Resolution Imaging Spectroradiometer (MODIS) and Sea-viewing Wide Field-of-view Sensor (SeaWiFS) were used to exploit large amount of data to support mapping of phytoplankton blooms. Field campagns were conducted around noon targeting the time of satellite overpass and includes collection of water samples in clean Nalgene bottles, *in situ* analysis of water quality using a portable Hanna Instrument and *in situ* remote sensing reflectance measurements using a Geophysical and Environmental Research (GER) 1500 spectroradiometer. High Performance Liquid Chromatography (HPLC) analysis showed that cyanobacteria, cryptophytes, euglenophytes and diatoms were the dominant algal groups present. Testing for phycocyanin (PC), Colored Dissolved Organic Matter (CDOM), Suspended Particulate Matter (SPM), hepatotoxin, and microscopy were also conducted. Absorption coefficients of total particulate, phytoplankton and non-algal particulate matter (NAP) were also measured using the quantitative filter pad technique (QFT). Retrospective true color satellite images were positive for phytoplankton bloom events in Lake Grenada. Chlorophyll *a* concentrations were higher towards the southwest portion of the lake, which signifies higher concentration of phytoplankton in that region. A positive hepatotoxin analysis was detected in the lake. This study certainly documents that Lake Grenada has a HABs problem.

P13.03

1:30 THE EFFECTS OF A SUBLETHAL DOSE OF BOTULINUM SEROTYPE E ON THE SWIMMING PERFORMANCE OF CHANNEL CATFISH (*ICTALURUS PUNCTATUS*) FINGERLINGS

Torri Thomas[1], Rachel Beecham[1], Patricia Gaunt[2]
[1]Department of Natural Science and Environmental Health, Mississippi Valley State University, 14000 Highway 82 W, Itta Bena, Mississippi, USA, [2]Thad Cochran National Warmwater Aquaculture Center, College of Veterinary Medicine,, Stoneville, Mississippi, USA

Visceral toxicosis of catfish (VTC) is a disease of cultured channel catfish **(*Ictalurus punctatus*)** in the MS. Delta shown to be associated with botulinum serotype E (BoNT/E). Botulinum

causes weakness and paralysis of skeletal muscles including those involved in swimming. This study attempted to determine if sublethal exposure to purified BoNT/E caused reductions in swimming performance and metabolism of channel catfish. Catfish swimming performance was assessed on 20 stocker channel catfish (mean weight 62.35 ±2.5 g) with 10 control fish and 10 fish injected intracoelomically with a sublethal dose of BoNT/E. Individual catfish were acclimated in a Blazka type swim chamber for 17 hours prior to swimming (water temperature ~28°C, dissolved oxygen 7 - 4 mg/L). A critical swimming speed (Ucrit) protocol was used and dissolved oxygen and temperature were monitored and used to calculate metabolic rate and cost of transport at each test speed (10-70 cm/s). There was a statistical difference between the Ucrits ($p = 0.0034$), but no differences were found between the metabolic rate ($p = 0.69$) or cost of transports ($p=0.67$) between the control and BoNT/E groups. There was a difference in the cost of transport at the various speeds (range: 10-70 mcm/s) tested ($p<0.0001$). These results indicate that botulinum E interferes with the swimming abilities of the catfish which could contribute to the mortality from VTC by making the fish more susceptible to predation.

P13.04

1:45 QUANTIFYING THE CONCENTRATION OF HARMFUL ALGAL BLOOMS (HABs) IN LAKE ENID, MISSISSIPPI, USA

Joyce Chumo[1], Padmanava Dash[2], Wellington Ayensu[2], Julius Ikenga[1], James Pinckney[3]
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Algal blooms are harmful to aquatic ecosystem. Cyanobacteria are a major freshwater algal group characterized as harmful algal blooms (HABs). The objective of this research was to quantify the concentration of HABs in Lake Enid, Mississippi, USA using remote sensing data and laboratory analyses. Data from Medium Resolution Imaging Spectrometer (MERIS), Moderate Resolution Imaging Spectroradiometer (MODIS) and Sea-viewing Wide Field-of-view Sensor (SeaWiFS) were downloaded from the NASA website from 2010 to 2012 and then processed to generate true-color images for identifying HABs in Lake Enid. Field data collections at about noon were made at 12 sites at Lake Enid on 20 June, 2012 to coincide with satellite overpass. Type of field data collected include water samples taken and chilled in clean Nalgene bottles, *in situ* water quality data using a portable Hanna Instrument (HI769828), and *in situ* remote sensing reflectance measurements using a Geophysical and Environmental Research (GER) 1500 spectrometer. Laboratory analysis with High Performance Liquid Chromatography (HPLC) and Chemtax showed the presence of 22 µg of cyanobacteria Chl a/L and 0.2 µg of hepatotoxic microcystin/L. Colored Dissolved Organic Matter (CDOM), Suspended Particulate Matter (SPM), absorption coefficient, and microscopic analyses were also conducted. Lake Enid traditionally is an important water resource for drinking water, recreational activities such as swimming, boating and sport fishing. Based on the potential health risks found in this study, it is recommended that Lake Enid be continuously monitored.

P13.05

2:00 DETECTION AND QUANTIFICATION OF HARMFUL ALGAL BLOOMS IN LAKE SARDIS, MISSISSIPPI, USA

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Harmful algal blooms (HABs) are consequences of elaborate cyanobacteria growth. The latter can produce a diverse range of cyanotoxins hazardous to aquatic ecosystem, human, and other animals. The objective of this research was to detect and quantify HABs in Lake Sardis, using remote sensing data and laboratory analyses. Data derived from remote NASA Spectrometer, Spectroradiometer and SeaWiFs were first downloaded from the NASA web site, from January 2010 to July 2012. These data were then processed to generate true color images for identifying HABs in Lake Sardis. Next, a field campaign to Lake Sardis was conducted on 26 June 2012 to collect water samples at 12 sites at about noon, to coincide with clear sky and satellite overpass. Laboratory analyses conducted included the following: High Performance Liquid Chromatography (HPLC) analysis for

quantification of cyanobacteria pigments, detection of cyanobacteria hepatotoxin (microcystin), as well as analyses for Colored Dissolved Organic Matter (CDOM), Suspended Particulate Matter (SPM), microscopy, and determination of absorption coefficients of total particulate, phytoplankton, and non-algal particulate matter. The true color MERIS and high resolution MODIS images recorded clearly showed the presence of algal blooms in Lake Sardis. The spatial resolution of SeaWiFS sensor was not adequate to resolve the algal blooms in the lake at the same time the phytoplankton blooms were observed in the MERIS and MODIS images. But the HPLC data indicate the predominance of cyanobacteria and microcystin towards the southwest part of the Lake. The implication of HABs and microcystin detected in this study suggests that Lake Sardis be continually monitored.

P13.06

2:15 DETECTION AND QUANTIFICATION OF HARMFUL ALGAL BLOOMS (HABs) IN THE ROSS BARNETT RESERVOIR, JACKSON, MISSISSIPPI, USA.

Winny Tanui[1], Padmanava Dash[2], Wellington Ayensu[2], Julius Ikenga[1], James Pinckney[3]
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Cyanobacteria are photosynthetic phytoplankton which produces algal blooms that can be harmful to freshwaters ecosystem. Harmful algal blooms (HABs) limit aquatic habitats, water quality, recreational activities and fisheries. The objective of our study was to detect and quantify HABs in the Ross Barnett reservoir (RBR) using remote sensing data and laboratory analyses. Time-series satellite data from NASA SeaWiFS, Spectroradiometer and Spectrometer were downloaded from NASA website and then processed to generate true color images for identifying the presence of HABs in the RBR. Field campaigns coincident with satellite overpass at about noon were conducted on 13 June 2012 and another on 29 June 2012, to collect water samples from 12 sites at RBR, as well as take *in situ* water quality data using a portable Hanna Instrument (HI769828), and *in situ* remote sensing reflectance measurements using a Geophysical and Environmental Research (GER) 1500 spectrometer. Analysis of the RBR water with High performance Liquid Chromatography (HPLC) and Chemtax detected 30 µg of cyanobacteria Chl a /L and 0.35 µg of hepatotoxic microcystin/L. Colored Dissolved Organic Matter (CDOM), Suspended Particulate Matter (SPM), absorption, and microscopic analyses were also conducted. The time-series true color satellite images taken from January 2010 to July 2012 indicate the presence of cyanobacteria and several other harmful algal groups in the RBR, which serves as the main drinking water resource and a major recreational destination for the greater Jackson area. Results of this study suggest a need to continuously monitor the water quality of the RBR for HABs.

P13.07

2:30 ASSESSMENT OF DNA QUANTIFICATION METHODS: COST, ACCURACY, AND SPEED

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DNA quantification is an essential tool in biological sciences. There are numerous methods for DNA quantification; each with different advantages, disadvantages, and limitations. We investigated three quantification methods: 1.) absorbance, on a NanoDrop 1000 Spectrophotometer; 2.) fluorescence (Hoerchst 33258 dye), on a Hoefer TK0 200 Fluorometer; and 3.) fluorescence (SYBR Green I dye), on a Beckman Coulter DTX 880. Our analysis established cost per sample for method 1 at $0.02; method 2 at $0.03; and method 3 at $0.07. The amount of time to generate each sample datum is 2 minutes, 3.2 minutes, and 0.28 minutes for methods 1, 2, and 3, respectively. Our results show that the Beckman Coulter DTX 880 instrument confers the most accurate data. The NanoDrop Spectophotometer had high precision; however, accuracy was confounded by sample purity. The Hoefer Fluorometer showed reasonable accuracy but lacked precision. Further analysis was conducted on the Beckman Coulter DTX 880 to establish practical user guidelines. In general we recommend expanding the number of standards used from four to seven; and a range of standards from 5ng to 500ng. Higher dye concentrations can be useful with higher amounts of DNA, but are not recommended.

MS INBRE Scholars 2013 Abstracts

P6.02

THE EFFECTS OF ALENDRONATE ON OSTEOBLAST CELLS IN CULTURE

Soaad Ibrahim, Esosa Adah Gerri Wilson, Michelle Tucci, and Ham Benghuzzi
University of Mississippi Medical Center, Jackson, MS 39216

Studies have shown that alendronate plays a major role in maintaining bone density and decreasing bone breakdown. Because of these effects, alendronate is used in the treatment of osteoporosis. The purpose of our experiment was to evaluate osteoblast cells in the presence of alendronate and to evaluate osteoporotic bone of animals that were given the drug for a period of eight weeks. In vitro, our results showed that the effect of alendronate on osteoblasts was dose dependent. Alendronate at a dose of 10^{-4}M significantly decreased cell numbers for the duration of the experiment, while a lower dose of drug (10^{-7}M) had no effect on cell number. In a second set of in vivo experiments, ovariectomized rats were treated with a physiological dose of alendronate, 0.025 mg/day (6.25×10^{-4} M), for 28 days. After 28 days of treatment femurs were harvested, fixed in formalin, decalcified, paraffin embedded, sectioned, stained and evaluated histologically. The evaluation showed no significant change in osteoblast or osteoclast number; however, there was an obvious size difference in both the osteoblasts and osteocytes. The data suggest over time the therapeutic dose of alendronate may directly affect the osteoblast cells which may ultimately effect bone strength.

P6.05

THE EFFECTS OF PLATELET RICH PLASMA ON DEGENERATING INTERVERTEBRAL DISCS.

Alicia Benjamin, Christina James, Michelle Tucci, Joseph A. Cameron, and Ham Benghuzzi
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Platelet-Rich Plasma (PRP) was first discovered in the 1970s. PRP is a substance that plays a role in blood clotting and wound healing. PRP consists of plasma that is rich with platelets and is injected for inflammation and pain relief. In our investigation we studied the use of PRP during the healing process of degenerative disc in animal models over a period of time. The objective of this study is to analyze the early and late phase effects of platelet-rich plasma (PRP) injection into and around the damaged intervertebral disc using an animal model. The L4-L5 intervertebral disc of 21 adult Sprague-Dawley rats was injured with a 21-gauge needle. Specimens received an immediate injection of PRP, a delayed injection of PRP, or no further intervention (sham). MRI was performed for a control at time 0 and each group at 4 weeks post injury. Three specimens were collected at 2 and 4 weeks post PRP injection, as well as 2 sham and 2 controls. Each disc was sectioned followed by histolopathological analysis. **RESULTS**: The sham group had clear degenerative changes with loss of organizational structure, empty space, fibrous tissue, and inflammatory cells. The PRP treated groups had fibers that were damaged with some empty spaces and inflammatory cells. However, there was maintenance of the ring structure and the nucleus appeared to have a healthy central portion. Overall, the PRP treated group retained more normal morphologic features, contained fewer inflammatory cells, and did not appear as damaged on MRI. The disk height was significantly different in the sham and immediate injection group at the 4 week interval.
CONCLUSIONS: The needle puncture technique is an effective method for creating a degenerative disk model. The administration of PRP has a protective effect on damaged disks and decreases the amount of inflammation in the acute and delayed injection settings. However, the greatest effect is noted with earlier injection.

O13.07

10:45 ANALYZING HETEROTROPHIC MICROBES IN DIRECT ECOLOGICAL COMPETITION WITH HARMFUL ALGAL BLOOMS (HABS) IN MISSISSIPPI WATER WAYS

Wellington Ayensu[1], Padmanava Dash[1], Daniel Kibet[2], Winny Tanui[2], Joyce Chumo[2], Marlon Flowers[2], Julius Ikenga[2], James Pinckney[3]
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Lakes Enid, Grenada, Sardis and the Ross Barnett Reservoir are among the main water sources that cater for the utility demands of over one million population of Mississippi State. These bodies of water essentially serve as house and

recreational resources. Due to seasonal introduction of high nutrients from neighboring rivers and agricultural run-offs they face periodical challenges from invading groups of heterotrophic bacteria (HB) that accompany harmful algal blooms (HABs). This negatively impacts the aquatic ecosystem resulting invariably in undesirable environmental outcomes. Our objective was to elucidate the types and levels of harmful micro-organisms that can pose health hazard as well as environmental pollutant in these lakes. We seek to understand the source as well as any association between and within cyanobacterial algal blooms and their phycotoxins that are frequently seen in equilibrium niche with seasonal blooms of HB that pose health hazards for fish, animals and humans. Our findings from membrane filtration technique indicated the presence of total Coliforms, a mixture of fecal enterococci, Streptococci and Staphyloccoci. Regression analysis of levels of Coliforms versus physicochemical properties such as turbidity, pH, temperature, Dissolved Oxygen (DO), and salinity conditions revealed no significant correlation. An innate complex state of imbalanced equilibrium within the biomes seems to exist. These results affirm that employing multiple methods of bacteria source tracking "toolbox" can be one of the effective means of detecting environmental pollutants in water bodies.

BACTERIAL *Vibrio* POLYCYCLIC AROMATIC HYDROCARBON DEGRADATION

Samantha Allen[2], Hang Nguyen[3], Adrieene R. Flowers[1], Kimberly J. Griffitt[1], Marcia L. Pendleton[1], Jay Grimes[1]
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This project was made possible through the support of Mississippi IDeA Network of Biomedical Research Excellence. The purpose of this study was to pursue experimental data on *Vibrio*, to determine if they are able to metabolize carbon from PAH (Polycyclic Aromatic Hydrocarbons). PCR Genomic DNA Extraction was performed on eight *Vibrio* strains. Gel electrophoresis performed on annealed samples gave negative results for the targeted 78bp region. A mineral salts agar made with Phenanthrene/Naphthalene was developed to isolate the carbon source and innoculated with bacteria. Results of bacterial growth from this experiment were confirmed using a staining process and photographic microscopy. Additionally over a five consecutive day period, Photospectrometry measured the concentration of bacteria in a liquid medium using Phenanthrene/Naphthalene as the sole carbon source. The plate/liquid results concluded that there is evidence to continue PCR on the *Vibrio* strains. It has been shown that, *Vibrio* population increases when there is an abundance of hydrocarbon in the environment. Bioremediation of carbon removal will help reduce the use of chemicals that are currently employed for that purpose. This study indicates that with further research, *Vibrio* might prove to be an effective mechanism for the reduction of unwanted carbon in the environment, such as those from man-made oil spills.

P3.12

YFDW AND YFDU ARE REQUIRED FOR OXALATE-INDUCED ACID TOLERANCE IN *ESCHERICHIA COLI*

Karen Ezelle, John McAfee, Cory Toyota
Millsaps College, USA

E. coli has several mechanisms for surviving low pH stress. We report that oxalic acid, a small chain organic acid (SCOA), induces a moderate acid-tolerance response (ATR) under two conditions. Cells adapted at pH 5.5 with 50 mM oxalate and subsequently challenged in minimal medium at pH 3.0 demonstrate increased surivival. In addition, there is also a significant protective effect when cells are challenged in the presence of 25 mM oxalate at pH 3.0. We report that the enzymes YfdW, a formyl-CoA transferase, and YfdU, an oxalyl-CoA decarboxylase, are required for the adaptation effect, but are not necessary the protective effect during challenge alone. The mechanism is not yet understood, but we demonstrate this oxalate-dependent ATR is not affected by Ca2+ depletion.

O2.06

10:15 IMPACT OF CALCIUM SIGNALING ON OCCIDIOFUNGIN ACTIVITY

V.A. Graham[1], D.M. Gordon[2]
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Occidiofungin is cyclic glycol-lipopeptide isolate from Burkholderia contaminans MS14. Occidiofungin has fungicidal properties and is stable against a variety for extreme conditions. The biological target of this antifungal is unknown. Recent data has shown that occidiofungin triggers activation of the cell wall integrity pathway, suggesting that the antifungal may cause cell membrane stress. In fungi, membrane stressor has been shown to induce an intracellular calcium signaling cascade, upregulating genes involved in various cellular processes. Interestingly, the bioactivity of azole antifungals have been shown to

be modulated by extracellular calcium levels. Given that occidiofungin exposure also induces a cell membrane stress response, we investigated the impact of calcium signaling on occidiofungin bioactivity. To this end, we determined the minimum inhibitory concentration (MIC) of a wild type strain of Saccharomyces cerevisiae grown in YPD, and YPD supplemented with CaCl2 or the Ca2+ chelator, EGTA. After 24 hours, the MIC for cells grown in YPD was 0.125 µg/mL. In the presence of CaCl2, cells had a two-fold higher MIC value while in the presence of EGTA, cells dephosphorylation of the transcription factor Crz1p. To determine whether calcium mediated resistance to occidiofungin was though Crz1p, we performed MIC assays on a Δcrz1 deletion mutant. MIC values were identical to wild type, suggesting that the calcium response to occidiofungin may be though a different cellular pathway. The importance of calcineurin and its componenets in the resistance to occidiofungin are currently under investigation.

P6.07

THE EFFECT OF SUSTAINED DELIVERY OF DEMINERALIZED BONE MATRIX PROTEIN IN THE FEMALE RAT

Octavia Ingram, Michelle Tucci, Zelma Cason, and Ham Benghuzzi
University of Mississippi Medical Center, Jackson, MS 39216

P13.02

1:15 DETECTION AND QUANTIFICATION OF HARMFUL CYANOBACTERIAL BLOOMS IN LAKE GRENADA, MISSISSIPPI, USING FIELD AND SATELLITE DATA

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Harmful algal blooms (HABs) are phytoplankton bloom events involving toxic or other HAB's negative impacts to other organisms. Main objective of this study was to quantify and analyze HABs in Lake Grenada, Mississippi, USA using field and satellite data. Time-series of satellite data from several satellite sensors were first processed to generate true color images of phytoplankton present in Lake Grenada. Medium Resolution imaging Spectrum (MERIS), Moderate Resolution Imaging Spectroradiometer (MODIS) and Sea-viewing Wide Field-of-view Sensor (SeaWiFS) were used to exploit large amount of data to support mapping of phytoplankton blooms. Field campagns were conducted around noon targeting the time of satellite overpass and includes collection of water samples in clean Nalgene bottles, *in situ* analysis of water quality using a portable Hanna Instrument and *in situ* remote sensing reflectance measurements using a Geophysical and Environmental Research (GER) 1500 spectroradiometer. High Performance Liquid Chromatography (HPLC) analysis showed that cyanobacteria, cryptophytes, euglenophytes and diatoms were the dominant algal groups present. Testing for phycocyanin (PC), Colored Dissolved Organic Matter (CDOM), Suspended Particulate Matter (SPM), hepatotoxin, and microscopy were also conducted. Absorption coefficients of total particulate, phytoplankton and non-algal particulate matter (NAP) were also measured using the quantitative filter pad technique (QFT). Retrospective true color satellite images were positive for phytoplankton bloom events in Lake Grenada. Chlorophyll *a* concentrations were higher towards the southwest portion of the lake, which signifies higher concentration of phytoplankton in that region. A positive hepatotoxin analysis was detected in the lake. This study certainly documents that Lake Grenada has a HABs problem.

O4.05

10:15 PARTIAL ELUCIDATION OF THE LIFE HISTORY OF TWO PARASITIC FLUKES (DIGENEA: BUCEPHALIDAE), ONE FROM THE PASCAGOULA RIVER, AND ONE FROM INSHORE WATERS OF COASTAL MISSISSIPPI

Lynnae Manuel, Stephen Curran
University of Southern Mississippi, Ocean Springs, MS, USA

The Bucephalidae Poche, 1907 is family of aquatic parasitic flukes (Digenea) consisting of approximately 235 species in 22 genera worldwide. Bucephalids have complex life cycles, with early larval stages parasitic in bivalves, and subsequent larval stages parasitic in the flesh of small fishes. Flukes almost always mature in the gut of piscivorous fishes. Digenean taxonomy is based on features present in adult worms. Larval stages bare little resemblance to their adult forms. Consequently, larval

stages encountered are not identifiable using conventional techniques. Our study uses molecular tools to match larval stages of two species of bucephalids with their adult stages in order to more accurately assess their roles in the environment. We amplified ribosomal DNA (rDNA) from two species of adult worms from 4 fishes, and larval worms from a variety of fishes and a bivalve in the Pascagoula River and associated estuary. Resulting rDNA sequences were aligned and those from adults were compared with those from larval stages. Adult worms representing *Rhipidocotyle lepisostei* lived as adults in 3 species of gars in the Pascagoula River and estuary. Associated larval stages of this species occurred in 4 species of fishes. The bivalve host remains unknown. Adult and larval worms representing *Paurorhynchus hiodontis* lived in the body cavity and liver respectively, of the mooneye fish in the Pascagoula River. The associated early larval stage of this species was found in a unionid bivalve, *Lampsilis teres*. This represents the only species of bucephalid known to have a truncated, 2-host life cycle.

P6.01

THE EFFECTS OF NEUROPEPTIDE Y ON OSTEOBLAST AND OSTEOCLAST CELLS LINES

Kierrariel Mitchell, Simeyon Butler, Gerri Wilson, Michelle Tucci, and Ham Benghuzzi
University of Mississippi Medical Center, Jackson, MS 39216

Neuropeptide Y (NPY) is a 36-amino acid neuropeptide that acts as a neurotransmitter in the brain and in the autonomic nervous system. In the autonomic system it is mainly produced by neurons of the sympathetic nervous system and serves as a strong vasoconstrictor and also causes growth of fat tissue. Recent evidence suggests NPY serves as a neuronal regulator in bone remodeling. Studies of neuropeptide Y (NPY) knock-out mice show reduced bone formation, suggesting NPY directly affects bone cells. The purpose of this study was to evaluate the role of NPY (concentrations 0.1×10^{-9} (low), 0.2×10^{-9} (medium), and 0.5×10^{-9} (high)) on osteoblast and osteoclast cells in vitro for periods of 24, 48 and 72 hours. Our results show that NPY did not have a direct effect on osteoblast cells but showed enhanced nitric oxide production by osteoclast cells. According to our findings, osteoclast cell numbers were decreased as early as 24 hours and remained depressed through 72 hours of culture. Osteoclast cellular nitric oxide levels were elevated after 24 hours and remained elevated for the duration of the study in all three doses of treatment. The concentrations of NPY used in this study were consistent with levels of NPY found in control (0.1×10^{-9}) intact female animals and ovariectomized (0.2×10^{-9}) rats with evidence of osteoporosis. Our data suggest a direct stimulation of osteoclast cells, which is consistent with evidence in the literature suggesting NPY increased oxidative burst in rat peritoneal macrophages at similar doses. Additional in vivo studies are needed to address the changes in osteoclast nitric oxide production and its relationship to bone remodeling in pathophysiological states of bone loss.

P6.16

SCREENING DISTRESS AMONG CANCER PATIENTS BY STUDY THE NUTRITIONAL PROBLEMS USING DISTRESS THERMOMETER SCALE AND PROBLEM CHECKLIST

Fatma Mohy El-Din[1], Maggie Clarkson[2]
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Cancer is a major public health problem in the United States and in many other countries. Treatments of cancer have practical, emotional, spiritual, and physical problems. All cancer patients experience some level of distress associated with the diagnosis and treatment of the disease. This study explores cancer-related distress using screening tools such as Distress Thermometer (DT) and Problem List (PL) from the National Comprehensive Cancer Network (NCCN). The DT tool is a 0-10 scale where 0 = no distress and 10 = severe distress. The PL is a complete checklist that identifies practical, family, emotional, spiritual/ religious, and physical, problems. A total of 32 adult cancer patients completed the DT and Pl questionnaires prior to receiving their first dose of radiation therapy. The study sample had a mean age of 60 years (range, 37-74 years) and included 15 females and 17 males. There are 22 (69%) of the patients are white and 10 (31%) are black. The three most common cancer sites included lung involving 9 patients (28%), breast involving 7 patients (22%), and 5 patients with gastrointestinal sites (16%). Seventy-five percent of participants received both radiation and chemotherapy as cancer treatment while 25% of the sample received radiation treatment only. The aim of this study was to identify patients who have significant distress that need support and psychosocial care. Results of the study suggest that distress assessment in cancer patients using these tools supports identification of contributing factors and referral for assistance to the appropriate health care team member.

P6.17

PROBLEMS RELATED DISTRESS AMONG CANCER PATIENTS PARTICIPATING IN SCREENING PROGRAM

Fatma Mohy El-Din[1], Maggie Clarkson[2]

[1]Cooperative Intern Program between the Mississippi Gulf Coast Community College—Jackson County Campus Biological Science Students, Gautier, MS 39553; the National Aeronautics and Space Administration,, Gautier, MS, USA, [2]the Singing River Hospital System, the Regional Cancer Center, Pascagoula, MS, USA

Distress is an unpleasant experience of an emotional, psychological, social, or spiritual nature that interferes with people's ability to cope (National Comprehensive Cancer Network). Many studies have looked at distress levels in cancer patients. The Institute of Medicine (2007) recommends psychosocial screening for all cancer patients to improve the quality of care. The purpose of this study was to identify how the distress has the greatest impact on patients' health. A cross-sectional group of 100 patients of mixed cancer diagnosis who participated in a screening program asked to rate the severity of 36 problem-related distress items. The results indicated that screening data can be used to inform programs, improve resources designed to reduce distress in cancer patients.

P6.27

THE EFFECTS OF BLACKSEED OIL, THYMOQUINONE, AND EGCG ON TRYPANOSOMA LEWISI INFECTED RATS

Andrew Sinclair, David Spencer, Isaiah Tolo, Jizong Liang

Belhaven University, Jackson, MS, USA

Trypanosoma lewisi is a nonpathogenic blood parasite that is related to the causative agents of human African sleeping sickness. In this study blackseed oil; its active constituent, thymoquinone; and a catechin found in tea, EGCg; were used to determine their effect on levels of parasitemia. The rats were divided into four experimental groups and one control group. The experimental groups were given doses of the compounds every other day while parasitemia was monitored via microscope counts. ANOVA statistical analysis showed no significant differences between the groups though the combined treatment group of thymoquinone and EGCg showed the highest parasitemia while the thymoquinone group alone had the lowest parasitemia.

P6.28

GENETIC POPULATION STRUCTURE AND DISEASE MANIFESTATION OF TRICHOMONAS VAGINALIS

David Spencer, Isaiah Tolo

University of Mississippi Medical Center, Jackson, MS, USA

Trichomoniasis is the most common non-viral sexually transmitted disease worldwide. It is associated with numerous pregnancy complications, such as tubal factor infertility, still birth, and pre-term birth, as well as causing increased susceptibility to other sexually transmitted diseases such as acquired immune deficiency syndrome (AIDS). The causative agent for Trichomoniasis is Trichomonas vaginalis, a parasitic protozoan that inhabits human vagina and urethra. This study sought to increase the data set for ongoing research into the impact of genetic population structure on disease manifestation and virulence. Sections of seven “housekeeping” genes were sequenced using multilocus sequence typing (MLST) and the results categorized on phylogenetic trees. Complete sequences of eighteen additional isolates were obtained from this work and added to the growing data set.

P6.31

CHRONIC ETA RECEPTOR BLOCKADE PREVENTS THE PROGRESSION OF RENAL INJURY IN DIABETIC DAHL SALT-SENSITIVE RATS

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[1]Tougaloo College, Tougaloo, MS, USA, [2]Department of Pharmacology, University of Mississippi Medical Center, Jackson, MS, USA

The endothelin (ET) system has been shown to play an important role in the development and progression of diabetic nephropathy (DN) via an ETA receptor mediated inflammatory response. Tumor necrosis factor-alpha (TNF-α) is inflammatory cytokine that has been used as a marker and predictor of chronic renal disease. Preliminary studies from our laboratory indicate that the induction of diabetes in Dahl salt-sensitive (SS) rats promotes the development DN similar to patients with diabetes that is associated with an increase in ET-1 excretion. Therefore, the present study examined whether

chronic ETA blockade with ABT-627 prevents the progression of renal injury in diabetic SS rats with pre-existing renal disease by decreasing renal TNF-α levels. Nine week-old SS rats were treated with streptozotocin (STZ, 50 mg/kg, i.p.) to induce diabetes. After 3 weeks of STZ treatment, proteinuria increased to 375±74 mg/day. The rats were then separated into two groups: (1) vehicle (drinking water) and (2) ABT-627 (5mg/kg/day). After 6 weeks of ABT-627 treatment, proteinuria decreased by 22% in diabetic SS rats versus vehicle treated rats without any changes in arterial pressure (289±17 vs. 371±30 mg/day). The expression of the TNF-α signaling pathway in the renal cortex was significantly reduced in ABT-627-treated diabetic SS rats compared to the values observed in vehicle treated rats. These findings indicate that the prevention of progressive proteinuria with chronic ETA blockade is associated with a decrease in the renal TNF-α pathway.

ADVANCED CT IMAGE ANALYSIS OF DIFFUSE LIVER DISEASE

Katherine Thaggard[1], Cody Branch[2], Daniel Carson[2], Haowei Zhang[2], Richard Hosch[2], Haley Clark[2], Seth Lirette[3], Michael Griswold[3], Andrew Smith[2]

[1]Mississippi College, Clinton, Mississippi, USA, [2]University of Mississippi Medical Center, Department of Radiology, Jackson, Mississippi, USA, [3]University of Mississippi Medical Center, Center for Biostatistics and Bioinformatics, Jackson, Mississippi, USA

Objective: Accurate staging of liver fibrosis requires a liver biopsy, which is invasive. Our goal is to develop new CT image analysis techniques to noninvasively stage hepatitis C virus (HCV) liver fibrosis/cirrhosis and follow response to therapy. The specific objective is to associate total and segmental liver volumes measured from CT images with the stage of HCV liver fibrosis/cirrhosis.

Methods: In this IRB-approved HIPAA-compliant retrospective pilot study, patients with various stages of HCV liver fibrosis/cirrhosis were included (N=87). Total and segmental liver volumes were measured using thick (3-5mm) and thin (0.6-2mm) slice liver CT images with Tera Recon Cloud (3D volumetric software) while blinded to the stage of liver disease. ANOVA-F test was used to assess differences in measurements across liver fibrosis stage. A Spearman Rank test was used to assess the correlation of thick versus thin slice measurements.

Results: Left lateral segment volume to total liver volume (LLSV:TLV) ratio was associated with the stage of liver fibrosis for measurements obtained from both thick and thin slice CT images (t-test, p=0.0019 and 0.0021, respectively). A higher LLSV:TLV ratio was associated with higher stage fibrosis/cirrhosis. TLV was not associated with the stage of liver fibrosis. There were high correlation coefficients between thick and thin slice images for measuring TLV (R=09921), LLSV (R=0.9435), and LLSV:TLV ratio (R=0.9487).

Conclusion: Volumetric liver measurements from CT images (specifically LLSV:TLV ratio) are associated with the stage of HCV liver fibrosis/cirrhosis. Both thin and thick slice CT images can be used to reliably quantify liver volume measurements

P13.03

1:30 THE EFFECTS OF A SUBLETHAL DOSE OF BOTULINUM SEROTYPE E ON THE SWIMMING PERFORMANCE OF CHANNEL CATFISH (*ICTALURUS PUNCTATUS*) FINGERLINGS

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Visceral toxicosis of catfish (VTC) is a disease of cultured channel catfish **(*Ictalurus punctatus*)** in the MS. Delta shown to be associated with botulinum serotype E (BoNT/E). Botulinum causes weakness and paralysis of skeletal muscles including those involved in swimming. This study attempted to determine if sublethal exposure to purified BoNT/E caused reductions in swimming performance and metabolism of channel catfish. Catfish swimming performance was assessed on 20 stocker channel catfish (mean weight 62.35 ±2.5 g) with 10 control fish and 10 fish injected intracoelomically with a sublethal dose of BoNT/E. Individual catfish were acclimated in a Blazka type swim chamber for 17 hours prior to swimming (water temperature ~28°C, dissolved oxygen 7 - 4 mg/L). A critical swimming speed (Ucrit) protocol was used and dissolved oxygen and temperature were monitored and used to calculate metabolic rate and cost of transport at each test speed (10-70 cm/s). There was a statistical difference between the Ucrits (p = 0.0034), but no differences were found between the metabolic rate (p =0.69) or cost of transports (p=0.67) between the control and BoNT/E groups. There was a difference in the cost of transport at the various speeds (range: 10-70 mcm/s) tested (p<0.0001). These results indicate that botulinum E interferes with the swimming abilities of the catfish which could contribute to the mortality from VTC by making the fish more susceptible to predation.

P6.03

SUSTAINED RELEASE OF MANNITOL FROM TRICALCIUM PHOSPHATE DRUG DELIVERY DEVICE

Zack Watson[1], Courtland Brown[2], Michelle Tucci[2], and Ham Benghuzzi[2]
[1]Mississippi State University and [2]University of Mississippi Medical Center, Jackson, MS 39216

Mannose, an isomer of glucose, is thought to aid in the healing of certain tissues, including tendons, when directly applied to the affected area. Sustained delivery of Mannose, or closely related sugars, is believed to substantially aid in the repair process and quality of certain tissues compared to those tissues treated directly. In this experiment, Mannitol, a sugar similar to Mannose, was encapsulated in fifteen porous, ceramic drug delivery devices of which three were shams, six were filled with 0.05g Mannitol, and six with 0.1g Mannitol. A delivery profile was found after soaking the capsules in sterile PBS for one week. The concentrations of released Mannitol were checked each day at noon. A graph of the concentration data did reveal a sustained release pattern with the sham showing no delivery, the 0.05g Mannitol showing a delivery of 3 micrograms/day over seven days, and the 0.1g Mannitol showing 4.5 micrograms/day over seven days. It was found that the capsules containing 0.05g Mannitol released 21 micrograms over the seven day period and the capsules containing 0.1g Mannitol released 31.5 micrograms over the seven day period. This shows that doubling the dosage does not necessarily mean doubling the amount delivered per day; rather, an increased dosage would be able to deliver a slightly larger amount for a longer period of time than the smaller dosage. This data shows that the device was successful in achieving a sustained delivery pattern. Subsequent tests on cells and later on larger, more complex models should be carried out to reveal the effects of this sustained release on living organisms.

P6.04

THE EFFECTS OF MANNOSE 6-PHOSPHATE AND MANNITOL ON MCCOY FIBROBLAST CELLS

Zack Watson[1], Courtland Brown[2], Michelle Tucci[2], and Ham Benghuzzi[2]
[1]Mississippi State University and [2]University of Mississippi Medical Center, Jackson, MS 39216

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P6.06

PLATELET-RICH PLASMA EFFECTS ON HEALING TISSUE INTERFACES: HISTOLOGICAL ANALYSIS IN A SPINAL DECOMPRESSION MODEL

Megan Williams, Michelle Tucci, Zelma Cason, and Ham Benghuzzi
University of Mississippi Medical Center, Jackson, MS 39216

Epidural fibrosis is thought to be an important factor in failed back syndrome. Fibrotic scar formation over the dura mater and around nerve roots following decompression surgery is thought to be the source of continued insult to these structures. Iatrogenic soft tissue trauma at the operative site is the cause of this fibrosis. While minimally invasive techniques have evolved to limit the degree of soft tissue trauma, it is ultimately unavoidable. Platelet-rich plasma (PRP) is an autologous product derived from whole blood containing a high concentration of platelets. Depending on the method used to derive the PRP the final product contains a variable concentration of platelets, white blood cells and other fractions of whole blood. These platelets release powerful growth factors as well as other signaling molecules. Preparations of PRP have been shown to affect the local inflammatory response and enhance healing in certain applications. Specific emphasis has been placed on the

ability of PRP to promote tissue healing without formation of scar tissue, a desirable result in some situations. This phenomenon likely occurs through platelet modulation of macrophage activity during the inflammatory phase of healing and subsequent growth factor enhancement of the proliferative and remodeling phases. Our objective was to evaluate the effect of PRP on local inflammation and fibrosis post-operatively in the setting of laminectomy for spinal decompression. Our results show preservation of the disc in the PRP treated group compared with Sham treated animals. In addition, we found significant increase in the muscle bone attachment in the PRP treated group compared with both control and sham treated animals after eight weeks of treatment. Our results indicate that PRP has significant growth factors that contribute to re-establishing an interface between the muscle and bone as well as provide nutrients to sustain the disc. Additional studies are needed to evaluate the long term effects on the tissue response surrounding the nerve.

P2.04

EVOLUTION OF THE MAMMALIAN CSH/GH CLUSTER

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The human Chorionic Somatomammotropin Hormone 1 and 2 (CSH1, CSH2), Chorionic Somatomammotropin Hormone-like 1 (CSHL1), and Growth Hormone 1 and 2 (GH1, GH2) are a group of closely related genes involved with the regulation of metabolic processes associated with growth. CSH1, CSH2 and CSHL1 are preferentially expressed in the placenta, whereas GH1 and GH2 play a key role throughout development. GH1 and GH2 promotes cartilage growth in children, stimulates production of insulin like growth factors, and carries out various metabolic functions in adults including increasing calcium retention, promoting the lysis of fat cells, and reducing the liver uptake of glucose. These genes are located in close proximity to each other, organized in a cluster known as the CSH/GH cluster. Most mammals possess a single gene in this cluster, whereas this gene family has expanded in primates, particularly in humans, which have 5 genes in the cluster. The purpose of this project is to use the tools of bioinformatics and comparative genomics to better understand this expansion.

BASE PAIR ABSTRACTS 2013

All Base Pair Abstracts will be presented on Thursday February 21, 2013 in the Health Science Division from 1:15-4:15 pm

P6.03

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P6.19

DIGITAL IMAGING TO MEASURE WOUND HEALING

Courtland Brown, Ham Benghuzzi, Michelle Tucci, Gerri Wilson, Bennie Harris, Drew Hildebrandt
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Two-dimensional wound measurement is a convenient way to assess healing. Length and width are used to estimate the wound surface area. Measurement over time helps in evaluating the wound progression or regression and the effectiveness of treatment regimes. Several techniques can be used to measure the wound. One method uses the length and width measurements to obtain the area in squared centimeters. One problem with this technique is the wounds are not perfect squares or rectangles so the measurements of the wounds are not accurate, and the estimated areas are greater than the actual area. Other techniques include tracing the wounds and using a metric grid to count the number of square centimeters within the wound perimeter. This is a more reliable method, but it can introduce discomfort or can disrupt the healing process of the wounds. We attempted to use a computerized wound measuring technique. A digital photograph of the wound was uploaded into the NIH image J program to determine the ease of calculating changes in wound during healing. Wounds were created surgically and followed at day 1, 7 and 14. Digital pictures of the wounds and a scale at the same magnification of the pictures were taken and uploaded into NIH image J for evaluation. Our results show excellent reproducibility with this system in determining changes in the wound bed with time. One major advantage of this system is the wounds are not disturbed by photographing whereas other measurements direct contact with the wound is required.

P6.20

MODIFIED INFLUENZA VIRUS FOR USE IN TRANSGENIC THERAPIES

Graeme Campbell[2], Stephen Stray[1]
[1]*University of Mississippi Medical Center, USA,* [2]*Murrah High School, USA*

The object of this study is to create through PCR amplification and mutagenesis expression plasmids containing modified Influenza A hemagglutinin (HA) and Nonstructural Segment (NS) genes. These modified plasmids will be used in the viral rescue of a novel influenza A virus. The HA gene is modified via PCR amplification which should create a segment encoding a "headless" HA protein. Headless HA diminishes influenza's ability to bind and infect normal human cells. The NS gene is modified via mutagenesis to prevent expression of the NS-1 protein. Lack of NS-1 in influenza viruses has previously shown to reduce influenza infection of normal cells. The plasmids are first modified by either PCR or mutagenesis reactions and then grown up in *E. coli* cultures. Promising cultures are sequenced. Thus far potential candidates have been selected in both modification groups and are currently undergoing off site DNA sequencing to verify that the modifications were successful. (Research Supported by the Howard Hughes Medical Institute)

P6.14

THE GEOGRAPHIC DISTRIBUTION OF MAMMOGRAPHY RESOURCES IN MISSISSIPPI

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Breast cancer is the most frequently-occurring cancer and the second-leading cause of cancer death in women. Since 1990, breast cancer mortality rates have steadily declined in the U.S.A. due to the combined use of screening mammography and adjuvant therapy. However, improvements in survival have not been uniform in all populations and in all geographic regions. Despite having lower incidence rates for breast cancers, African-American women die from these diseases at higher rates than do Caucasian women. Because of the profound impact of population-based disparities on Mississippi's overall breast cancer control outcomes, we investigated whether the geographic distribution of mammography resources affects breast cancer incidence, staging and/or mortality. We used Geographic Information Systems (GIS) technology to map all mammography facilities in Mississippi and the surrounding states. Publicly-available population characteristics available through the U.S. Census Bureau, and breast cancer statistics available through the Mississippi Cancer Registry, were geocoded into this map. The geographic distribution of mammography resources primarily correlates with population densities and major traffic arteries in Mississippi. The relationships between cancer outcomes and mammography resources are complex, and must be interpreted in the context of other demographic characteristics. Our results may be useful in identifying counties where breast cancer education and screening programs should be modified or intensified.

P6.13

SURFACE CHARACTERIZATION OF POLYPEPTIDE-POLYELECTROLYTE CONJUGATE COATINGS FOR CELL CULTURE

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[1]Murrah High School, Base Pair Program, Jackson, MS, USA, [2]Biomedical Materials Science, University of Mississippi Medical Center, Jackson, MS, USA

In order to study and treat liver diseases such as non-alcoholic fatty liver disease, an improved *in vitro* hepatic cellular model is needed. Elastin-Like Polypeptides (ELPs) are a class of genetically engineered polypeptides that have demonstrated promise as a hepatocyte culture substrate, encouraging adherence and hepatic function from primary rat hepatocytes. Furthermore, hydrophobic ELP molecules conjugated with hydrophilic polyethyleneimine (PEI) induce an accumulation of primary rat hepatocytes into 3D spheroid aggregates in culture. Cells of these spheroids demonstrate increased production and cell function more closely aligned to *in vivo* hepatocytes than do cells comprising traditional monolayer morphology. To extend our knowledge of electrochemical and morphological properties of ELP-PEI conjugates, we characterized hydrophilicity of ELP-PEI conjugates with a range of surface charge distribution by performing contact angle measurements (goniometry) on ELP-PEI coated TCPS surfaces. We also mapped the morphology of these surfaces using atomic force microscopy (AFM). We seek to correlate hydrophilicity, spatial topography, and surface charge distribution with hepatoma cell culture function, adherence patterns, hepatic spheroid size, and hepatic spheroid movement. This work is supported by NSF Award # 1033525.

P6.18

THE CHARACTERIZATION OF RENAL INJURY IN FEMALE T2DN RATS FED A HIGH FRUCTOSE DIET

Brianca Fizer, Tiffani Slaughter, LaTeia Taylor, Richard J. Roman, Jan Michael Williams

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In Type 2 diabetes, studies have shown that males have a greater risk of albuminuria than females. Recent studies from our laboratory have demonstrated that male Type-2 diabetic nephropathy (T2DN) develop severe renal injury while female T2DN rats do not. Moreover, the fasting blood glucose levels are significantly lower in females when compared to male rats. The overall goal of the current project is to determine whether feeding female T2DN rats a high fructose (HF) diet increases their blood glucose levels similar to the levels observed in male T2DN rats. And if so, will the female rats develop renal disease. At 9 months of age, the rats were placed in metabolic cages for an overnight urine sample to measure baseline protein excretion. The rats were then divided into 3 groups: (1) female - normal diet, (2) female - high fructose diet, and (3) male - normal diet. After 5 months of treatment, glucose levels were similar in females when fed either a normal or HF diet (114±15 mg/dL) but significantly lower than males (273±17 mg/dL). However, protein excretion increased to 171±53 mg/day in female T2DN rats fed a HF diet while only increasing to 49±5 mg/day in female T2DN on a normal diet. Protein excretion was similar between males fed a normal diet (267±47 mg/day) and females fed a HF diet. These data indicate that female T2DN rats fed a HF diet develop proteinuria similar to that of their male counterparts without changing glucose levels.

P2.01

MAPPING AND IDENTIFICATION OF A GENETIC MUTATION THAT CAUSES CATARACTS

Zaliya Morris[1], Ashley Johnson[1], Johnathan Lee[1], Ashlyn Harmon[1], Xuexiang Wang[1], Elise Gomez-Sanchez[2], Michael Garrett[1]

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Cataracts are a major cause of blindness. The most common forms of cataracts are age and UV- related and develops mostly in the elderly, while congenital cataracts appear at birth or in early childhood. The Dahl salt-sensitive (SS/Jr) rat is an extensively used model of salt-sensitive hypertension. In the mid 1980's, cataracts appeared in a few animals in the Dahl S colony, presumably the result of a spontaneous mutation. The mutation was fixed and bred to establish the SS/Jrcat substrain. The SS/Jrcat substrain has been exclusively used by a single investigator to study the role of steroids and hypertension. Using a classical genetic analysis approach, we localized the cataract gene with high-resolution to a less than 1 Mbp region on chromosome 9 using an F_1[SS/Jrcat X Spontaneous hypertensive rat (SHR)] X SHR] segregating population. The 1 Mbp region was found to contain only 13 genes, including 4 genes from the γ-crystallin (*Cryg-b,-c,-d,-e)* gene family. Mutations in the many of the γ-crystallins are known to play a role in cataract formation in both humans and rodent models. All of the γ-crystallins were sequenced and a novel point mutation in the start codon (ATGàGTG) of the *Crygd* gene was identified which led to the complete absence of CRYGD protein and the likely cause of cataracts in the SS/Jrcat strain. In summary, the identification of the genetic cause in this novel cataract model may provide an opportunity to better under the development of cataracts, particularly in the context of hypertension.

P11.01

UNDERSTANDING THE LINK BETWEEN REWARD AND OBESITY

Maria Muhammad, Kevin Freeman
UMMC, Jackson, MS, USA

Research suggests that obese individuals are more sensitive to the rewarding effects of food. This experiment was done to understand the difference in reward an obese individual has verses a lean individual for a quantity of corn oil. It was hypothesized that obese rats would work harder and thus value corn oil more than lean rats would. Genetically obese and lean Zucker rats were used in this experiment to test this hypothesis. Rats were tested in a behavioral economics assay, which relates the cost of a reward (number of lever presses required for the reward) to its intake. As the number of lever presses required for corn oil increased, the obese rats maintained their consumption of the reward in spite of higher pricing unlike their lean counterparts. From these results, this experiment confirmed the hypothesis that obese rats would work harder and thus value corn oil more than lean rats would. This also suggests that obesity may be enabled by a heightened sense of value assigned to foods high in fat.

DEVELOPMENT OF A LC/MS METHOD TO QUANTIFY PODOCIN, A POTENTIAL BIOMARKER FOR CHRONIC KIDNEY DISEASE

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[1]*William B. Murrah High School, Jackson, MS, USA,* [2]*The University of Mississippi Medical Center, Jackson, MS, USA*

Chronic kidney disease (CKD) results in significant illness and mortality in the United States. It can progress through several stages with increasing loss of kidney function that ultimately leads to end stage renal disease (ESRD) and kidney failure. Our goal is to develop a liquid chromatography/mass spectrometry (LC/MS) assay to measure levels of important biomarkers of CKD in urine samples. The biomarker we have chosen is podocin, a protein found in specialized cells in the glomerulus of the kidney called podocytes. Since kidney disease results in loss of podocyte function and number, we hypothesize that podocin levels in the urine may be an accurate indicator of kidney disease state. We used database searches to obtain the sequence of podocin and selected candidate peptides to use in our LC/MS method. We confirmed that the peptides chosen had transitions that had been observed in other proteomics studies. We optimized MS conditions and began development of an LC/MS method to be used in the analysis. Standard curves generated for each of the peptides demonstrated appropriate concentration dependence and were found to be suitable for the research project. We are currently performing quality control (QC) measurements to quantify known amounts of podocin peptides in mock sample extracts to eliminate matrix-dependent interferences. We will then proceed with trypsin digests proteins prepared from rats prone to developing CKD. (Supported in part by an award from the Howard Hughes Medical Institute to the Base Pair Program)

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